THE DARK SIDE OF MEDIA

An Interdisciplinary Approach to Elucidate the Persistence of Negative Experiences with the Smartphone in Everyday Life

DISSERTATION

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vorgelegt von

Miriam Bartsch

aus Hamburg

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Erstgutachter: Prof. Dr. Uwe Hasebrink

Zweitgutachterin: Prof. Dr. Katharina Kleinen-von Königslöw

Vorsitzende: Prof. Dr. Kathrin Fahlenbrach

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Don’t get too comfortable with who you are at any given time—you may miss the opportunity to become who you want to be.

—Jon Bon Jovi

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reach my destination. Finally, I want to thank the research participants who contributed their time and insights into their everyday use of media. The project would have never been possible without them.

Similar yet different to other journeys, I believe I have learned and grown in the process of this one. I hope that this thesis contributes toward elucidating our communication habits in everyday life and will present a first step towards a more conscious use of the smartphone. There is still a lot to do. So, although it seems as if I have reached my destination, I am beginning to believe that this might turn out to be merely a stopover—and I am curious about what comes next. I hope, you, too, will never stop wandering in pursuit of knowledge and will enjoy exploring this project with me in the following pages.

Hamburg, December 2021 Miriam Bartsch

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Abbreviations, Symbols, & Acronyms

α	Cronbach's alpha (measure of internal consistency)
APA	American Psychiatric Association
app	application
AU	Auto Use
B	unstandardized regression coefficient (capital beta)
BCa	bias-corrected and accelerated
ß	standardized regression coefficient (beta)
BMPN	Balanced Measure of Psychological Needs Scale
BMI	body mass index
CI	confidence interval
CMC	computer-mediated communication
DSM	Diagnostic and Statistical Manual of Mental Disorders
ΔR^2	delta R^2 is the change in R^2 between two equations or steps in a regression model
df	degrees of freedom
DUI	driving under influence
DV (or, Y)	dependent variable
EN	Endangerment
ES	Emotional Stress
ESM	experience sampling method
F	*F*-test statistic
FB	Facebook
Figure A	figure that can be found in the appendix
fMRI	functional magnetic resonance imaging
GO	gratifications obtained
GS	gratifications sought
H	hypothesis
ICD	International Statistical Classification of Diseases and Related Health Problems
IR	Interruption
IS	Insignificance
IV (or, X)	independent variable
JustifF	justifications factor one (functional factor)
JustifS	justifications factor two (social factor)
KMO	Kaiser-Meyer-Olkin measure of sampling adequacy
LL	lower limit (of confidence interval)
LoT	Loss of Time
M	mediator variable
MB	Media Bubble
MSA	Measures of Sampling Adequacy
MTurk	Amazon Mechanical Turk, see footnote 19

n	sample size
Neg. Exp. F1	negative experiences factor 1 (adaptation experiences)
Neg. Exp. F2	negative experiences factor 2 (acceleration experiences)
ns	not statistically significant
OK	Overkill
PCA	principal component analysis
p	probability (*p*-value)
r	Pearson product-moment correlation coefficient
RQ	research question
R-squared/R^2	coefficient of determination; also multiple correlation squared (a measure of strength of an association and indicator of variance explained)
SCS-K-D	Brief Self-Control Scale (German version)
SD	standard deviation
SDT	Self-Determination Theory
SE	standard error
SES	socio-economic status
SmaPho	smartphone
SNS	social networking site
SRHI	Self-Report Habit Index
STAI	State-Trait-Anxiety-Inventory
t	*t*-Test statistic
t1, t2, …	point in time of measurement in longitudinal studies, first time = t1, second = t2 (and so on)
Table A	table that can be found in the appendix
U&G	Uses-and-Gratifications Approach
U&G F1	Uses-and-Gratifications needs factor 1, subsuming social interaction and self-presentation needs (referred to as social needs)
U&G F2	Uses-and-Gratifications needs factor 2, subsuming entertainment and relaxation needs (referred to as entertainment needs)
U&G F3	Uses-and-Gratifications needs factor 3, subsuming safety and loneliness needs (referred to as safety needs)
UL	upper limit (of confidence interval)
ULS-8	UCLA Loneliness Scale (short form)
VIF	variance inflation factor
WHO	World Health Organization
WoC	Way of Communication

1 Introduction

Have you ever had a negative experience with media? Do you keep using them, nonetheless? Most people nod as reaction to these questions. But why?—Why would you use a medium again if use is most likely accompanied by negative outcomes? The answer does not come as easy as one might think, because there are presumably multiple reasons—or more precisely, variables—working in concert. The purpose of the subsequently presented empirical research project is to explore these questions.

But first let me ask one more: Which medium did you think of primarily when being asked these questions? Most often, the smartphone comes to mind first. It should come with little surprise then that the mobile device has been associated with these questions in scientific and popular media alike and is often assumed to have changed life as we knew it, too (see e.g., Baym, 2015). In fact, no medium has conquered our everyday life as fast as the smartphone (Gazzaley & Rosen, 2016). Out of 7.77 billion people worldwide, 5.16 billion have used a mobile phone, 4.57 billion had access to the Internet, and 3.81 billion were active on social media just in April 2020, with numbers still continuously increasing (We Are Social & Hootsuite, 2020a, 2020b). In fact, numbers have risen by 13% from 2020 to 2021 with an estimate of now 53% of the world's population being active on social media (We Are Social & Hootsuite, 2021). In Germany[1], 83% of the population uses a smartphone, and messengers such as WhatsApp are the most frequently used daily applications (Bleisch et al., 2019). Moreover, 40% of 18- to 64-year-old German participants (n = 2093) just recently stated that they could not live without their phones (Statista, 2020). Forty percent believing to depend this much on their phones are quite a lot and trends such as "digital detox"[2]; or terms such as "couch potato"[3], also point towards a generally noticed need for distance from (some forms of) media use in our society. This is particularly true for the smartphone as it has become a constant companion for many people (e.g., Vorderer et al., 2017a). Although the adoption of new media has always influenced our way of life (e.g., Baym, 2015), the mobile devices' affordances[4] are as manifold as the

[1] The smartphone penetration rate worldwide is estimated to have reached 78% (cf. O'Dea, 2021).

[2] Detoxing describes the process of abstaining from a toxic or unhealthy substance to get it out of the body and is often used in relation to the withdrawal from alcohol and other drugs. It is used in analogy to this especially with smartphone use, pointing to the notion of an unhealthy amount or form of technology use. The concept is relatively new and has also gained scientific attention in the past few years (see e.g., Syvertsen & Enli, 2019 for an overview).

[3] The term "couch potato" refers to a person who is spending too much time immersed in media (particularly their television, in that case often literally on their couch) instead of in "real life".

[4] Affordances are defined as "the properties of an object (e.g., hammer) or environment (e.g., online chat room) that provide particular opportunities for action" (Bartsch & Subrahmanyam, 2015, p. 340).

assumed detrimental effects of use; and these trends and terms have also entered the scientific literature by now (e.g., Syvertsen & Enli, 2019). Persistent negative experiences with the smartphone are common in everyday life despite such trends. The literature reviewed in Chapter 2 and the findings of this project will exemplify this further.

Not only depict the presented statistics the current smartphone penetration but, and especially in combination with the literature on negative effects (which will be introduced in Section 2.1), stress the relevance of the present and other studies with the intention to elucidate everyday uses and effects, particularly negative ones that are persistently experienced in everyday life. Although studies point to a widespread phenomenon of potentially even clinical relevance, so do the continuously rising numbers of social media users show that use does not seem to decrease despite such negative consequences (Kemp, 2020). Hence, this thesis will address the aforementioned questions and thereby also a current gap in research; that is, analyzing negative experiences in everyday life and the interplay of variables important to explain their persistence. This dissertation project consists of two studies to pursue this endeavor. It is of exploratory nature and will combine a qualitative interview study (in the following called "study I") with a standardized online survey study (subsequently called "study II"), which was developed subsequently under consideration of the findings of study I. Its theoretical base is, furthermore, of interdisciplinary nature to extend the existing scope of research. More precisely, concepts and variables from the fields of communication studies and psychology will be interconnected in this thesis.

Persistent negative experiences with the smartphone can range from perceived stress due to constant availability to the contradictory feeling of less connection to other people despite being connected via this mobile technology (e.g., Dwyer et al., 2018; Utz, 2017; Vorderer et al., 2017a). They can not only affect our psychological but also our physical health; and still unnoticed experiences might exist, too, because most scientific literature has skipped a step. That is, negative everyday experiences with the smartphone are not in focus of most journal articles but instead its possibly "darkest" side is, namely addictions or other mental disorders resulting from use (e.g., Elhai, Dvorak, et al., 2017; Montag, 2018). The reviewed research will show that, aside from addiction (see Section 2.1.1), narcissistic personality disorder, affective, anxiety, and eating disorders as well as stress and sleeping problems (see Section 2.1.2) are often associated with the mobile device and focused on in scientific research, respectively. Section 2.1.3 will introduce not clinically denominated experiences, such as assumed effects on interpersonal relationships and other distractions caused by using the device. It will further be illustrated that ubiquitous everyday experiences are not well represented to date even though

they might set the course towards—also clinically relevant—yet underestimated negative outcomes of smartphone use.

From a communication studies perspective does our use of media usually happen voluntarily to fulfill our individual needs—at least that is what the Uses-and-Gratifications Approach (U&G; Katz, Blumler, et al., 1973) proposes. The seminal approach will be introduced in Section 2.2. It assumes that the user is active and deliberately choosing media, amongst other sources, to satisfy certain needs. The outcomes of media use are generally, as the presented catalogue of needs will exemplify, expected to be positive. However, the so-called "other consequences" of media use (namely negative outcomes) were occasionally regarded within the U&G framework, too, though not extensively (Becker, 1979; Haridakis, 2013; LaRose et al., 2001). If media use is not followed by a gratification, the medium will not be used again, so the assumption of the approach. However, some people manifest permanent dysfunctional patterns of media use that can be found within their media repertoires (for more information on media repertoires see e.g., Hasebrink, 2014; Hasebrink & Domeyer, 2012; Hasebrink & Popp, 2006). So, why does it happen that we experience negative outcomes of smartphone use yet persistently continue to use it, nonetheless? To date, this is a perspective the U&G fails to explain, and literature on addiction and other disorders does approach this question by implying an underlying clinical condition for which a formal diagnosis does not yet exist.

Notwithstanding that the U&G is an invaluable and versatile approach, it lacks explanatory power when it comes to persistent negative consequences of media use, which are not rare in our everyday lives, considering particularly the amount of literature on clinical outcomes of use. Therefore, psychological concepts will be considered, beginning with the Self-Determination Theory (SDT; e.g., Deci & Ryan, 1985; Ryan & Deci, 2000b) which will be introduced in Section 2.3 as it constitutes a fitting extension to the seminal U&G. The SDT is a humanistic theory and, like the U&G, also assumes an actively striving individual yet takes into account negative consequences that might occur when pursuing need satisfaction. Furthermore, the SDT assumes that only the satisfaction of three basic needs is necessary for the well-being and optimal development of an individual. These three are: the needs for autonomy, competence, and relatedness. The latter seems to be of particular importance, also in online settings, as will be delineated in Section 2.3.1 (e.g., Chan, 2018; Ryan & Deci, 2000c). Fear of missing out (FOMO; introduced in Section 2.3.2) on rewarding experiences that others could have, has become a common phenomenon especially among younger social media users, and it is assumed that it stems from a thwarted need for relatedness (Dossey, 2014; Przybylski et al., 2013). Most humans are inherently social beings and the pain of social rejection is just as real as physical

pain (e.g., Eisenberger, 2015). So, it is unsurprising that social anxieties like FOMO exist and drive social actions not just in offline environments. People also have an innate tendency to compare themselves and what they are doing to others. They do this in order to validate their beliefs and abilities (Festinger, 1954). SDT explains this via the need for autonomy. That is, people are actively tending towards growth which can be realized via self-actualization, but for this they need these comparisons to others. However, it might be that comparisons lead to a feeling of dissonance (Festinger, 1957). This can be the case when the subject or object of comparison differs from a person's individual attitudes, desires, or beliefs. The feeling of inconsistency resulting from this juxtaposition is assumed to cause strain, which is why such an undesired result of a comparison should induce some action to relieve the tension. Often, no actual change in behavior can be observed, possibly because people tend to underestimate the influence mass media have on themselves. In fact, research on the third-person effect has shown that people believe to be less prone to negative effects than others (e.g., Davison, 1983; Perloff, 2009). These psychological perspectives on media effects will be introduced in Section 2.3.3. They contribute to explain why persistent negative experiences in everyday life are frequent and use of the smartphone remains the same, nonetheless. Especially FOMO has been found to be an underlying driving force of unhealthy media use, yet behavior change does not follow.

Habits might offer a plausible explanation as to why behavior change does not follow easily though negative experiences are probable and persistently experienced, too. Habit research will, therefore, be introduced in Section 2.4. With 43% of daily behaviors assumed to be performed out of habit (Quinn & Wood, 2005, as cited in Wood, 2019) and 15% of our waking day spent with media (Kemp, 2020), much of our media use is potentially habitualized, too. Even before smartphones became part of our daily routines were 50% of media use derived to take place out of habit (Wood et al., 2002). One paragraph will contrast needs and habits within the framework of the U&G (see Section 2.4.1) and argue that they cannot be the same but that they are potentially located on the same continuum, moreover that many habits have their starting point in the pursuit of need satisfaction. The subsequent paragraph will, furthermore, reveal why the smartphone might pose a special case of media habits (see Section 2.4.2). In short, smartphone use does not fulfill all criteria promoting the formation of a habit. These are: repetition, reward, and a stable context in which a behavior usually takes place. Despite the lacking stable context in use of mobile technology are these habits just as hard to unlearn as others, and they establish quickly, too (e.g., Schnauber-Stockmann & Naab, 2019; Wood, 2019). It will also be discussed that habit and addiction should not be confused with each other

(see Section 2.4.3) even though habitualized media use might lead to more negative experiences. Additionally, it will be illustrated why it is easy to continue using the smartphone despite potential downsides of use. That is, habitualized actions are usually not reflected upon, even though habitual and conscious processes can be mixed with each other, because people are not aware of the triggers and mechanisms involved. They are also used to their routines, so that assumedly emotional acts do not even lead to much arousal anymore once a habit has set in. Moreover, we have learned to like the device and its affordances, as the section will also establish. Therefore, also nonoptimal results of media use might not be reflected upon and respectively continually experienced. Acting out of habit has its benefits, because it makes our daily lives much easier by saving us energy and conscious deliberation. However, behavior that is not in line with our goals can become habitual just as well, thereby making parts of our lives, and especially change of unwanted behaviors, even harder (see Section 2.4.4). Moreover, habits not only take time to form, but they are also relatively resistant to extinction.

Self-control (see Section 2.5) is assumed to be *the* trait of a person with the most potential to, at least, interrupt habitual behavior. But self-control, as researchers supposing a limited strength model argue (Baumeister et al., 1994, 2018; Baumeister & Heatherton, 1996), needs energy and this energy is not indefinite; it can weaken like a muscle, so that this resource is drained at the end of a day full of exercising self-control, and a person becomes more prone to fall back on bad habits in the process (Itzchakov et al., 2018). Section 2.5.1 also delineates the criticism this concept had to face recently but also why the image of a limited resource of self-control should not be discarded just yet. Self-control and habit will be related to each other, and especially a more recently suggested view of self-control, namely effortless self-control (Gillebaart & De Ridder, 2015), will be introduced in Section 2.5.2. This novel perspective offers a plausible explanation for the positive association of high trait self-control and better habits. In short, people with higher self-control possibly lead a more controlled (i.e., routinized, organized) life, and repetition, which is inherent in very structured daily routines, is one aspect important for habits to establish, as mentioned before. Furthermore, those high in self-control tend to implement strategies that make it easier to follow their aspirations, such as, for instance, keeping the phone out of sight to not get distracted while working on something important. This way, they do not actually have to resist temptations but avoid them to begin with and are consequently more successful in their goal-pursuit than people scoring lower in self-control, who have not established such beneficial habits. Self-control failure can also be associated with detrimental effects on the need for competence, as will be outlined in the subsequent segment (i.e., Section 2.5.3) which examines the association of self-control and media use. Smartphones

have become a ubiquitous medium and are, thus, in need of permanent regulation. That is, the device has become a ubiquitous medium and using it has become a norm in our society. Its implementation in daily routines, its frictionless use, and the access to a plethora of opportunities has contributed to its fast adoption and habit formation alike. Moreover, it offers immediate gratifications, and people are assumed to pursue need satisfaction. These inner cues as well as the device's ubiquitous availability and attention-demanding notifications make it even harder to resist its affordances and the respective temptations (Hofmann et al., 2017). Aside from connections to habits and needs, will the section identify the relations of self-control to FOMO, social comparison as well as to negative experiences; and will connect self-control to loneliness, too, which will be introduced in the next part.

The last section of the literature review (that is, Section 2.6) will reveal that loneliness can potentially have life-threatening consequences. Loneliness is a disease, associated with thwarted needs, especially for relatedness, and often fewer skills to establish and benefit from social contacts. So, lonely people are striving to feel connected to others, but they are not necessarily able to satisfy this strongly felt need (see Section 2.6.1). Media could be utilized to counterbalance the detrimental effects of loneliness, but negative effects are often positively associated with loneliness, too (see Section 2.6.2). Problematic use, and especially initially mentioned "addiction" to social media, has frequently been associated with loneliness, leading to the assumption that lonelier people do more often end up reporting negative experiences with the smartphone than people who are better integrated in society.

These inferred connections will be addressed in the subsequently presented two studies. For study I, the U&G framework and the assumption of persistent negative experiences in our everyday smartphone use are the only presuppositions needed to follow the procedure. However, the entire reviewed literature will be referenced to starting with the contextualization of the results. The negative experiences will, accordingly, be explored within the framework of the classic communication studies approach in study I, which will be presented in Chapters 3 to 5. Four research questions (RQ) will be addressed in study I, which are as follows: "What media are negative experiences associated with?" (RQ 1), "Which persistent negative experiences with media are being reported?" (RQ 2), "What is the social context usually like when persistent negative experiences take place?" (RQ 3), and "How are persistent negative experiences justified?" (RQ 4).

Chapter 4 will depict the sampling procedure in Section 4.1 as well as describe the choice to conduct explorative interviews to inquire the four research questions in Section 4.2.

It will also describe the participant characteristics in Section 4.3 and analysis of the interview data in Section 4.4. The results will be reported in Chapter 5 as it will attend each research question sequentially as well as the methods used to approach it, starting with the medium most negative experiences were reported with (see Section 5.1). It will furthermore introduce the extracted persistent negative experiences in Section 5.2, the role of social context of negative experiences in this study in Section 5.3, and the reasons for enduring them persistently despite their detrimental nature in Section 5.4. The results will also be discussed in this segment, so that only a more general discussion can be found in the subsequent section which will also discuss the significance and limitations of the interview study (see Section 5.5). A summary will conclude study I (see Section 5.6).

After this initial assessment of quotidian negative experiences with media utilizing explorative interviews, the respective findings will be connected to the introduced concepts from the field of psychology. To repeat, these are: SDT, FOMO, social comparison, social dissonance, third-person effect, habit, self-control, and loneliness. The classic U&G model will consequently be extended as well as tested in study II, which will be presented in Chapters 6 to 8. The results of study I are in line with the literature on particularly smartphones as being first and foremost associated with negative experiences. Therefore, only social networking applications or sites (e.g., Instagram, Facebook) and messengers (e.g., WhatsApp, Facebook Messenger) designed for communication purposes will be analyzed in study II. The objectives of the study will be outlined, this includes the hypotheses derived from the inferred connections of the variables introduced as well as from the interview analyses of study I (see Section 6.1). The extended model will be presented in Section 6.2. The methods employed to test the hypotheses and the extended model will be outlined then (see Chapter 7) and include the participants' characteristics (see Section 7.1) as well as the measures utilized (see Section 7.2).

The results and discussion of study II (see Chapter 8) represent the core of the present thesis as they combine the results of study I with the initial purpose of this project while employing a comprehensive and standardized design. Smartphone use of the sample and the negative experiences identified in study I as well as their relationship will be analyzed first (see Sections 8.1, 8.2, and 8.3). These analyses will be followed by analysis of the justifications of persistent negative experiences with the smartphone in Section 8.4. The results reported in these sections will also be compared to the findings of study I. Factor analyses were conducted for all scales employed and will be reported in the respective sections of analysis (which are Sections 8.3.3, 8.4.3, and 8.5, to be more precise). Subsequent analyses will follow the structure of the model and the hypotheses will be tested accordingly. So, after the assessment of the

negative experiences and justifications as well as the exploratory factor analyses, will Section 8.6 analyze to what extent justifications explain variance in persistent negative experiences. Section 8.7 will, in nine subsections, extend the scope and analyze the contribution of as well as the interconnections among the remaining variables of the model. The test of the entire model will conclude the analyses (in Section 8.7.9).

Descriptive methodology was employed for analysis of the participants'' characteristics, whereas mostly inferential statistics (i.e., correlation, regression, and mediation analyses as well as *t*-tests) were used for comparison of the results of study I and II as well as to test the hypotheses and the model. Following the explorative style of the project, and thus also study I, the results will be discussed directly within their suitable context. Also corresponding to study I, will I briefly summarize each section but additionally offer four short conclusions to recapitulate on some more substantial parts of analysis in study II. These are the analyses of (1) the negative experiences (see Section 8.3.6); (2) the factors underlying the scales (see Section 8.5.6); (3) the interplay of negative experiences, justifications, and their persistence (see Section 8.6.3); as well as (4) the entire model (see Section 8.7.10). The significance and limitations of study II will be discussed and an outlook for future research will be offered, paralleling the procedure of study I (see Section 8.8). Study II will also end with a comprehensive summary (see Section 8.9).

This thesis will conclude with a reflection upon its contributions and main results, which are summarized in Chapter 9. The chapter also reviews the methodology employed, the generalizability of its findings as well as the advantages of the combination and succession of a qualitative and a quantitative study. It is relatively brief, considering that results have been presented, discussed, and summarized thoroughly for both studies in the preceding sections. However, it will offer three main findings to derive from the project (and to build on in future research). Furthermore, a possible course of action to counteract unwelcome persistent negative experiences will be suggested.

2 Theoretical Framework

In the following, I will first introduce supposedly common negative experiences with media, especially the smartphone, and show that many experiences are precipitantly referred to as mental disorders. The reviewed literature will furthermore indicate that persistent everyday experiences are under-researched though already depicting worrisome incidents which could possibly lead to clinically relevant disorders. Subsequently, the U&G will be introduced, including possible shortcomings as well as reasons for it still being a valued approach and valid for newer media, too. This is particularly true when broadening the scope of the classic model by including concepts from the field of psychology. The SDT, research on FOMO, social comparison processes, social dissonance, third-person effects, habits, and self-control as well as loneliness will be utilized for this endeavor. These approaches will be reviewed as well as related to each other in the subsequent sections.

2.1 Negative Experiences with Media

> I have 422 friends, yet I am lonely. I speak to all of them everyday, yet none of them really know me. (…) I took a step back, and opened my eyes, I looked around, and then realized that this media we call social, is anything but when we open our computers, and it's our doors we shut.
>
> —Gary Turk

The supposedly dark influence of media is a tale as old as media themselves: With the adoption of every new medium by a large group of people came new criticism and fear—fear of change, fear of unknown consequences for known customary ways of life (Baym, 2015). There have always been similar reports in the history of media. For instance, the book once was a medium people thought would bring harm to its readers (Baym, 2015; Fang, 2015) and studies on television derived similar assumptions of the device's adverse effects (Horvath, 2004; McIlwraith, 1998; McIlwraith et al., 1991). Also, change of interpersonal (that is, bi-directional as opposed to unidirectional) communication via mass media was accompanied by suspicion when it became possible to communicate synchronously without being co-present. This has been the case as early as the invention of the telegraph in the 1800s and became even more personal when transmission of sound via landlines was possible (Baym, 2015); and when the telephone eventually entered people's homes, much of the formerly private world was pervaded by a more public one (see also Ling, 2018; Marvin, 1988). Nowadays, especially digital media

tend to cause an ambiguous discourse, as this quote summarizes:

> On the one hand, people express concern that our communication has become increasingly shallow. For many, the increased amount of mediated interaction seems to threaten the sanctity of our personal relationships. For others, new media offer the promise of more opportunity for connection with more people, a route to new opportunities and to stronger relationships and more diverse connections. Both perspectives reflect a sense that digital media are changing the nature of our social connections. (Baym, 2015, p. 1)

This has also been researched as *mediatization*, which describes the ongoing process of a removal of social and spatial barriers as media become ever more integrated into everyday life and have been changing it, respectively (e.g., Krotz, 2012, 2017; Vorderer et al., 2015). Especially the Internet has transformed our lives since it has brought multiple affordances with it. It subsumes the affordances of other (mass) media, such as television, radio, or newspaper, and combines them with new forms of—now online—banking, shopping, or entertainment (e.g., streaming; see for instance Bitkom, 2019b). The smartphone has pervaded daily routines in particular and thereby shifted the known ways of our interpersonal communication (e.g., Krotz, 2012, 2017; Pettegrew & Day, 2015) so that much communication is mediated by this device nowadays. In fact, communication poses the most frequent use (Bleisch et al., 2019; Vorderer et al., 2016; We Are Social & Hootsuite, 2020b). The mobile access to the Internet also has accelerated everyday life since one can get so many things done *on the go* or *in between* and people have learned to depend on these affordances very quickly. So, it is not surprising that research and popular media have caught on to it as well. In addition to its properties as a communication device and the aforementioned affordances, the smartphone is even more versatile: it can serve as a navigation system, camera, or calendar, for instance. The mobility and immediacy of thousands of applications for information, communication, or entertainment alike have helped to integrate it easily and quickly into our everyday life. Moreover, amongst mass media, the smartphone has developed at a spectacular speed. A benchmark of 50 million users has to be reached in order to say that a medium has penetrated society (cf. Gazzaley & Rosen, 2016). According to Gazzaley and Rosen, the radio took 38 years, telephone 20 years, television 13 years, cell phones 12 years, the Internet four years, blogs three years, MySpace (as "the first truly popular social network", p. 104) 2.5 years, Facebook two years and YouTube only 1 year to reach this benchmark "and nearly all major websites and applications that followed—including Instagram, Pinterest, WhatsApp, Snapchat, and others—did so in record time", too (2016, p. 105). Aside from the affordances the mobile device has to offer (see e.g., Faraj & Azad,

2012; Resnick, 2002 for further research on affordances), it has its downsides as well: Research has found that it might be due to an "inability to regulate one's use of the mobile phone" that "negative consequences [follow] in daily life" (Billieux, 2012a, p. 299). Even though the author's recommendation was to follow up on the "various factors and pathways leading to a problematic engagement in one (or more) online activity than to struggle with the need to establish a valid diagnosis of 'Internet addiction'" (Billieux, 2012b, p. 306), most research did, in fact and conversely, engage in research on addiction and other disorders associated with Internet use in general (e.g., Cheng & Li, 2014; Kuss et al., 2014; Young & de Abreu, 2010), smartphone use in particular (Duke & Montag, 2017b; Elhai, Dvorak, et al., 2017; Lin et al., 2016; Rosen et al., 2012), and more specifically, with specific applications or activities associated with the smartphone (e.g., Kwon et al., 2013; Montag et al., 2019; Roberts et al., 2014; Sha et al., 2019). Still, the call for more research to provide a solid base for respectively valid diagnoses remains open.

Since inconsistencies in terminology can often be observed in the existing literature, it should be noted that—no matter the term used (namely, *smartphone*, *mobile device*, or simply *phone*)—I will *exclusively* (unless explicitly stated otherwise) refer to the respective devices characterized by their ability to connect to the Internet and offering the previously mentioned affordances (e.g., installation of various applications, such as WhatsApp, Facebook messenger, or Instagram); as opposed to a *cell phone*, of which some also might be connectable to the Internet, but do not provide quite as many options, let alone the installation of apps, respectively. In the following, I will provide an overview of the most referred to negative "consequences" of smartphone use and thereby point to the continuing importance of everyday experiences as vantage point.

2.1.1 **From Addiction…**

Addiction to substances, such as alcohol or drugs, is precisely defined in the respective manuals, and specific criteria must be met and occur for a defined period of time to make a clinical diagnosis. The respective manuals are: the "Diagnostic and Statistical Manual of Mental Disorders" (5th edition, DSM-5; American Psychiatric Association (APA), 2013) and the "International Statistical Classification of Diseases and Related Health Problems" (World Health Organization (WHO), 2015). The DSM is approved by a national assembly of the American Psychiatric Association whereas the ICD is approved by the World Health Assembly (which means, by the—194 as of 2020 (see https://www.who.int/about)—health ministers of all WHO member countries). Thus, a disorder included in the DSM should be part of the ICD as well

(providing there has been sufficient evidence) but not the other way around. Also, APA and WHO work together and coordinate the manuals. For this reason, I will only refer to the DSM in the following.

To diagnose an alcohol use disorder[5] "a problematic pattern of alcohol use leading to clinically significant impairment or distress, as manifested by at least two (…) [criteria; as shown in Table 1], occurring within a 12-month period" has to be observed (American Psychiatric Association, 2013, p. 490). Much research has been done on other kinds of addictions, which do not involve a substance—since some assume that every behavior can become an addiction (Grover et al., 2013; whereas others argue that this is too broad of an assumption, possibly overpathologizing every behavior; e.g., Panova & Carbonell, 2018). Addictions that are not based on substance abuse are often called *behavioral addictions*, such as "shopping addiction" or, more relevant for this study, "Internet addiction" (James & Tunney, 2017). It must be noted that these kinds of addictions are not yet "included [in the respective manuals] because at the time there is insufficient peer-reviewed evidence to establish the diagnostic criteria and course descriptions needed to identify these behaviors as mental disorders" (American Psychiatric Association, 2013, p. 481) and, "although some behavioral conditions that do not involve ingestion of substances have similarities to substance-related disorders, only one disorder—gambling disorder—has sufficient data to be included in this section [of the DSM-5]" (ibid., p. 586).

Nevertheless, there is a multitude of research on various forms of Internet addiction, and more specifically smartphone addiction, often simply adapting these criteria (Cheever et al., 2018; Cheng & Li, 2014; De-Sola Gutiérrez et al., 2016; Duke & Montag, 2017b; Young & de Abreu, 2010). A prevalence of Internet addiction from 1% up to over 15% has been reported (Cheever et al., 2018). This range implies not only the need for standard procedure (regarding measures, for instance, see e.g., Busch & McCarthy, 2021), but also suggests that the numbers of those simply excessively long or often connected to the Internet, or at least overly dependent in *everyday life*, might be much higher since not everyone will "really" be addicted (yet). As a comparison, not everyone who drinks alcohol is automatically addicted and will be diagnosed with alcohol use disorder. Almost 70% of adult Americans have reportedly consumed alcohol within the past year, but the prevalence rate of alcohol use disorder was reported at 5.6% for the same time (National Institute on Alcohol Abuse and Alcoholism, 2020).

[5] Which is corresponding to what most would call an addiction, but the DSM refrains from using this often negatively connoted term.

Since alcohol use disorder and use of the smartphone are often compared and more than 70% of the population of many advanced economies (such as Germany, the UK, or the US) own a smartphone (Pew Research Center, 2019b), it is likely that the same applies for the use of the device as for the consumption of alcohol.

Based upon over 60.000 records, we unlock our smartphones on average 53 times a day —or every 18 minutes (Markowetz, 2015) and, based upon 30.000 sets of data, used it about 2.5 hours per day on average in 2016 already (Andone et al., 2016)[6]. Are we addicted, then? Was everyone who participated in those studies? As I already pointed to, the scientific debate is still active as criteria have not yet been established to include this as a diagnosis (Montag et al., 2019). However, research is busy studying this phenomenon, yet under differing labels, such as "problematic/compulsive/impulsive (…)[7] use", "(…) dependence", or "(…) overuse", just to name a few (e.g., Al-Barashdi et al., 2015; Cheever et al., 2018). Some authors have started to refrain from the addiction term and use terms such as "(…)[8] use disorder" instead[9] (Montag et al., 2019). However denominated, the definition of smartphone addiction—and the other classifications—often includes an "...excessive attention and uncontrolled dedication to one's cell phone" (De-Sola Gutiérrez et al., 2016) or "is a construct defined as excessive use of a smartphone with accompanying functional impairments in daily living, and symptoms resembling those found in substance use disorders" (Elhai et al., 2019, p. 45). Accordingly, and just as for other behavioral addictions, the criteria are often based upon those for substance related addictions. So, lowered mood when (involuntarily) without the device and other withdrawal symptoms, loss of control, neglect of other things (at work and in private life), or excessive use despite problems resulting from it, are the predominantly associated consequences (Lin et al., 2016; Montag, 2018). For a comparison of criteria see also Table 1.

[6] That was in 2016, numbers are even higher these days as could even objectively measured data confirm (for an overview see Ryding & Kuss, 2020).

[7] Internet/smartphone/mobile phone/WhatsApp, etc. The technology or terms are used depending on study.

[8] Internet/smartphone/mobile phone/communication/WhatsApp/Facebook, and so on, could be used to fill in the parentheses.

[9] Which is, as noted before, the term used for addiction in the DSM. This might make the term less negatively connoted yet describing basically the same—an addiction. Thus, strictly speaking, using "disorder" instead of "addiction" does not really refrain from classifying the observed behavior as a mental disorder.

Table 1

Comparison of Criteria for Smartphone Addiction and Alcohol Use Disorder

Smartphone Addiction	Alcohol Use Disorder
Recurrent failure to resist the impulse to use the smartphone	Craving, or a strong desire or urge to use alcohol
Withdrawal: as manifested by dysphoria, anxiety and/or irritability after a period without smartphone use	Withdrawal, as manifested by either of the following: a. The characteristic withdrawal syndrome for alcohol (refer to Criteria A and B of the criteria set for alcohol withdrawal, pp. 499-500). b. Alcohol (or a closely related substance, such as a benzodiazepine) is taken to relieve or avoid withdrawal symptoms
Smartphone use for a period longer than intended	Alcohol is often taken in larger amounts or over a longer period than was intended
Persistent desire and/or unsuccessful attempts to quit or reduce smartphone use	There is a persistent desire or unsuccessful efforts to cut down or control alcohol use
Continued excessive smartphone use despite knowledge of having a persistent or recurrent physical or psychological problem resulting from smartphone overuse	Alcohol use is continued despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by alcohol
Excessive smartphone use resulting in persistent or recurrent physical or psychological problem	Continued alcohol use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of alcohol
Smartphone use in a physically hazardous situation (e.g., smartphone use while driving, or crossing the street) or having other negative impacts on daily life	Recurrent alcohol use in situations in which it is physically hazardous
Smartphone use resulting in impairment of social relationships, school achievement, or job performance	Recurrent alcohol use resulting in a failure to fulfill major role obligations at work, school, or home
Excessive smartphone use causes significant subjective distress, or is time consuming	A great deal of time is spent in activities necessary to obtain alcohol, use alcohol, or recover from its effects
Excessive time spent on using or quitting the smartphone use	-
-	Important social, occupational, or recreational activities are given up or reduced because of alcohol use
	Tolerance, as defined by either of the following: a. A need for markedly increased amounts of alcohol to achieve intoxication or desired effect b. A markedly diminished effect with continued use of the same amount of alcohol

Note: Comparison of the criteria for smartphone addiction by Lin et al. (2016, p. 5) and alcohol use disorder as cited in the DSM-5 (American Psychiatric Association, 2013, pp. 490-491).

Smartphone addiction, though more precise than Internet addiction, is still too broadly defined (Pontes et al., 2015) since different applications serve different functions (Dienlin & Johannes, 2020). What exactly are we—supposedly—addicted to, then? The device? All applications or just some of them? Some applications (such as fitness apps) were designed to benefit us (Yen & Chiu, 2019), so are only a few specific ones detrimental? Or can the same application have a different effect on different people—with their individual histories, characteristics, different contexts of use, etcetera—as would be likely, given that research on media effects by now assumes effects to be more individual than a simple stimulus-response-model could predict (e.g., Brosius, 2003)?

Most of these questions still remain to be answered conclusively, but some researchers have at least acted upon the broadness of smartphone addiction: Not only was a distinction into a disorder associated with communication (Internet communication disorder) and more specifically *smartphone use disorder* suggested (Duke & Montag, 2017a), but and even more specific, a *WhatsApp use disorder* and a *Facebook use disorder* introduced (Sha et al., 2019). It was also stressed that different concepts are necessary since they (e.g., Internet use disorder and smartphone use disorder) have been shown to differ more than they overlap (Duke & Montag, 2017a). Smartphone use disorder was, for instance, measured in a German speaking sample (n = 2299) via a scale to measure smartphone addiction that was based upon Kwon and colleagues' (2013) widely used instrument (d-K-SSS; Montag, 2018). Whereas WhatsApp use disorder showed a strong overlap with smartphone use disorder (r = .68, p < .01) in the respective study (Sha et al., 2019), it did to a lesser degree with Facebook use disorder (r = .47, p < .01); and also WhatsApp and Facebook use disorder did only overlap moderately (r = .48, p < .01). So, different applications, though both designed for communication purposes, might indeed serve different functions and possibly have different effects, too.

When studied, often used indicators of unhealthy or maladaptive use are frequency, intensity, or audience orientation (e.g., passive vs. active) of use (e.g., Elhai et al., 2016; Elhai, Dvorak, et al., 2017; Elhai, Tiamiyu, et al., 2018; Oberst et al., 2017). However, smartphones and the respective applications are not inherently detrimental (Liebherr et al., 2020; Melumad & Pham, 2020; Rosen, Whaling, et al., 2013). In fact, studies on use of social media and well-being suggested a plethora of positive effects stemming from the affordances of the newly developed possibility to connect across distances, for instance (Baron, 2011; Michikyan & Suárez-Orozco, 2016). Also, research found positive effects for shy (socially anxious or less satisfied with their lives, for instance) or lonely people, showing they could benefit from the options the Internet has to offer (e.g., Ellison et al., 2007; Steinfield et al., 2008). With

smartphones though, the literature has—at least in the past years—become a little less optimistic as it often found a detrimental connection between usage and well-being (e.g., Horwood & Anglim, 2019; Hughes & Burke, 2018; Rotondi et al., 2017; Verduyn et al., 2015). It is likely that these effects depend on individual risk factors, such as extraversion, low self-esteem (even before smartphones; Bianchi & Phillips, 2005), or impulsivity (for an overview see Billieux, 2012b). Also, different use of a medium will lead to different effects with more active use associated with positive outcomes (Dienlin & Johannes, 2020), for instance when meaningful interactions are actively sought (Bayer et al., 2018; Domahidi, 2018); whereas passive use or use intended to evade other obligations (in case of escapism or procrastination, for instance) is more often related to negative outcomes (Reinecke et al., 2018; Verduyn et al., 2017). Even though a trend towards a lowered well-being could be derived, effects from mostly self-report studies have shown to be ambiguous, and more objective methods are often asked for (Dienlin & Johannes, 2020; see also Twenge & Campbell, 2019).

Neuroimaging is much more objective. In a study with participants who never had used a smartphone before (n = 35) it could be shown that use, just like other things we learn, changes the structure of the brain and, more concerningly, decrease of numerical processing ability and increase of social concern over a three month period of time was causally linked to the device (Hadar et al., 2017). Studies using functional magnetic resonance imaging (fMRI) found evidence that reward areas of the brain, especially the nucleus accumbens which is associated with reward and, accordingly, addiction, are activated when using a smartphone. More "likes" were related to greater activation of neural regions associated with reward processing when photos on Instagram were viewed by thirty-four adolescents (age ranging from 13 to 18 years) while in the fMRI (Sherman et al., 2016); but receiving likes (n = 31, M_{age} = 23.1 years, SD = 3.2 years) also led to an activation of the reward system (Meshi et al., 2013). Moreover, more use of Facebook, objectively measured via a tracking application over five weeks in n = 62 adults, correlated inversely with gray matter volume of the nucleus accumbens (Montag et al., 2017). Even though the direction of the effect is not known due to cross-sectional data, the association was robust, suggesting brain change being related to use of this (and possibly other) social networking site(s).

In a study focusing on the overuse of the WeChat[10] messenger in China, very similar

[10] WeChat is also a messenger app which in its onset was similar to WhatsApp and now includes other options, such as banking or paying, for instance (Montag et al., 2018). It is ranked on the 5th position of the most popular social platforms worldwide (based on monthly active users), even one position before Instagram (but after Facebook, YouTube, WhatsApp, and FB Messenger; We Are Social & Hootsuite, 2020a).

results were found and the authors concluded that "structural alterations in the fronto-striatal-limbic circuitry represent a common denominator across different types of digital addiction, including Internet Communication Disorder" (Montag et al., 2018, p. 4). It has to be noted that addiction was prompted via a self-report measure, but also that participants (n = 61, mean age 22.34 years, SD = 2.29 years) had to have never been diagnosed with any mental disorder in order to be included in the study. Hence, even though higher levels of addictive symptoms were associated with the results, the mean scores were not exceptionally high and might possibly represent just the use that is quite normal these days—which presumably already depicts an unhealthy amount considering the time spent and dependence often reported yet is not sufficient to label it a clinical disorder. Comparably, and supporting the aforementioned results, prefrontal abnormalities found for Internet addiction disorder matched those found in substance abuse studies (Kuss & Griffiths, 2012; Yuan et al., 2011). Moreover, the authors' findings are in line with previous research in that field, discussing the detected "enhanced impulsivity and impaired inhibitory control as endophenotype[11] markers across psychiatric diagnoses, that precede the development of the complete clinical picture of the disorder" (Montag et al., 2018, p. 5). This is a substantial conclusion for the present project as well. That is, it implies that everyday use of a normal population already points into a direction that might be *preceding* an actual mental disorder. In other words, correlates of a changed brain structure exist to indicate more excessive uses of social media and some of these brain changes serve as markers that represent a pre-stage of a full mental disorder yet to be developed, underpinning the argument that we first have to research the preceding everyday experiences that might lead to an actual disorder eventually.

2.1.2 **…and "iDisorders"…**

Smartphone use might have negative side effects, but they do not necessarily have to pose an addiction. However, extreme or problematic smartphone use could also be the expression of an underlying mental disorder or another effect associated with use. Those could be "…(a) psychological effects such as poor memory, concentration and decision-making, anxiety, procrastination and sleep disturbance; (b) social effects such as negative impact on relationships and loss of sense of community; (c) physical effects such as harm from accidents, repetitive strain injury (…) and posture" (van Velthoven et al., 2018, p. 2). Larry Rosen has

[11] An endophenotype is defined as "a type of biological marker that is simpler to detect than genetic sequences and that may be useful in researching vulnerability to a wide range of psychological and neurological disorders. Endophenotypes may be a useful link between genetic sequences and their external emotional, cognitive, or behavioral manifestations" (https://dictionary.apa.org/endophenotype).

been researching negative effects of media for decades and found persuasive evidence for mental disorders being associated with technology use for which he gave a comprehensive overview in the suitably named book "iDisorder" (Rosen et al., 2012). For instance, the prevalence of narcissistic personality disorder, a disorder characterized by a person's self-centered, arrogant, empathy-lacking, and entitled behavior (amongst others[12]), has tripled over the past decades (Csef, 2016; Twenge et al., 2009). Moreover, it is associated with social networking sites because these platforms are perfect for impression management (Goffmann, 1972) since they allow for their users to present themselves with extreme egocentricity and in the most favorable way possible (see also e.g., Spitzer, 2018).

Aside from narcissistic personality disorder, depression is often among the researched disorders positively associated with more frequent smartphone use (Lin et al., 2016; Steers et al., 2014; Wolniewicz et al., 2018, 2020). Moreover, a systematic review of 117 papers found that depression and anxiety are associated with more problematic use, and so are stress and self-esteem (but less consistently than depression and anxiety; Elhai, Dvorak, et al., 2017). The effect sizes were at least moderate for depression; small to moderate for stress and self-esteem (see also Vahedi & Saiphoo, 2018); and small for anxiety in the respective review study. Results from brain imaging could link smartphone use and depression, too (Huckins et al., 2019), supporting the findings of otherwise mostly cross-sectional self-report studies. In a representative German sample with an age range from 14 to 85 years (n = 1557; M_{age} = 42.37 years, SD = 14.84 years), perceived stress was positively related to burnout and depression; furthermore, communication load due to checking/sending/receiving of e-mail and social media had a significant indirect effect on both, though only for adults over 50 years of age (Reinecke et al., 2017). This age effect indicates that digital natives and digital immigrants (Helsper & Eynon, 2010; Prensky, 2001) differ in what they perceive to be stressful when using the Internet. However, positive associations of use and stress as well as relations to detrimental health effects can be found across the life span. In two longitudinal studies with Finnish adolescents, (12-14 years, n = 1702 and 16-18 years, n = 1636), excessive use was found to lead to school burnout and, in turn, to depressive symptoms (Salmela-Aro et al., 2017). Conversely, in two other longitudinal studies, conducted over two (n = 594, mean age 12 years) and six years (n = 1132, participants were 19 years on average), social media use did not predict depressive symptoms but the opposite (Heffer et al., 2019), indicating that a more complex interplay of variables might be at

[12] The interested reader is referred to the respective manuals (DSM or ICD) for a comprehensive list of diagnostic criteria for this and other here only briefly introduced mental disorders.

work than a simple one-directional association.

Effects of social and traditional media (e.g., Instagram, model casting shows, or soap operas) associated with changes in body image of women and men alike are also often reported (e.g., Fardouly et al., 2015; Gierl, 2019; Lupton, 2017; Tiggemann, 2005). Seeing and especially comparing oneself to the often unrealistically thin (and by far not representing the real amount of thin people or average body proportions found in a population; see e.g. World Health Organization, 2020) models, influencers, or other media personae can lead to dissatisfaction with one's own body, body shame, or even eating disorders, especially in females (Kleemans et al., 2018; e.g., Rodgers, 2016); whereas male audiences were found to be influenced by often unusually muscular role models in the media (e.g., Carrotte et al., 2017; Gray & Ginsberg, 2007). So-called pro-ana (anorexia nervosa) and pro-mia (bulimia nervosa) platforms refuse to accept both illnesses as such as well as the accompanied dangers, moreover, defend related behavior as being a "lifestyle choice". Similar, but more mainstream (Ging, 2020), is "thinspiration", a phenomenon related to social media personae sharing dieting and exercising advice. Those webpages have shown to also have a reinforcing effect on eating disorders (Rodgers et al., 2016).

Taking away the phone from a person who had developed a greater dependence has been found to lead to higher anxiety even in just a brief period of time. For instance, in an experiment with n = 163 participants at a University in Southern California were half of them involuntarily freed of their phone while the other half was instructed to turn it off and keep it out of sight. The State-Trait-Anxiety-Inventory (STAI) was administered before, after 10 minutes, and again after 20 minutes. The researchers found rising levels of anxiety in those participants who had indicated to depend more on their phones (Cheever et al., 2014). Similarly, one in eight participants (n = 634) of a UK study reported to feel anxious when offline (*Ofcom. The communications market report*, 2016). This has also been named "nomophobia" (which is short for "no mobile phone phobia"), and similar indicators (for instance, not being able to communicate, convenience, being disconnected, or not able to access information; Yildirim & Correia, 2015) were found in various studies (Gurbuz & Ozkan, 2020; King et al., 2013; Semerci, 2019). A more objective measure of arousal (which is an indicator for anxiety or stress) associated with the smartphone can be obtained via electrodermal activity. Cheever and colleagues (2018) utilized this measure and could repeatedly show that hearing the notification sound of one's smartphone without being able to check it elicits a response, with the response being even greater in adolescents than adults. The latter is no unique finding though, since youth represent the main user group with the highest adoption rates of mobile technology and social

media in Germany and worldwide (Bitkom, 2019a; e.g., Bleisch et al., 2019; Pew Research Center, 2019b; We Are Social & Hootsuite, 2020a). Nonetheless, these findings illustrate the connection of the mobile phone to mental as well as physical effects once more. Longitudinal research has, for instance, found a stronger relationship of smartphone use with stress and anxiety over a period of ten years (from 2007 to 2017; Vahedi & Saiphoo, 2018).

Closely related is technostress. It describes a state of enduring anxiety, defined as "any negative impact on attitudes, thoughts, behaviors, or body physiology that is caused either directly or indirectly by technology" (Weil & Rosen, 1997, p. 5). Especially social applications (i.e., all means of interpersonal communication) were found to be positively related to technostress (Lee et al., 2014). The general concept of stress should be familiar to most people from experience—rushing to work, meeting deadlines, preparing for stressful exams or presentations, preparing a huge dinner, or driving during rush hour. The list could go on for pages. Lazarus pioneered in the area of research on psychological stress (1966), which is particularly dependent on a person's appraisal of the respective stressor[13]. Psychological stress can be described as behavioral and physiological reactions to the comparison of individual capabilities and environmental demands. If demands outbalance a person's capacities to cope, stress will arise. The capabilities include an individual's coping strategies (e.g., experiences); psychological resources (e.g., self-efficacy beliefs, vulnerability, resilience); and social characteristics, such as social support (cf. Lazarus, 1966; Smelser & Baltes, 2001).

Stress, however, is not *just* stress. No matter the kind of stress, it can have physiological and psychological impact and, thus, might even lead to serious health issues. Stress is related to hypertension and other cardiovascular problems, ulcers, or a weakened immune response (cf. e.g., Netter, 2001). Psychologically and statistically, stress and fear (or anxiety) are different constructs yet closely related, not just in their physiological reactions (getting sweaty hands, for instance); and they interfere with coping skills which leads to a weakened response to a stressor. Stress is also linked to mental diseases such as depression or (smartphone) addiction (e.g., Montag, 2018). Again, the type of stress (e.g., social stress or technostress) does not seem to matter (Vahedi & Saiphoo, 2018) and, aside from clinical disorders, stress was also found to have a negative impact on well-being in general. For instance, in a recent Australian study with

[13] Whatever demand is triggering stress is called a stressor, and they "can be biological (e.g., a viral infection), environmental (e.g., extreme temperatures), or psychological (e.g., taking a difficult exam)" (Vahedi & Saiphoo, 2018, p. 348).

$n = 539$ adults ($M_{age} = 25.1$, $SD = 7.8$) and using multiple scales for measuring well-being[14], problematic use was found to be negatively related to almost all scales employed to capture well-being (Horwood & Anglim, 2019). Similarly, Ling & Yttri (2002) found that users would experience stress when cell phone use was restricted because they had learned to depend on the device for texting and coordination and would feel rather helpless without it.

Especially media have contributed to a more accelerated lifestyle within our deeply mediatized society (Hepp & Hasebrink, 2018), entailing both affordances and detriments (David et al., 2018). Roberts et al. (2014) noted fittingly that the "use of modern smart-phones can be both freeing and enslaving at the same time" (p. 263), thereby pointing once more to the deeply media-interwoven lives of many people nowadays. Accordingly, stress these days is also sometimes termed "digital stress" (e.g., Hefner & Vorderer, 2016; Reinecke et al., 2017). Similarly, but just referring to calls and texts via the cell phone (and not social media use), this has also been researched under the term *entrapment*. Researchers measured this by asking about perceived stress and pressure as well as felt obligations to respond quickly and be available (Baron, 2011; Hall & Baym, 2011). While the affordance of interpersonal connection is clearly the main motivator for smartphone use, has entrapment been found to be a major drawback even in a study that compared five countries (those were: Japan, Sweden, Italy, Korea, and the United States; Baron, 2011). WhatsApp groups were associated with feelings of entrapment in a sample of $n = 238$ (representative for the population in Hong Kong) 18- to 34-year-olds as well (Chan, 2018). Especially overdependence[15] was found to be positively linked to feelings of entrapment and, thus, less relationship satisfaction, which was initiated by mobile maintenance expecta-

[14] It would be too comprehensive for the framework of this dissertation to go into details on the vast research landscape on well-being and the associated issue of measurement, but I will briefly inform the interested reader and suggest literature for further reading: Well-being is assumed to be a relatively stable disposition (cf. e.g., Horwood & Anglim, 2019) and a distinction between *subjective* or *psychological* well-being has been proposed (though other definitions or forms of well-being exist as well, spiritual well-being for instance, see e.g., Ellison, 1983). The former is often operationalized using Diener's Satisfaction with Life Scale (1985) which measures positive and negative affect as well as satisfaction with life. Sometimes, this form is alternatively called *cognitive* well-being. For psychological well-being, Ryff (1989) developed a scale measuring six dimensions: self-acceptance, positive relations with others, autonomy, environmental mastery, purpose in life, and personal growth. Occasionally, well-being is also measured using just a single-item (e.g., "How do you feel?" Verduyn et al., 2015) or (sometimes also labeled emotional well-being; see e.g., Eid & Larsen, 2008) using the Positive and Negative Affect Scale (PANAS; Watson et al., 1988). So, different measures (and terms) are used and not every study explicates which approach they refer to.—Since this could be turned into a thesis of its own, the interested reader is referred to Diener (2009) on subjective well-being or Ryff and Keyes (1995) on psychological well-being.

[15] Defined as a too close or dependent relationship with someone and associated expectations of too much interconnectivity, so that the individual person cannot really follow their own path—as opposed to *dependence* which was described to reflect a healthy, close relationship in which all share a lot and work well as a team (Hall & Baym, 2011).

tions (Hall & Baym, 2011). Similar results were obtained in a German study utilizing a probability sample (Reinecke et al., 2017): Communication load and Internet multitasking were positively related to perceived stress, and social pressure was predicting communication load (for users between 14 and 49 years of age; $n = 1022$).

Activity is a good way to reduce stress (Van Berkel & Reeves, 2017; von Haaren et al., 2016), but the smartphone—at least without an additional intervention or motivation—is frequently associated with low activity levels (Brickwood et al., 2019; Direito et al., 2015, 2017). For instance, in an online study with $n = 423$ participants (mean age around 40 years, $SD = 16$ years), Fennel and colleagues (2019) found higher usage time to be positively related to sedentary behavior, terming it a "leisure device". A total of 81% of their sample used the smartphone while in a sitting position, which is in coherence with the negative association to cardiorespiratory fitness level and amount of use (Lepp et al., 2013).

Stress can also have a detrimental effect on sleep, though sleep could counteract stress (Lund et al., 2010). Additionally, problematic smartphone use was found to predict poor sleep quality (Wang et al., 2019; Yang et al., 2020). Just like stress is a little trouble sleeping an everyday experience and not immediately a cause for concern, because it usually does not last—but if it does, it can be clinically relevant as it has potentially serious side effects (e.g., cognitive performance, mood, body weight, heart diseases) and might even constitute or become a mental disorder (e.g., insomnia; American Psychiatric Association, 2013). Even everyday use of the phone, such as before going to bed or directly after waking up, has negative effects already—for instance on sleep quality, focus, and productivity (Hughes & Burke, 2018; Lanaj et al., 2014). Moreover, the effects of the smartphone on sleep quality were found to be distinct (namely, more worrisome) than those effects derived from tablet, computer, or TV (Lanaj et al., 2014). Well-being, relationship quality, and happiness have been found to increase when the phone is left outside the bedroom (Hughes & Burke, 2018), but some users keep their phones close to their beds and check them even at night (Garmy & Ward, 2018; Troxel et al., 2015). Accordingly, poor sleep quality has been associated with even more concerning consequences than just being depleted and less productive during the day, such as depression, anxiety, or smartphone addiction (Hughes & Burke, 2018; Montag, 2018; Rosen et al., 2016). Not just due to its effect on sleep quality has smartphone use been found to have negative effects on productivity and performance in both private and work life alike (Duke & Montag, 2017b; Hawi & Samaha, 2016; Oberst et al., 2017; Rosen, Carrier, et al., 2013; Wilmer et al., 2017).

2.1.3 …to Everyday Effects of Smartphone Use

Some everyday effects associated with smartphone use, meaning behaviors that do not justify a clinical diagnosis, have already been introduced (such as stress, decreased sleep quality, or depleted productivity). Moreover, everyday behavior such as texting while walking or texting while driving (Appel et al., 2019; Bayer & Campbell, 2012) is potentially life-threatening although not in need of diagnosis. This behavior can be observed every day, and 60% out of 1211 US adults reported at least one distracted driving behavior (Gliklich et al., 2016) with 48% reading text messages and 33% even writing them.—This was in 2016, numbers have risen by now and phone use has taken over the lead in accident statistics also in Germany, even before DUI (e.g., Spitzer, 2018). It is worth mentioning that even traffic lights for pedestrians have been installed into the ground to prevent from accidents because so many people are looking down using their phone and, thus, tend to overlook "traditional" lights (Larue et al., 2020; Montag, 2018).—The device really has become our constant companion, and although most of us "know better", do we use it almost constantly, potentially even risking our health.

We also risk our relationships to others, as research in the following will highlight, although they are so very important to us since we—or most of us—are inherently social beings who need others for their well-being (Jonas et al., 2014; Kawachi & Berkman, 2001; Sandstrom & Dunn, 2014). Reduced quality of social face-to-face interactions has been associated with smartphone use, for instance (Dwyer et al., 2018; Rotondi et al., 2017). From a series of experiments could be derived that, aside from an undermined enjoyment of those interactions, emotions usually gained from social interaction or those emotional behaviors that a person usually would show (e.g., smiling) were reduced when the smartphone was present (Dwyer et al., 2018; Kushlev et al., 2019). Also, feelings of connection, even to one's own children, were diminished by more frequent smartphone use (Kushlev & Dunn, 2019). The authors concluded that "being constantly connected to the Internet may carry subtle costs for the fabric of social life" (ibid., p. 1619). Having comparable effects, phubbing[16] was introduced and it seems that this behavior has become sort of a norm despite its detrimental effect on social and romantic relationship satisfaction (Chotpitayasunondh & Douglas, 2016, 2018; Schneider & Hitzfeld, 2019). In fact, the mere presence of a smartphone has been shown to influence the evaluation of an interpersonal face-to-face encounter—so, it does not just distract us from tasks but also from one another (Allred & Crowley, 2017; Przybylski & Weinstein, 2013; Thornton et al.,

[16] Phubbing is a portmanteau of "phone" and "snubbing", describing the preference of using the phone than being in contact with another person who is present.

2014; Ward et al., 2017).

To sum up, the reported topics and implications so far are only portraying a part of the studies concerned with negative effects. However, the intention was to illustrate the bigger picture with regard to studies focusing mostly on clinical implications of use. With extant literature on clinically relevant implications of use, why are everyday behaviors important?—We are social beings, and the smartphone might obstruct us in our everyday lives just as much as we feel it helps us navigate through it. This might lead to the aforementioned (mental) disorders, but it might also "just" lead to much smaller everyday issues, such as miscommunication or less concentration, a little less happiness, a lowered feeling of belonging, a bit more stress or annoyance, and so on. The effect does not need to pose a clinical disorder yet, but might affect us just as strongly, especially in the long run—with long-term effects still being (under-)researched (cf. e.g., Liebherr et al., 2020; Wilmer et al., 2017). Everyday behaviors can lead to actual disorders, given the right—or, in this case, wrong—environmental, psychological, or biological predispositions (e.g., Grover et al., 2013; Martin et al., 2013), but what are these circumstances? Can the development of maladaptive practices be stopped towards a more beneficial use with fewer or no clinical outcomes? If the onset or at least "tipping points" (that is, when normal behavior turns into a disorder; Roberts et al., 2014) became clearer, then maybe—or rather, hopefully—yes.

Aside from their importance towards outcomes which are in need for treatment, everyday negative effects are persistent, thus, users are repeatedly stressed, annoyed, and so on. This might have unwelcome side-effects even in the most resilient ones (i.e., those users who will stay "diagnosis-free"). Phenomena were reported, such as texting while driving. This is just one example of irresponsible behavior that even assumedly smart people, who should "know better", show. Not all of them will have an underlying medical condition "causing" this (i.e., not everyone will be addicted to the phone just because they are using it while driving—the derived prevalence rates in comparison to number of users while driving support this). More probable are everyday effects such as habits that take over, getting even the most conscientious person to "quickly" check their device while operating a motor vehicle. Furthermore, use is negatively related to age with adoption rates and use being higher in the younger population (Mehner & Bucher, 2020). Adolescents are still developing physically and psychologically, hence they are more vulnerable to develop maladaptive practices and/or experience the dark sides of social media use (such as phubbing, a lowered feeling of belonging, or effects on body image; Michikyan & Suárez-Orozco, 2016; Subrahmanyam & Smahel, 2010; Uhls et al., 2017). Smartphone addiction cannot be diagnosed to date, but if relationship issues, inappropriate or

even dangerous checking behavior, or any other reported mental imbalance result from use, it does not need an "official" clinical diagnosis for it to have far-reaching consequences for the individual and society alike.

So, with mostly social motives driving smartphone use (Roberts et al., 2014) and social relationships being mainly based upon communication—can research from communication studies shed more light on these persistent everyday experiences? In the following, I will introduce the seminal U&G and propose an extension of it by leaving the discipline's borders and including psychological research to widen the scope.

2.2 The Uses-and-Gratifications Approach

> What do people do with the media?
>
> —Elihu Katz

For a long time, research on the effects of (mass) media was accompanied by the image of a passive recipient and questioned the impact of those media on the audience (cf. Bonfadelli & Friemel, 2015). This began to change in the 1940s when studies started to focus on other variables influencing media effects than just the media themselves. The reasons for listening to the radio, reading the newspaper, or comics, and watching television became the focus of attention (see e.g., Haridakis, 2013; Herzog, 1940; Lazarsfeld & Stanton, 1941, 1944, 1949) as did social and psychological factors of the individual, for instance. This view was approached using different names, such as phenomenistic (Klapper, 1960, as cited in Schenk, 2016), functional (Wright, 1959, as cited in Haridakis, 2013), or situational (Freidson, 1953, as cited in Haridakis, 2013). They all had in common that variables other than just the medium itself became important for the description and study of media effects. Katz called it *uses and gratifications* and laid the foundation for this paradigm by asking one—now famous—question in an editorial note back in 1959: "What do people do with the media?" (p. 2). The focus was suddenly directed towards different factors, such as audiences' choice of media, social environment, interpersonal communications, and group membership; and mass media were merely a mediator of effects since many more variables had to be taken into account (Haridakis, 2013; Schenk, 2016). The seminal U&G by Katz and colleagues (1973; see Figure 1) summarizes this as a paradigm of active users who consciously choose media according to their needs and goals (e.g., McQuail et al., 1972). More precisely, it states that there are "(1) social and psychological origins of (2) needs, which generate (3) expectations of (4) the mass media or other sources,

which lead to (5) differential patterns of media exposure (or engagement in other activities), resulting in (6) need gratifications and (7) other consequences, perhaps mostly unintended ones" (Katz, Blumler, et al., 1973, p. 510). This audience-centered perspective "stresses that media effects are the result of a confluence of factors working in concert" (Haridakis, 2013, p. 1); whereas the media itself are not enough to cause an effect and they are maybe an important, but not the only source of influence in a person's environment (Klapper, 1960). Now, active and goal-oriented use was focused on, and even though a somewhat passive use was still regarded to be possible, completely unconscious use was not (Haridakis, 2013). For instance, Rubin (1984) discerned instrumental and ritualistic use of media. The former presents goal-oriented, motivated, and, thus, more involved and active use, whereas ritualistic use is more habitual and used to pass time and for distraction (see also e.g., Rubin, 2009b). This distinction was found repeatedly in later studies, even those concerning smartphone use (e.g., Hiniker et al., 2016; Joo & Sang, 2013).

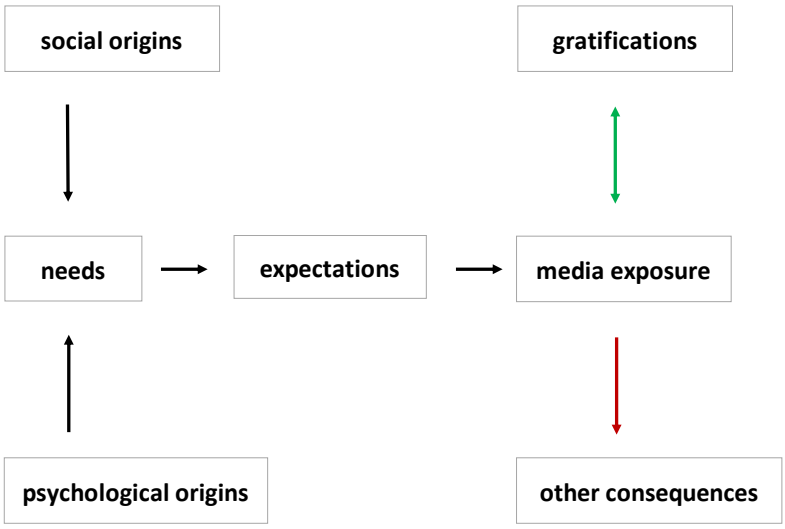

Figure 1

The Classic U&G Model

Note. Model based on Katz, Blumler, et al. (1973); own illustration.

Ever since, many scholars have followed this new approach of media effects, and research on uses and gratifications has flourished. Especially "(1) social and psychological origins of media gratifications; (2) expectancy-value approaches; (3) audience activity; (4) gratifications sought and obtained; (5) gratifications and media consumption; and (6) gratifications and

media effects" were major categories of the research that followed the classic model (Palmgreen et al., 1985, p. 18). The studies concerned with social and psychological origins of media gratifications (i.e., 1) investigated the social and cultural context of the recipients as well as their personality, attitudes, and other psychological characteristics that might influence media consumption. Though, aside from "psychological dispositions and states (e.g., anxiety, depression, confidence in personal control, loneliness); extent of contact with others in the personal environment; and levels of social activity outside the home (travel, sports, entertainment, and culture)" not much "attention has been paid to the demographic and other social origins of new-media gratifications or to their impact on effects" (Blumler, 2019, p. 6).

The expectancy-value approach (i.e., 2) shifted focus in direction of expectations towards need gratification via media and the evaluation of these experiences. Closely related is the approach to compare the gratifications sought (GS) with the gratifications a person perceived to have obtained (GO) from their media use (i.e., 4), to find out how satisfying media use had actually been. This was yet another shift in research towards the evaluation of the effects and possible consequences, because for the first time, the supposedly gratifying outcome of media use was regarded (Palmgreen & Rayburn, 1982, 1985; Rayburn & Palmgreen, 1984). Research also indicated that expectations towards media are shaped by the expectations via a feedback loop, so that gratifying vs. detrimental experiences would influence future expectations and exposure to media, respectively (e.g., Potter, 2012; Rayburn & Palmgreen, 1984). Accordingly, expectations towards GS are based upon the experiences of the past (i.e., the GO) and even though they were not found to be completely isomorphic, the measures often correlated at least moderately. Some have argued that these measures are definitely of different quality since they do not correlate perfectly (e.g., Rayburn & Palmgreen, 1984) and were found to explain different variance, too (cf. Wenner, 1982). It is suggested that they influence but do not determine each other (cf. Rosengren et al., 1985). However, other U&G researchers found GS and GO to be sufficiently isomorphic to "consider them as essentially pre- and postexposure measures of the same audience experience" (Levy & Windahl, 1984, p. 69) and comparing the items (e.g., for GS: "I want to get some entertainment." vs. for GO: "The TV news is often entertaining"), the reason for this assumption is certainly comprehensible. Possibly most importantly, research has found that just because a gratification was sought it did not necessarily lead to it being (fully) obtained. This would be in line with research on negative media effects outlined before: Just because a person might hope for a certain effect that would gratify a need, does this not necessarily lead to this effect or a full satisfaction of it. Negative outcomes of media—or, more specifically, smartphone use—are rather frequent, as has been outlined before,

while most use is clearly[17] motivated in anticipation of positive consequences instead. Therefore (unless a medium is used to gratify a need for the first time) and because GS pose "learned expectations" (Levy & Windahl, 1984, p. 55), the GS measure should already be a good indicator of usage (see also LaRose et al., 2001). Importantly, the audience was now perceived as actively influencing choice and effects of the experience (i.e., 3)—as opposed to being determined to endure a certain media effect just due to sheer exposure. Levy and Windahl (1984) have differentiated the audience orientation (i.e., their selectivity, involvement and use/utility) before, during, and after media use. Their findings suggest that the level of activity is influenced by perceived gratification, which, in turn, is influenced by the recipient's motivation. So, users are assumed to actively process media contents and, thus, influence the gratification experience in each stage of usage. In fact, cognitive and affective involvement were found to mediate between Internet motives and effects (for instance, Internet dependency; Sun et al., 2008).

Within the U&G tradition, motives are understood as the manifestation of needs, and these motives guide (need-satisfying) actions (e.g., Rosengren, 1974). Indeed, multiple motivations were found to predict consumption (i.e., 5) as exposure was associated with the expected gratifications (Rosengren et al., 1985). Furthermore, the approach also states that other activities can satisfy needs instead of media. Indeed, the reverse seems to apply, too: Media were found to satisfy interpersonal needs that were not met in "real life". For instance, the Internet can foster relationship closeness (Pornsakulvanich et al., 2008) or help people who are more introverted or anxious to get in contact with others (e.g., express themselves, belong to a group, or get to know different perspectives), the need was called interpersonal utility (see Papacharissi & Rubin, 2000). A lot of research has also focused on the association of gratifications and effects of media consumption (i.e., 6) since the U&G framework is concerned with effects, too, because without exposure to media there can be no media effects (cf. Haridakis, 2013). Studies have found many gratifications to be related to media effects and some found, for instance, that GS also predicted later media effects (for an overview see e.g., Rosengren et al., 1985; Ruggiero, 2000).

2.2.1 The Classification of Needs over Time

Especially in the first years after the U&G was coined, the main concern of researchers was to establish a classification of needs. So, indices to measure motives were developed, often

[17] The expected effects of media use as presented in past research within the U&G framework have a positive connotation.

by using a two-step design with an initial explorative study followed by a confirmatory study (McQuail et al., 1972; Rubin, 1981, 1983; Rubin et al., 1988). In an early yet prominent study (Katz, Haas, et al., 1973), needs were clustered into five groups, so that media would serve cognitive, affective, cognitive-affective, contact, and escapism needs. Though the media landscape has changed a lot ever since, needs could mostly still be allocated this way, though preference of media for need satisfaction assumedly differs now that the Internet, and especially social platforms, exist. Rubin (1981, 1983), for instance, derived the underlying motives for watching television as follows: to pass time/as a habit, companionship, arousal/excitement, specific program content, to escape, entertainment, and social interaction. Most needs appear repeatedly across studies and for different platforms, yet even independently from media: A set of needs for interpersonal communication was explored and a respective scale devised. The needs sought to be met via interpersonal communication were pleasure, affection, inclusion, escape, relaxation, and control (Rubin et al., 1988); with escape and relaxation as well as pleasure (including entertainment, for instance) being need-factors also found for media use, whereas "versions"[18] of inclusion and affection as well as control can also be found for computer-mediated (as opposed to face-to-face communication; Blumler, 2019; Church & De Oliveira, 2013; Pornsakulvanich et al., 2008; Quan-Haase & Young, 2010). This has been the case for many needs translated to newer media (e.g., Rubin, 2009b, 2009a; Ruggiero, 2000; Stacks & Salwen, 2014; Sundar & Limperos, 2013). For instance, based upon the mentioned media as well as communication motives, Papacharissi and Rubin (2000) have constructed an Internet motives scale with the factors interpersonal utility, pass time, information seeking, convenience and entertainment.

Within the framework of U&G research and considering social media, the word "user" has become even more interactive than before since a user also has become a producer, and mass communication, thus, may entail more involvement than ever before. This is reinforced by the mobility that enables constant media use, hence more encounters with need satisfaction or dissatisfaction. For instance, uses and gratifications of newer media such as Twitter, Facebook, or Instagram were surveyed (e.g., Alhabash & Ma, 2017; Johnson & Yang, 2009; Quan-Haase & Young, 2010; Sherlock & Wagstaff, 2019). Most of them were in alignment with those found for Internet and personal communication previously (cf. Papacharissi & Rubin, 2000). However, the Web 2.0 offers additional affordances compared to communication options in the

[18] The nomenclature varies in U&G research since studies are often "too compartmentalized" (Ruggiero, 2000, p. 12).

early years of the Internet, such as e-mail or text-based instant messaging. Even back then though, self-expression and communication with friends and family were predominant motives (alongside entertainment, information needs, pastime, and professional development) for use or creation of personal homepages (Papacharissi, 2002). With more diverse affordances of the Internet and its applications, additional gratifications were found as well. For instance, in a study first exploring (n = 137, mean age 26 years) and then surveying (n = 241, mean age = 25.97 years, SD = 9.30, range 15-66 years) Facebook users (Joinson, 2008), the following needs prominent for use were found: social connection, shared identities, photographs, content (such as quizzes or games), social investigation, social network surfing, and status updates. Some needs for using YouTube were the same as for watching television (e.g., entertainment, information seeking) and some more distinct for social media (e.g., co-viewing, sharing; Haridakis & Hanson, 2009). The social component while watching (Rubin, 1983) and/or for talking about content after exposure (e.g., Levy & Windahl, 1984) was considered, though not measured as a need in television studies before, but YouTube combines them and makes the experience supposedly even more social (cf. Haridakis & Hanson, 2009).

Quan-Haase and Young (2010) compared the uses and gratifications of instant messaging and Facebook, and found that even though both are primarily used for pastime (i.e., "to have fun, to kill time, to relax, and to provide a form of escape from everyday pressures and responsibilities", p. 358), an important difference was social information acquired via Facebook. The network allows users to find out about activities and thoughts of their acquaintances without being online at the same time and without asking. Even though instant messaging was thought to allow for a deeper connection with friends, the asynchronous and easy way to stay informed presented a small, but distinct difference in this study of n = 77 Canadian students (mean age 19.68 years, SD = 1.26). In an exploratory study combining qualitative interviews (n = 16) and an open-ended questionnaire (n = 14), four motives were identified for use of the professional networking application LinkedIn: interpersonal communication, online identity, information, and career advancement (Florenthal, 2015). Moreover, research suggests that motives differ not only depending on platform or among media, but that also specific features or affordances within the same social networking site (SNS; e.g., chat, status updates, wall posts, and so on) are driven by different motives (Smock et al., 2011). More recent research has compared the uses of Facebook, Snapchat, Instagram, and Twitter (Alhabash & Ma, 2017). Motives for usage of these platforms differed slightly as their entailing features also serve somewhat different purposes. For instance, Twitter is a microblogging platform, allowing for communication via 140-character texts. Facebook is used for social networking, allowing users to share

photos, video, text, stories, and so on. Instagram is more visually oriented to mainly share photos, videos, and stories. Snapchat's shared messages (text, video, etcetera…) are only available for a 24-hour-period while that is only true for the stories feature on Instagram or Facebook. U&G motivations were found to explain more variance (51% to 61% additional to demographic data, depending on platform) in usage intensity than demographic variables alone (4% to 13%, depending on platform) did. While entertainment significantly predicted use of all four platforms in a sample of n = 363 US college students, self-expression was only relevant for Instagram, convenience only predicting Snapchat and Twitter use, and passing time only predicted Instagram use intensity. Plausibly, self-documentation was only relevant for Facebook and Instagram use intensity (Alhabash & Ma, 2017), though it had been found to be relevant for the explanation of Twitter use before (Liu et al., 2010).

Differences like these are not too surprising given the different cohorts studied in these examples or inconsistencies in measures. In fact, a multitude of U&G typologies and respective tools for measurement exist (Ruggiero, 2000), therefore the variability in studies is tremendous (for more examples of U&G typologies across new media see e.g., Liu et al., 2010; Sundar & Limperos, 2013). However, each medium, or even content of a medium, is used for a multitude of expected gratifications (Blumler, 2019). Moreover, when compiling "time-honored and newer gratifications" (ibid., p. 5), an assembly of needs tend to occur repeatedly in U&G studies also including newer media, for instance: entertainment, pass time, convenience, escape, surveillance (of friends/acquaintances), social/interpersonal utility, guidance, connection with others, and information seeking (see e.g., Blumler, 2019). As mentioned before, these are still mostly allocable to clusters of needs that were suggested in the 1970s (e.g., Katz, Haas, et al., 1973).

Moreover, these needs can also be found in studies analyzing U&G motives for smartphone use: Entertainment and connectedness were found to be the main reasons for use of n = 214 Hispanic millennials at a Texas university (Wilkinson & Saldaña, 2018), for instance. Gan (2016; 2017) found that entertainment, information, and reward significantly influenced following a person on WeChat or giving them "likes" in two studies with n = 204 and n = 215 young students (around 18-24 years of age in both studies) in China; though in a later study only media appeal, enjoyment, and information, but not social needs were found to motivate a continuing use of the platform (Gan & Li, 2018). However, social needs were defined and measured as needs for social support rather than social connection in the respective study. Additionally, WeChat, as noted before, entails many more functions than, for instance, WhatsApp, so motivation for use might differ. Also, cultural or political aspects, such that

China tends to be less individualistic and its government more strict, might influence the use of social media for social purposes in comparison to western societies (e.g., Lee et al., 2016). In another study with a US sample of n = 309 adult MTurk[19] participants, process (e.g., news consumption, entertainment) and social (e.g., communication, social networking) motives were found to be associated with positive anticipation of use but also with overuse and, consequently, a possible addiction to the device; with content consumption (vs. social use) predicting problematic behavior to a greater degree (Elhai, Hall, et al., 2017).

Taken together, entertainment and information needs have stood the test of time—or media—and so have social motives. Obviously, these motives supposedly lead to expectations of a positive—need satisfying—experience with the media and most parts of the original model were, in fact, studied extensively (which is not to say that questions do not still remain insufficiently answered, such as the question of the influence of social context, for instance). However, "other consequences", and among those possibly "unintended [or negative] ones" (Katz et al., 1973, p. 510), were not in the spotlight of researchers' interests, though at least some studies did investigate or consider negative outcomes of use—or "avoidance motivations" (Becker, 1979)—as well (Haridakis, 2013; LaRose et al., 2001). Klapper (1963) might have been the first to question the functional (i.e., positive, health serving) perspective of uses and gratifications since "what may be functional for one sort of person may serve no function, or may be dysfunctional, for another sort of person, or for a special-interest group" (p. 521). Still, almost 60 years after the first mention of dysfunctional outcomes, not much is known about the unsatisfying consequences of and their implications for media use in the future. LaRose and colleagues (2001) were the first to employ this idea in a U&G Internet study by asking n = 171 Mid-Western US students (mean age 21 years) for four negative experiences, such as the computer freezing or not finding the information they were looking for. However, the negative correlation of Internet use and negative outcomes was weak (r = -.16, p < .05) and disappeared in a multiple regression model. Another example of negative experiences investigated within the U&G tradition is the aforementioned study by Elhai, Hall, and colleagues (2017), connecting two types (i.e., information and entertainment vs. social reasons) to the possibly most negative outcome, namely an addiction to the device. In a similar fashion, Kim and Haridakis (2009) found a link between the U&G motives habitual entertainment, caring for others, escape, and excitement, and Internet addiction, influenced by personality characteristics such as locus of

[19] MTurk stands for "Amazon Mechanical Turk" (https://www.mturk.com/) and represents a crowdsourcing marketplace that can be used for multiple purposes such as conducting a survey study.

control, loneliness, shyness, and thrill seeking. Other studies linking unintended negative consequences of media use to U&G motives have, for instance, found negative body image of young girls and boys (n = 1.452 students, M_{age} = 14.37 years, SD = 1.15) to be associated with soap opera viewing, motivated by social learning and escape from negative affect (Tiggemann, 2005). A multitude of similar studies exist (Sherlock & Wagstaff, 2019), but not often in relation to the analysis of U&G motives. Also, studies found adolescents, especially younger ones (i.e., 12-14 years; in a sample of n = 412 Dutch adolescents; M_{age} = 14.1, SD = 1.45), to be more prone to talk to strangers online. Aside from frequency as important factor, motives for talking to strangers included entertainment, meeting new people, and social compensation (Peter et al., 2006). Implying similar potential risks to talking to strangers online (and maybe meeting up offline), in a more recent study with n = 163 young adults (18-30 years of age), six motives for using the dating application Tinder were extracted: love, casual sex, ease of communication, self-worth validation, thrill of excitement, and trendiness (Sumter et al., 2017). Very closely related to this study, Chinese users (n = 433, 11-58 years, with an average of 30 years of age) named fun and ease of connectivity, sexuality, self-esteem, love, sociability, and coolness as motives underlying mobile dating application use (Solis & Wong, 2019). These studies are not the only ones relating risks of (social) media to its users and especially adolescents, but not many are based within the U&G framework. Despite their somewhat varying motives and range of effects, the aforementioned studies all have in common that negative consequences resulted from positive—or at least neutral—attitudes towards media use, and it was often found that individual as well as personality characteristics influence these effects as well (Haridakis, 2013). Considering also the previously illustrated research on negative effects (see Section 2.1), many studies on negative outcomes of use, such as addiction, exist; but in addition to employing another theoretical framework (e.g., not from a U&G perspective) they often depict these "other consequences" in terms of the worst case—as an actual mental disorder.

2.2.2 **Criticism on the U&G**

In over 45 years of research, the classic model has often been extended. A very comprehensive extension, depicting the broad explanatory claims of the U&G (cf. Aelker, 2008), was the non-recursive "General Media Gratifications Model" by Palmgreen and colleagues (see appendix, Figure A 1). It was "an attempt to locate gratification processes within an overall societal perspective" (Palmgreen et al., 1985, p. 16); and, indeed, it included the expectancy values and beliefs as well as GS and GO; more ritualistic use; society and culture as well as

individual characteristics, leading to attitudes and values; and feedback loops, one of them from the effects to the beliefs and expectations, influencing the GS and repeated media exposure, respectively. However, critics and among those some of the U&G reseachers themselves, pointed to mostly only bivariate tests of parts of this and other U&G models (e.g., LaRose, 2010a; Rosengren et al., 1985). The U&G is an approach that, though not entirely lacking theory (Blumler, 1979, 2019), is not falsifiable and hence can be criticized with regards to its universal validity (e.g., Aelker, 2008). In a similar vein, very basic assumptions of the approach itself were critiziced, such as unclear definitions of the active user or the motives and their origins (e.g., Blumler, 1979; Katz, 1987). Aside from the passive vs. active user, much discourse has also taken place with regard to other variables' influence on U&G (LaRose, 2010a). It also relies heavily on self-report data (Becker, 1979) which, aside from social-expectancy biases, takes for granted a certain amount of self-reflection in study participants that does not necessarily exist (e.g., Ruggiero, 2000). It was also thought to be "too individualistic while disregarding other societal and cultural influences" (Rayburn, 1996, as cited in Alhabash & Ma, 2017, p. 3). Even though many of the model's factors are supposedly unique to the individual (cf. Haridakis, 2013), generalization of media effects can often be found in studies (e.g., Rubin, 2009a) and needs were found in diverse samples as well; leading to the assumption of at least some of the same factors at work, despite a person's individual personality and social characteristics. The variance explanation of U&G needs is presumably dependent on medium, but leaves room for improvement, which points to the option of other factors influencing effects, too (Alhabash & Ma, 2017). Lastly, possible dysfunctional outcomes of need gratification were not critically regarded (Katz, 1987).

Despite all criticism the approach had to endure, it is still a viable and valid framework for the analysis of user behavior and its influence on media use and effects, especially when treated as such—a framework or approach, not a theory. Especially with regards to social media and their proliferation among large proportions of society and young people in particular (e.g., Pew Research Center, 2019b), it can "provide valuable insights into (1) what social media are adopted; (2) the uses of social media; and (3) what motivates adoption of different sites and services" (Quan-Haase & Young, 2014, p. 269). Ruggiero even argued that "any attempt to speculate on the future direction of mass communication theory must seriously include the uses and gratifications approach" (2000, p. 3) since the basic question for U&G researchers has not changed in the digital world: Why would a person (continually) use a medium? What gratifications can they get from usage? He also inferred that the approach has to be expanded for the use of newer media to include concepts such as "interactivity, demassification, hypertextuality,

asynchroneity, and interpersonal aspects of mediated communication" (Ruggiero, 2000, p. 29). So—as has also been shown in the past when analyzing characteristics of the user, investigating attitudes, or involvement, for instance—the approach invites the integration of multiple theories to provide a more comprehensive view than would be possible than from one theory or discipline alone.

To sum up, within the U&G framework, the focus shifted from a passive "hypodermic needle" (cf. Pooley, 2006) view of media effects to that of an active and goal-oriented as well as motivated user. Media are one source amongst several, such as, for instance, social contacts, to fulfill needs or desires. Social and individual characteristics of the user influence the selection, use, and effects of usage. Media are influential, but other people are considered to be—usually—more influential in the effects process (cf. Rubin, 2009b). Moreover, needs found for the use of traditional media (e.g., newspaper or television), were found to be transferable to online environments as well (e.g., LaRose et al., 2001; Papacharissi & Rubin, 2000), such as entertainment, information, or interpersonal contact. However, each platform has its more or less unique affordances and as such, needs assumed to be gratified can slightly differ. They are also assumed to differ depending on social and individual factors. Often compartmentalized research complicates establishing one uniform set of needs (per medium or application) and, thus, to build a consistent foundation of research. Overall, the motives for usage of the social web have a more distinct social component than those for use of more traditional media. Some newly explored needs (e.g., self-presentation) were already important for interactions not including a medium, whereas others (e.g., sharing of content, likes) might have been important too, but did not exist like this before the event of social media (e.g., Haridakis, 2013). While the classic model was expanded quite often and most parts were researched in length, many questions remain open, and some critical points still need to be addressed. Using U&G as a reference for researching a mostly active media user, interested in their motives and satisfaction of needs, however, is as topical in social media research as it was in the beginning of U&G. More importantly, the quest to extend knowledge, especially about persistent negative consequences of use, is far from finished. Research from psychology might shed light on some of the mentioned open questions.

2.3 Self-Determination Theory

> This process of the good life is not, I am convinced, a life for the faint-hearted. It involves the stretching and growing of becoming more and more of one's potentialities.
>
> —Carl R. Rogers

With its focus on the individual instead of direct or "mechanistic" effects from media, U&G "is a psychological communication perspective" and "stresses individual use and choice" (Rubin, 2009a, p. 165). The criticism notwithstanding, the U&G is still a valued and frequently used approach—it just cannot explain our smartphone use to the extent of persistence in spite of negative outcomes. Additionally, the lack of explication of the "social and psychological origins of needs" in U&G was often criticized as well as lack of regard of social context of media use. Therefore, I propose an extension using research from social psychology: The SDT by Deci and Ryan (e.g., 1985) constitutes a fitting addition to the U&G. Almost as long-established as the U&G, the SDT assumes that "needs specify innate psychological nutriments that are essential for ongoing psychological growth, integrity, and well-being" (Ryan & Deci, 2000b, p. 229). Contrary to drive theories (e.g., Hull, 1943), SDT does not see every behavior motivated by an imbalance of needs but regards humans as always striving towards becoming a better version of themselves (e.g., via self-actualization). Most importantly, the STD also accounts for negative, or as they call it "nonoptimal psychological outcomes under conditions of threat or deprivation" (p. 229). With this, the SDT is unmistakably a valuable extension to the U&G and might add a new perspective on persistent negative effects with the smartphone despite "knowing better". Deci and Ryan identified three basic needs in "hundreds of studies"(Ryan & Deci, 2017, p. 85) which have shown to be universally valid, even across the globe and cross-developmentally. These needs are necessary for psychological health, yet they all need to be satisfied to reach this goal. These three needs are the need for *competence*, the need for *relatedness*, and the need for *autonomy*. Deci and Ryan defined competence according to White (1959, as cited in Ryan & Deci, 2000b) as a "propensity to have an effect on the environment as well as to attain valued outcomes within it. (…) Relatedness refers to the desire to feel connected to others—to love and care, and to be loved and cared for" and autonomy "refers to volition—the organismic desire to self-organize experience and behavior and to have activity be concordant with one's integrated sense of self" (p. 231). First, if we utilize a mobile device, we have a need to feel competent about it—for instance, we want to be able to write a message or look up a webpage, we want to be (or feel) literate about what we are doing. The second describes a need to feel autonomous about decisions and to make them voluntarily.

Translated to mobile technology: we want to decide for ourselves if and when we use a device or not. Lastly, we want to feel related to others. We need to belong to social groups, such as family, friends, colleagues, and so on (cf. e.g., Baumeister & Leary, 1995). We are social beings, so this might even be the most important need for most of us (see e. g., Jonas et al., 2014; Kawachi & Berkman, 2001; Sandstrom & Dunn, 2014). Additionally, SDT takes external influences explicitly into account, for instance the influence of (varying) social contexts on need satisfaction. Need satisfaction influences the well-being of an individual and though well-being is considered to be relatively stable over a lifetime, a daily within-person variation in need satisfaction has been documented as well (Reis et al., 2000). So, even though someone is doing well most of the time, daily levels can differ—as can daily uses for need gratification. SDT is goal oriented, which means in SDT people strive for need satisfaction in order to pursue and accomplish their aspirations (cf. e.g., Ryan & Deci, 2000b). This inherent striving towards self-improvement implies an actively seeking individual, intrinsically motivated to become a better version of themself by learning, growing, and thus satisfying their basic needs. This self is continuously formed during lifetime and also through the contact to other people as „as an enduring theory or set of meanings that one constructs about oneself and that provides a sense of continuity, integration, and purposeful connection" (Lilgendahl, 2015, p. 490). Within SDT, when someone is intrinsically motivated, the behavior itself satisfies said basic needs but without a conscious intent of doing so and, most importantly, without external rewards (see e.g., Ryan et al., 2019), since external rewards have the opposite effect and undermine voluntary intrinsic motivation (Deci et al., 1999).

Related to the experience of intrinsic motivation is the concept of flow (Csikszentmihalyi, 1990, 2014), which describes the experience of being fully immersed in an activity without noticing it or time flying by while being at it. For the experience of flow, the activity has to be goal-oriented, optimally manageable and nonconsciously rewarding in itself. SDT has been linked to this part of the flow concept as it is closely related to the experience of intrinsic motivation (Di Domenico & Ryan, 2017; Ryan & Deci, 2000a): The concept of flow does not imply the performed activity to be intrinsically motivated but the activity is in itself rewarding and challenges one's competences while fostering a feeling of control. By that, a person feels to have accomplished a task while optimally challenging their abilities, thus, satisfying inherent basic needs. It is assumed to take around 15 minutes to reach a state of flow (DeMarco & Lister, 2013)—but, as flow is a concept that finds application in everyday life, mobile media are part of this life by now as well and mobile phones are interrupting us every 18 minutes on average. In doing so, their presence is possibly undermining flow, making us not

just less productive (Markowetz, 2015) but also less happy and well-functioning in the process (e.g., Csikszentmihalyi, 2014). Just as media use might impact the experience of flow and consequently intrinsic rewards as well as need satisfaction, SDT, similar to U&G, has been researched within the media framework, too. Needs can be satisfied or thwarted by means of media use, respectively (Karapanos et al., 2016; Reinecke, Vorderer, et al., 2014; Ryan et al., 2006).

2.3.1 SDT and Media

Unsurprisingly, then, is the present study not the first to combine U&G and SDT: For instance, Karapanos and colleagues (2016) did so by predicating their study on both concepts, yet employing mostly SDT needs as measure for gratifications sought via WhatsApp (n = 254) and Facebook (n = 240) in young adults (median age of 27 and 30 years, respectively), finding that relatedness predicted WhatsApp use intensity, whereas self-esteem predicted Facebook use intensity. Interestingly, relatedness was also one of two needs most thwarted when asked for unsatisfying experiences (popularity being the second) highlighting the social role of WhatsApp once more, whereas Facebook might, as reported before (e.g., Alhabash & Ma, 2017; Sha et al., 2019), satisfy different needs. Though these authors surveyed for more than the three proposed basic SDT needs, it supports the salient role of the need for relatedness (e.g., Ryan & Deci, 2000c) which is often coined as the driver underlying social media use, also in relation to outcomes positively associated with social well-being (Chan, 2018). In line with these results are those by Hall (2017), who found that entrapment (e.g., stress caused through availability) resulted in lower feelings of relatedness. Since all needs are interdependent in SDT and need to be satisfied for full functioning and well-being (Chen et al., 2015; Deci & Ryan, 2014), it is important to note that the quality of relationships depends not only on satisfaction of relatedness, but also autonomy and competence, as they were found to explain additional variance (e.g., La Guardia et al., 2000) and autonomy was also negatively associated with problematic smartphone use (Horwood & Anglim, 2019). So, an optimal relationship would, for instance, provide feelings of mutual respect and support and thus provide the means to satisfy our needs for autonomy and competence too, while enabling us to feel close to others as well. This is also true for contact via social media: Just as mobile communication via WhatsApp was related to relatedness satisfaction, yet another study suggested that WhatsApp use, under certain circumstances, can thwart the needs for autonomy and competence. In an experimental study with n = 61 participants (age ranged from 19 to 56 years, with a mean of 25 years, SD = 7.23), Rieger and Halfmann (2019) found that the perception of constant availability (when notifications and

read receipts were enabled vs. disabled) led to more social stress which, in turn, lowered feelings of autonomy and competence. They could confirm the influence of social stress on these two needs in a following diary study with $n = 197$ participants (mean age 25 years, $SD = 7.10$, range = 17 to 61 years). Additionally, in both studies (Halfmann & Rieger, 2019) competence was assumed to be especially important as it mediated the effect of social pressure on well-being. So, communication overload could diminish the positive effects the smartphone could have. Though some studies already employed an experimental research design and/or collected data over a few consecutive days, potential long-term effects of social pressure on the three needs (and their interplay) still need to be looked into.

2.3.2 The Potential Role of Fear of Missing Out

Thus, deprived needs can be associated with more of an overuse of media—and also with a greater *fear of missing out* (Dossey, 2014). FOMO has been defined as "a pervasive apprehension that others might be having rewarding experiences from which one is absent" and is associated with the urge to stay persistently connected to one's network (Przybylski et al., 2013, p.1841). Derived from SDT, it was suggested that FOMO results from a thwarted need for relatedness, and it was indeed found to be an inherently social phenomenon which is less strongly experienced when a person is already in a social situation vs. alone (Milyavskaya et al., 2018). Using experience sampling, Milyavskaya and colleagues also found FOMO to be greater towards evenings or weekends, which are more strongly associated with social alternatives than weekdays are.

Evolutionarily speaking, we always needed social ties to have better chances of survival. So, the need to be connected to others is at our very core and, understandably, our so called social brain signals when social bonds are in danger; it is a truly painful reminder for us to seek safe(r) companionship with others (Eisenberger, 2015). Everyone who has ever experienced some sort of ostracism knows that it hurts to be excluded from social happenings of any kind (Schneider et al., 2017; Williams, 2007). Brain correlates exist, showing that the pain we feel when we are rejected or excluded activates the same neural regions as physical pain does (Eisenberger, 2015). Additionally, ostracism was suggested to threaten basic need satisfaction, as two survey studies with $n = 150$ ($M_{age} = 32.28$, $SD_{age} = 10.17$) and $n = 271$ ($M_{age} = 36.28$, $SD_{age} = 12.64$) US MTurk participants showed (Hales et al., 2018). With its strong connection to anxiety, FOMO was often termed a driving force behind more frequent and also problematic use of especially the smartphone (e.g., Chotpitayasunondh & Douglas, 2016; Dossey, 2014; Elhai, Yang, et al., 2020; Rosen et al., 2016). In an early study with a representative UK sample

(*n* = 2079, aged 22 to 65 with a mean of 43 years, *SD* = 11.5), Przybylski and colleagues (2013) found FOMO to be associated with more social media engagement and lower need satisfaction, general mood, and life satisfaction. Moreover, FOMO mediated the relationship between the individual differences and more social media exposure with higher levels of FOMO positively predicting more social media engagement. In another study, FOMO completely mediated the connection of life satisfaction and problematic use of the smartphone in general and of Facebook and WhatsApp in particular (Sha et al., 2019). Over the years, FOMO has been connected to a multitude of variables aside from thwarted needs and problematic use. For instance, FOMO was positively correlated to anxiety, depression, and neuroticism (Elhai, Yang, et al., 2020; Sha et al., 2019). Higher levels of FOMO were also associated with more proneness to boredom, inattention and interruption of several tasks (in private life as well as work-related), lower life satisfaction, and well-being in general (Elhai, Yang, et al., 2020). FOMO was also found to correlate positively with problematic sleep (Rosen et al., 2016), walking while texting (Appel et al., 2019), and might very well be connected to narcissism, too, as this personality disorder is associated with a lack of social connectedness (Casale et al., 2016; Elhai, Yang, et al., 2020). FOMO is often used as a mediating variable; for instance, to explain the effect of negative affectivity on problematic smartphone use (Elhai, Levine, et al., 2018). FOMO also predicted frequent or even problematic use via depression or anxiety as mediators (Elhai, Levine, et al., 2018); or lowered emotional well-being via problematic smartphone use, as a recent Estonian study suggested (Gugushvili et al., 2020). It was also suggested that, based upon two first long-term studies, FOMO might be the underlying trait causing negative outcomes (such as, e.g., negative affect, stress, sleep issues, or fatigue; Elhai, Rozgonjuk, et al., 2020; Milyavskaya et al., 2018). FOMO's role in frequent use and respective outcomes of social media use has proven to be salient, no matter its position in the equation, and it could be found across countries as well as for all ages and sexes alike (though a tendency towards greater experience of FOMO in younger and female participants can be assumed; Elhai, Yang, et al., 2020).

2.3.3 Social Comparison, Social Dissonance, & Third-Person Effect

Aside from FOMO, also the type of smartphone use is often discussed in relation to negative experiences: As briefly introduced before (see Section 2.1.1), it has a supposedly different impact on well-being if use is active or passive. Whereas active use was mostly found to be connected to beneficial outcomes (e.g., feelings of support or connectedness), passive use has more often been linked to negative outcomes of use such as depressive symptoms or more negative self-perceptions, with FOMO and *social comparison* mediating this relationship while

being closely related to each other as well (Burnell et al., 2019; Verduyn et al., 2017). Social comparison was explained via an intrinsic curiosity towards the gain of information (Loewenstein, 1994) that leads to learning and, thus, gaining competence (Di Domenico & Ryan, 2017). This inherent curiosity also leads us to compare ourselves to other (groups of) people, and even media (personae) can serve as a source of comparison and orientation (e. g., Döring, 2013; Fardouly, Diedrichs, Vartanian, & Halliwell, 2015; Leavitt, Covarrubias, Perez, & Fryberg, 2015). SDT explains this through the need for autonomy: We actively tend towards growth, which can be realized via self-actualization; and for self-actualization, we tend to compare ourselves to others because objective, nonsocial norms are often not available yet we need them to form a consistent self (Festinger, 1954). We can validate our beliefs and abilities through comparisons to other people, maybe even change them, reduce uncertainty in the compared-to domains, and gain accurate self-evaluations (for further details see Cooper, 2007). Social comparisons can be upwards or downwards, meaning that we can compare ourselves to someone who is doing better or worse than we are. The ways in which a person might be doing better can vary decisively and especially individually, depending on what is important for a person or in their focus in that moment. For instance, someone else can have a subjectively better job, or the body one aspires to for oneself, or is doing something that oneself is missing out on (hence its relation to FOMO; see e.g., Reer et al., 2019). Depending on individual differences in variables such as mood or identification, either direction of comparison can have a positive or negative effect, as research has shown (Buunk & Ybema, 2003; de Vries et al., 2018; Haferkamp & Krämer, 2011; Johnson & Knobloch-Westerwick, 2017). Regarding social media, upward comparisons are often reported to be associated with negative effects immediately but also in the long run (Karsay et al., 2019), especially in the domain of body images, because many media personae are unrealistically thin or muscular and the respective negative effects are assumed to be mediated by social comparison orientation (Döring, 2013; Ferguson, 2013; Tiggemann & Anderberg, 2019). Additionally, detrimental effects on relationship quality have been found, such that the need for relatedness can be thwarted by upward comparisons leading to feelings of rejection or depression (Kuo & Yang, 2017); or a stronger need to belong moderated the association of SNS addiction and envy, with envy mediating the association of addiction and FOMO (Yin et al., 2019).

In our development, the self-concept is deemed to be fundamental and defined as the sum of our self-awareness, characteristics, roles, values and ambitions—basically everything we would use to describe ourselves (Morf & Koole, 2014). We need to form a stable self-concept, so our self would be coherent and thereby behavior (mostly) predictable (Aronson,

1997), because “we do not like inconsistency. It upsets us and it drives us to action to reduce our inconsistency” (Cooper, 2007, p. 2). So, what if we compare ourselves to others, and the picture we have of our selves differs from what we would like to be—and, respectively, what we see on social media? The SDT is a humanistic theory, with the striving individual being at its center. Striving for consistency and being in harmony with oneself is also an element of humanistic client-centered therapy (Rogers, 1961). It is assumed that people strive to reach their “ideal self”—whereas the “real self” is how we perceive ourselves and are perceived by others, the ideal self represents how we desire to be and what we find worth striving for. Higgins (1987) added the “ought self” that describes how we or others think we should or *ought* to be (e. g., law-abiding, responsible, ambitious,…, etc.). Even though the awareness of “photo-shopped” or otherwise edited pictures has risen and people present themselves as more real than ideal by now (e.g., Michikyan et al., 2015; Toma & Hancock, 2010), studies still report the possibly detrimental influence of unrealistic content on at least some user groups, especially those with pre-existing vulnerabilities (e.g., de Vries et al., 2018; Verrastro, Liga, Cuzzocrea, & Gugliandolo, 2020). Furthermore, depending on smartphone penetration, constant availability has established a standard (Ling, 2012), so the society shows us how we *should* act and people might adapt to this or, in terms of SDT, internalize this norm. The affordances of this availability as opposed to under which circumstances it is perceived as social pressure still needs exploration though (Bayer, Campbell, et al., 2016). These assumptions of how our self is formed and how it works can further be explained with another theory by Festinger (1957): the theory of *cognitive dissonance*. It assumes that beliefs, attitudes, or behaviors are often not in unison with our inner self and that we need to take action when we feel that they are inconsistent. This is especially the case when we invest effort but fail; or when we have to make—and afterwards justify—a decision; or when we are forced to be compliant (e.g., with rules or norms). To act against one’s inner strivings would also be considered strenuous (i.e., need thwarting) in SDT. Plausibly, being forced to act against our inner nature or failing at something we believed we would be good at can be detrimental to feelings of autonomy, competence, and also relatedness. However, Katz noted already in 1959 that “media cannot ordinarily influence an individual who has no ‘use’ for it in the social and psychological context in which he lives” (p. 2). So, people’s values, roles, and interests have to be considered, too, and SDT proposes this all along. Katz also noted that people select what they see according to their wants, like Festinger stated that people would select information in order to avoid or lower feelings of dissonance. That is, people chose media according to their needs and beliefs as well as showed a tendency to avoid oppositional messages. In case of confrontation with “counter-positions”, people would justify

their behavior or attitudes, or adjust their importance in order to feel congruent again. However, they would rarely change their beliefs or attitudes to lower dissonance.

In accordance with this, most people have a bias insofar that they perceive others are more susceptible to messages and effects of mass media than themselves. Davison (1983) introduced this as the *third-person effect* which ever since has been researched extensively for numerous effects—such as those of news, advertisements, or entertainment media (for reviews see e.g., Perloff, 1993, 1999, 2009). The effect supposedly has a behavioral (Xu & Gonzenbach, 2008) and a well-researched perceptional component (Paul et al., 2000; Sun et al., 2008), such that not just attitudes and beliefs are supposed to be influenced but behavior as well. Effects on attitudes were found to be moderate (Paul et al., 2000; Sun et al., 2008), but those on behavior rather small (Xu & Gonzenbach, 2008). Especially negative or unfavorable effects of media, which are not in compliance with the perception of one's own self are supposed to be ascribed to others, whereas beneficial effects are perceived to be greater on oneself as compared to others, which was also termed *first-person effect* (e.g., Perloff, 2009). The third-person effect was found to be stronger when people perceive others as less educated (Paul et al., 2000; Peiser & Peter, 2000), so that a downward comparison can be assumed to take place and possible self-enhancement might follow. Also, more distant persons are perceived to be more prone to negative effects than oneself would be, whereas those belonging to the in-group (with which one compares oneself) are perceived to be less vulnerable just like oneself (Andsager & White, 2009; Reid & Hogg, 2005). For SNSs, though, not just supporting results exist: In accordance with third-person assumptions, others were perceived to be more prone to negative effects such as on privacy, future employment opportunities, or relationships. However, for privacy and future employment opportunities, also close friends were rated to be at risk (Paradise & Sullivan, 2012) and participants believed others to get more positive uses from online social networks than oneself as well (Heravi et al., 2016). So, there is support for the effects applying to social media, but—as so often the case—more studies (e.g., long-term or experiments, investigating different social media) are needed to draw conclusions about the specifics of the effect in these applications.

To recap, the three needs proposed by SDT need to be satisfied for optimal functioning and well-being of an individual. Within the frameworks offered by SDT and also U&G, a person is actively striving towards need satisfaction. In SDT, all needs have to be satisfied for optimal well-being of a person and SDT more explicitly takes changing contexts as well as dissatisfaction into account. However, also media can serve to satisfy or dissatisfy the respective needs. FOMO was reported to play an important role and supposedly results from a

thwarted need for relatedness. FOMO supposedly drives more frequent media use and has been associated with many negative outcomes, such as lower life-satisfaction or overuse; and was also found to be closely related to social comparisons. Healthily integrating norms into one's own self via self-actualization can be accomplished via processes of comparison to one's surrounding environment. Media personae can also serve as means for this, and distorted presentations might lead to dissatisfaction and dissonance with one's self-concept, respectively. Though others are assumed to be more prone to negative effects of media than oneself or those close (as in similar) to oneself, a person is still assumed to try to want to change inconsistencies as they are supposed to constitute a state of tension.

What does this mean for the objective of this study? Is being aware of these mechanisms enough to change unwanted behaviors—namely, to be more active when online, compare less or only upwards, and to only pursue actions according to our inner desires? This way, negative experiences would simply not be persistent anymore, right?! Wrong—I reported that third-person effects are only small on intended behavior (as, for instance, found in a meta-analysis; Xu & Gonzenbach, 2008). So, the effect of messages on our perceptions might be moderate but this does not change our behavior or intentions to act differently. Why might that be? Research on habit, introduced in the next section, might provide some insights.

2.4 **Habit**

> Habits are first cobwebs, then cables.
>
> —Spanish proverb

Forty-three percent of actions in daily life are executed out of habit (Quinn & Wood, 2005, as cited in Wood, 2019) and "it's habit that creates persistence" (p. 13). But what exactly are habits?—Habits "are [defined as] a form of automaticity in responding that develops as people repeat actions in stable circumstances" (Verplanken & Wood, 2006, p. 91), whereas, more broadly, "automaticity can be understood as behavior that is triggered by situational cues and lacks control, awareness, intention, and attention" (Bayer & Campbell, 2012, p. 2084). Forming a habit means that our brain learns that past behavior has led to a certain outcome. The cues leading to the behavior can be incorporated into our cognitive structure and, thus, steer us to perform the respective behavior without actively thinking about it anymore (Wood & Rünger, 2016). Thus, habit is "a cognitive structure which involves a propensity to act, and not (…) the act itself" (Verplanken & Orbell, 2019, p. 66). In order to form a habit, one needs repetition of

a behavior, a stable context, as well as reward—intrinsic, if possible. A habit takes time to form; how much time depends on the complexity of it, with complex actions (i.e., consisting of multiple components) taking longer to feel automatic. In a longitudinal study, $n = 96$ UK students were asked to perform a desired health behavior daily. It took them 66 days on average until it *felt* automatic (Lally et al., 2010). In a longitudinal study conducted in the UK ($n = 94$; mean age 37.6 years, $SD = 10.13$), it took the participants five weeks for physical exercise to become habitual (Armitage, 2005); whereas in a study with German students ($n = 51$, mean age 21.2 years, $SD = 2.06$) a habit for usage of a mobile phone application formed within one month (Schnauber-Stockmann & Naab, 2019). Immediate and, thus, especially intrinsic gratifications have been shown to promote habit learning (e.g., Gardner & Lally, 2013) and once learned, "habits are (…) relatively insensitive to rewards" (Wood, 2019, p. 39). Moreover, intermittent gratifications of behavior, as known from research on operant conditioning, have shown that intermittent rewards of a favorable action would benefit the learning process (see e.g., Skinner, 1965, for the basics of operant conditioning, i.e., learning through reinforcement and/or punishment) and are associated with more profound learning, a mechanism casinos use for keeping people gambling (Brevers et al., 2015). Behavior only rewarded intermittently is also more resistant to extinction, because a reward is not needed every time the behavior is performed (Crum et al., 1951). In fact, habits have been shown to decay similarly slowly as they are learned even when optimal circumstances for habit change were given (Walker et al., 2014). Furthermore, this uncertainty (of reward) was found to reinforce addictive behaviors as it influences the brain's neurotransmitter signaling pathways in the same way as exposure to psychostimulant drugs does (Mascia et al., 2020), with dopamine release playing a crucial role (Yin & Knowlton, 2006). So, checking one's phone and intermittently "finding" a message when doing so could actually reinforce learning that there is a positive reward waiting for this behavior and, arguably, might even lead to an addiction in some cases (LaRose et al., 2003; Montag, 2018; Putnam, 2000). Results from neuroscientific research back this assumption: In a meta-analytic review, Patterson and Knowlton (2018) found evidence that while learning a task, brain areas involved in executive control and active decision-making (hippocampal and prefrontal areas) were active, whereas the activation shifted to another area with repetition of behavior (basal ganglia and putamen). So, different areas seem to be involved in the active choice that stands at the beginning of a new behavior as opposed to behavior that is already persistent (see also Knowlton & Patterson, 2016; Wood, 2019). Accordingly, daily use of the smartphone can be performed in a conscious manner but also without conscious awareness

(Bayer, Dal Cin, et al., 2016) as both ”conscious and unconscious processes interact and complement each other” (Baumeister et al., 2011, p. 354).

2.4.1 Habits and Needs

Following this chain of evidence, need gratifications might take place outside of conscious awareness, but the habits leading to the respective actions performed to satisfy needs once arose from actively seeking need gratification, just as proposed by U&G (LaRose, 2010a; Wood & Neal, 2007). The “classic” U&G (Katz et al., 1973) acknowledges that some media use is more casual or passive but not entirely involuntary, unconscious, or impulsive (cf. Haridakis, 2013), yet some later theories (Rubin, 1983, 1984) and extensions to the model (e.g., Rosengren et al., 1985) included habitual or ritualized user behavior. For instance, the General Media Gratifications Model (Palmgreen et al., 1985) includes “habitual media behavior” (see appendix, Figure A 1) though not habits’ proven direct effects, which “enjoys ample theoretical and empirical support and that challenges the core ‘active audience’ assumption of” U&G (LaRose, 2010a, p. 206). Furthermore, within U&G, habits are often part of the needs users seek to obtain (e.g., “I watch TV because it’s a habit”, Greenberg, 1974, as cited in LaRose, 2010a; or e.g., “Because it’s a habit, just something to do”, Rubin, 1983), but since these needs are actively and consciously pursued yet habits act outside conscious awareness, habit cannot pose a need (LaRose, 2010a; cf. e.g., LaRose et al., 2001). So, habits and U&G needs are neither the same nor absolutely contradictory yet possibly at different sides of a need-satisfaction-continuum. Indeed research has suggested that conscious (e.g., immersive) and unconscious (e.g., habitual) processes can be mixed, such that one might for instance automatically grab the phone yet happen to reach a state of being completely immersed when using it (Bayer, Campbell, et al., 2016). This is possible because the aforementioned four facets, or “horsemen” (Bargh, 1994), of automaticity—lack of control, attention, awareness and intention—do not have to apply simultaneously in a given situation (Saling & Phillips, 2007; Verplanken & Orbell, 2003). Consequently, a behavior can start unintentionally yet continue outside of conscious awareness or even in a mixed mode, with some behaviors running on “auto pilot” whilst some need conscious attention (LaRose, 2010a, 2015). Especially for unwanted behavior, initiation can be outside intention, attention, and maybe even control, but a person nonetheless can be aware of it (Orbell & Verplanken, 2010). Most habits in everyday life form when pursuing goals, thus also serve them and are respectively important for self-regulatory processes (Ouellette & Wood, 1998). For instance, habits (in this case “defined as the frequency of past behavior”, see LaRose, 2015, p. 369) can have a direct positive effect on perceived autonomy support as well as self-

determination motivation (Hagger & Chatzisarantis, 2009). Moreover, intrinsic rewards are not just important for habit formation because of their immediacy, but also because the action itself is rewarding, thus, performing it affords the possibility of reaching the aforementioned state of flow. Repetition might even be experienced as rewarding itself because we tend to like things we know. That is, mere exposure to things (e.g., objects, surroundings, people, or activities) changes our attitude towards liking them (e.g., Bornstein & Craver-Lemley, 2017). I mentioned mere exposure before (see Section 2.1.3), introducing negative effects of smartphone presence on attention and communication experience (Allred & Crowley, 2017; Thornton et al., 2014; Ward et al., 2017), but the term was coined long before mobile technology was developed. Zajonc (1968, 2001) introduced it and with it the phenomenon of attitude change associated merely with exposure to an unfamiliar stimulus with no reinforcement needed, only repetition. Simplified, familiarity leads to liking. Such a routine is also associated with predictability, greater perceived safety, and better well-being (Avni-Babad, 2011). In congruence with this line of argument, some research found the mere presence of the smartphone only to be detrimental if its presence was noticed but not if it was not (Allred & Crowley, 2017); whereas in other studies, the mere presence effect for smartphones could not be replicated at all (Crowley et al., 2018; Sanchez, 2020). One possible explanation could have to do with habit: The smartphone might distract only those persons who are not used to having it in sight. In one model trying to explain the mere exposure effect, unfamiliar stimuli were argued to lead to more arousal than familiar ones and that arousal would become less with more exposure (Berlyne, 1970; Kruglanski et al., 1996). This is in line with the mentioned research on habit formation: When a habit has formed, hence a situation or action has already become familiar and more predictable, less dopamine release would follow its exposure. Also, the more familiar something becomes, the easier, or more *fluent*, becomes the processing of the respective stimulus. This processing fluency is also associated with more positive affect towards the stimulus (Dragojevic, 2020). The mere exposure effect is stronger when someone is not aware of the stimuli, meaning that participants would attribute liking of a stimulus to the attributes of the stimulus (e.g., an image, a person, etc.) and not the repeated exposure to it (Bornstein & Craver-Lemley, 2017; Bornstein & D'agostino, 1992). Habits take place outside our awareness and, thus, are possibly favored over uncertain or unfamiliar things/objects/people and so on that do not evoke these feelings (yet)—without us even noticing this bias just because it is part of our routine. In short, "we repeatedly do the things we love doing. But we also grow to love the things that we repeatedly do" (Wood, 2019, p. 204). Transferred to the use of the smartphone, this could mean that just because we use it repeatedly, we are familiar with it and the ease of

using it. This leads to positive affect—despite possible detrimental outcomes as described earlier (see Section 2.1)—and using it might be rewarding in itself, leading sometimes even to a state of immersion so that people appear as "smombies" (some time ago, people appearing to be behaving in sort of an "automatic mode" when using their smartphones were termed "smombies", which is a portmanteau of smartphone and zombie). This was often reported in case of the context of walking or driving while texting (e.g., Appel et al., 2019; Hayashi et al., 2015; Lin & Huang, 2017; Panek et al., 2015; Spitzer, 2018).

Another possible explanation for the ambivalent results of mere exposure effects in smartphone use is associated with boredom: Liking tends to decrease with more frequent exposure, especially in people showing more proneness to experience boredom (Bornstein et al., 1990; Stang, 1974). So, if someone uses the smartphone too often or has been exposed to acquaintances' too frequent uses, they simply might enjoy another task or the interpersonal situation (as utilized in the studies to measure the mere presence effect) more than shifting any more attention towards the phone; accordingly, no effect of mere smartphone exposure would be detected. This is also in line with our preference for novel stimuli (Pascalis & de Haan, 2003) as we inherently strive for knowledge and self-actualization (and not just ease of processing; cf. e.g., Deci & Ryan, 2002; Ryan & Deci, 2017). Bornstein and Craver-Lemley (2017) derived from previous research that a dual process is likely when it comes to the mere presence effect: Liking rises with frequent exposure, which is in accordance with the arousal-related effect described above, but this affective reaction is followed by cognitive processing that leads to a decline of the liking after the exposure has been to frequent, hence boredom sets in. This has also been the case for stimuli that were not complex enough (e.g., Bornstein et al., 1990). Similarly, habit strength had also been linked to inherent interest in an activity, independent from past behavior (Gardner & Lally, 2013). So, motivation to participate might also have influenced the results in such a way that more motivated people pay more attention to the task at hand instead of succumbing to the distraction of the device (which is plausible, given that participants are often self-selected, thus are willing to participate in the respective study). Yet another possibility is the changed norm of smartphone behavior in a manner that standards of use have changed and are dependent on cultural contexts and, thus, people may be more familiar with the device or even have developed an "anti-attitude" towards smartphone use when in company (Diefenbach & Ullrich, 2019; Montag & Diefenbach, 2018), so that the effect would be limited due to the heightened awareness of the issue associated with the presence of the device.

To conclude, the mere exposure effect is well-documented, has many real-world implications yet still needs research to explain its mechanism in its entirety (the interested reader is recommended to read Bornstein, 1989, or Moreland & Topolinski, 2010, for more comprehensive insights on the mere exposure effect). Considering the reported effects at work for the present project might help to shed light on the possible interplay of habits and needs: Smartphone use might be activated automatically to pursue satisfaction of needs but might also be in itself rewarding because its use has become familiar. Familiarity also contributes to this behavior becoming habitual, just as this repetition might lead to a more favorable attitude towards use. Use frequently takes place outside of awareness and, in conclusion, contributes to the explanation as to why we might find it uninteresting to break the associated habit even when we become aware of it, even when accompanied by negative experiences.

2.4.2 **Why Mobile Media Habits are Special**

Not just mere exposure, but also low friction eases the path of an action becoming habitual; meaning, if it is uncomplicated or easy to perform a behavior, it becomes more likely than any action that is attended by even a tiny obstacle. This is somewhat similar to the favored fluency of processing mentioned in the previous chapter. We seem to like easiness—in thinking and acting. An obstacle creating friction can be as little as having to remove your phone from a pouch to check it for notifications instead of having it in a transparent cover. Nonetheless, it is usually easy to check the phone multiple times per day as it is (expected to be) always present in our lives and, accordingly, most carry them in their pockets, ready to quickly check them for messages by default. Moreover, using the phone as an alarm often makes it the first thing in the morning as well as last thing we see and touch before we sleep (Montag, Kannen, et al., 2015).

So, opportunities for using it are manifold—which is important for habit formation, with high opportunity behaviors presumably even leading to the formation of stronger habits (Ouellette & Wood, 1998). Moreover, especially the affordances of the smartphone provide the option for a multitude of different rewards, even when the intention is to just quickly check the phone (Van Koningsbruggen et al., 2017). That is not all: Media habits supposedly (LaRose, 2010a, 2015) differ from other habits because of the many different cues associated with them. That is, strong mobile media habits exist despite changing contexts—and context poses, per definition, an important factor in habit formation, but context does not necessarily describe a stable location. Context can also be a specific time or state of mind, or other people (cf. Wood, 2019, p. 133). So, a situation (e.g., standing at a bus stop) can possibly trigger using the phone

(e.g., to ease boredom or distract from waiting), because that was the "reward" in the past when performing this behavior. Furthermore, it does not even need to be the same bus, or station, or time—waiting for transportation might be enough of a stimulus to elicit the behavioral response (cf. e.g., Bayer, Campbell, et al., 2016). Especially interactive habits associated with social rewards are expected to easily form outlasting habits (Graybiel, 2008). In three longitudinal studies (tracking data, experiment, and a diary study), Oulasvirta and colleagues (2012) found particularly a checking habit, defined as "brief, repetitive inspection of dynamic content quickly accessible on the device" (p. 105), to be associated with smartphone use. Moreover, just quickly checking one's phone might be a "gateway habit", leading to longer exposure than intended, as the tracked data could attest. The experiment could show that "awareness cues" in form of notifications led to more unlocking the screen and more scrolling. The diary study found that, back then, habitual use was not perceived to be too pervasive or problematic. This was an early yet informative example of habits in the use of mobile devices, but gateway habits might be a key to explaining why media- and especially smartphone-related habits form so quickly and without a need for context in either acquisition (i.e., learning of a habit, which is reward-sensitive) or the activation phase (then insensitive to rewards) of habit formation (LaRose, 2010a; Schnauber-Stockmann & Naab, 2019). Though their diary study took place before the advent of the smartphone, Wood and colleagues (2002) concluded that over 50% of everyday media use was habitualized. But with the smartphone being implemented in daily life like being part of one's body or a companion even (Carolus et al., 2018), more than half of its use might be taking place out of habit by now. Mobile technology was found to be especially prone for habitual and immersed use as opposed to social media use via PC, for example (Kuru et al., 2017). Habitual smartphone use was suggested to "progress into excessive use" (Elhai, Levine, et al., 2018, p. 296; cf. also Horwood & Anglim, 2019; Van Deursen et al., 2015). Some researchers even argued that habit and addiction were located on the same continuum and that habits neither represent an addiction nor necessarily their pre-stage, but rather a struggle of self-regulatory mechanisms at work (LaRose et al., 2003; Oulasvirta et al., 2012). Self-regulatory mechanisms surely influence habits as can be derived from the reported literature, but, for reasons further explicated in the next section, addiction might still constitute a different extreme than *just* being a bad habit (e.g., LaRose et al., 2010; Wood, 2019).

2.4.3 **Habit vs. Addiction**

It is not easy to change habits and an evaluation of those behaviors is easier (or maybe even only feasible) in retrospect as they often take place without conscious awareness (Quinn

et al., 2010; Wood, 2017). But what if we know that we use the smartphone too often or for too long at a time, and that it possibly comes with negative effects—why, then, would we continue? As Wendy Wood put it, we might "need to stop overestimating our rational selves" (p. 5), meaning that much behavior we show is not performed deliberately. In two experience sampling (ESM) studies, Wood and colleagues found that 60% (n = 70) and 51% (n = 209) of repeated behavior was performed without the participants thinking about it (but instead, for instance, they were ruminating or daydreaming). The authors inferred that these behaviors were performed out of habit (Wood et al., 2002). Personality differences and age did not predict how much a person relies on habit: We all seem to be equal in this matter and our procedural memory was found untouchable through knowledge, meaning knowledge alone cannot change the course of actions performed (Wood, 2019; Wood et al., 2002). Furthermore, it could be shown in a multitude of studies that the influence of past behavior on future actions has more impact than intention, attention, or other attempts to use willpower to predict an intended outcome (Gollwitzer & Sheeran, 2006; Hagger & Chatzisarantis, 2009; Kim, 2012; Pronin & Kugler, 2010; Song & Zhang, 2011); especially when attitudes and intentions are affected by uncertainty, ambivalence, or indifference and thus are unstable (Ajzen, 2002). However, strong habits are not easily controlled—not even implementation intentions[20] could make a difference though they are otherwise considered to be successful in habit change (Webb et al., 2009). So, the influence of nonconscious smartphone use might be a good explanation for a detrimental behavior taking place persistently and potentially liking this behavior might add to the difficulties of behavior change, as backed by research on mere exposure.

As introduced, has research on Internet use and later on social media quickly jumped to conclusions about user addictions (see Section 2.1.1) instead of analyzing everyday behavior—such as supposedly normal habitual use of technology (Bayer & LaRose, 2018). In fact, it was argued that habit and addiction might be on the same continuum and, thus, *just* extremes of one another (LaRose et al., 2003), but the earlier presented criteria necessary for diagnosis of an addiction (see 2.1.1, particularly Table 1) show that these extremes had to be at far ends from one another. Habit might be a pre-stage of addiction insofar that behavior is out of conscious control, independent from our intentions or desires, and persistently taking place (Everitt & Robbins, 2016). But, habits take over without us noticing, acting out of awareness, whereas

[20] If-then plans are one suggested way to counteract undesired behavior by linking a specific reaction or intention to actions in a specific, foreseeable setting (see e.g., Gollwitzer, 1999; for a meta-analysis, see e.g., Gollwitzer & Sheeran, 2006; and for a more comprehensive introduction, the interested reader is referred to Oettingen, 2014).

addiction takes over our complete lives with still a lot of conscious thought and action involved in the pursuit of the craved substance or behavior (Wood, 2019) though also lacking volitional control over it (Bayer, Dal Cin, et al., 2016). Furthermore, as opposed to even bad habits, an addiction leads to severe impact in important areas of professional and private life (e.g., cutting ties to important others, neglect of important tasks and work, or even delinquent behavior). Repercussions like these are not comparable to reported addictive behaviors in (arguably, more or less) normally functioning student samples, though often variables such as more impulsiveness and mindlessness are associated with more extreme behavior (Bayer, Dal Cin, et al., 2016). However, Bayer and colleagues (Bayer, Dal Cin, et al., 2016) also noted how automatic and often immersed behavior (think of "smombies" once more) can appear "addiction-like" to observers. Additionally, bad habits can be influenced and altered as we will see in more detail in the paragraph on self-control (see Section 2.5); addictions usually require professional treatment, though especially relapse might be associated with habit-mechanisms triggered by the respective known context cues (Kirchner et al., 2013; Verplanken et al., 2008).

2.4.4 **Upsides and Downsides of Habits**

That much of our behavior and the involved processes take place outside conscious awareness (Sheeran et al., 2013) actually has its benefits: Habits relieve us from a number of decisions we would have to make in daily life because especially repeated tasks run on autopilot, consequently leaving brain capacities for more demanding activities. "Automatic processes are efficient and rigid, whereas controlled ones are costly (i.e., in terms of effortful consumption of resources [such as energy when executing self-regulation]) and flexible" (Muraven & Baumeister, 2000, p. 247). Further, a lack of immediate emotional feedback is associated with actions performed out of habit. Not only do habits make everyday life easier, they also decrease stress this way: In a diary study, Wood, Quinn, and Kashy (2002), found that the performance of just one nonhabitual behavior would increase stress whereas habitual behavior, even when seemingly emotive, did not heighten stress-levels (see also, e.g., Baumeister & Bratslavsky, 1999; Wood, 2019). As outlined earlier, stress can have serious consequences (see Section 2.1.2), so habits really can benefit us in more than one way in everyday life. Habits also take over when demands are too much, so that a person cannot deliberate about a decision (e.g., when under pressure, stressed, or distracted). In doing so, at least good habits, namely those in accordance with goal intentions, are performed even when willpower is low (Neal et al., 2013). In short, habits are an invaluable resource and even guide our behavior when consciously doing so is not possible. Of course, this is only beneficial in the case of good habits.

If willpower is low and we fall back into old habits that divert us from our initial goals, such as stopping at a bakery to buy cake on our way home although on a diet or checking the phone despite working on an important ongoing task with a deadline approaching, the habit is undesirable.

Just as habits can align with goals and their cues lead to favorable behavior, they can also be bad habits and thus not be in accordance with goals (Wood, 2017). That is, they also have their downsides, because they are action-driven, thus our mind is not set towards deliberating about whether or not to perform an action or thought—they are simply elicited when a certain cue is present. Moreover, when people are asked about habitualized behaviors, they are—because their performance was elicited outside of conscious awareness—found to be unaware of the reasons for them, no matter if they were aligned with goals or not (Bar-Anan et al., 2010). If people are insecure about reasons for their actions, they have even been found to confabulate them (Adriaanse, Weijers, et al., 2014; Nisbett & Wilson, 1977). If behavior is goal-opposed and we become aware of this, we feel inconsistency, but we will not simply *change* our actions or attitudes—most of the time, we would rather *adjust* our attitudes (add information or lower importance of them, for instance); this way, we "justify" our actions and accordingly lower the unpleasant feeling of dissonance that might accompany going "astray" due to habit (e.g., Festinger & Carlsmith, 1959).

Habits also have the downside of tunnel vision, meaning we pay selective attention and might miss things that are just beyond our awareness, such as showing much less interest in information on alternatives to driving a car (e.g., public transport, biking) when that is our usual means of traveling (Verplanken et al., 1997). Driving on auto pilot is also associated with more accidents happening on better known routes. In fact, over 50% of accidents happen within five kilometers of one's home, presumably because people feel safe in known surroundings, but also because in familiar contexts, habits take over and attention might be directed to other tasks instead on the road. This "close to home effect" was found for all sexes and age groups, but not for novice drivers, adding to the explanatory value of the habit-argument, because when driving is still a recently learned skill, many decisions require conscious execution (Burdett et al., 2017; see also Wood, 2019). So, using one's phone while driving a car can for some part be attributed to habit, representing a dangerous downside of this otherwise helpful resource.

Certain personality traits were found to favor an interruption of habits or their inhibition (Adriaanse, Kroese, et al., 2014). For instance, research trying to explain why people would text and drive knowing the risks as well as its illegality showed that self-control seems to play

an important role: Students who texted more frequently while driving also showed less ability to delay rewards than those who texted less frequently when behind the wheel (Hayashi, Russo, & Wirth, 2015). The authors concluded that texting while driving was an "impulsive choice made by drivers" (p. 185). The results show that the students who frequently text while driving discounted delayed rewards at a greater rate than the matched control students. The study supports the conclusion that texting while driving is fundamentally an impulsive act that is influenced by traits such as self-control. So, habit has taken over as it is insensitive to rewards. Moreover, in an experience sampling study by Quinn and colleagues (2010), around 12% of the reported emotions, thoughts, or behaviors that participants tried to inhibit were undesired habits and around 38% of actions were temptations that were goal-opposed but would lead to immediate gratifications, with only 3% of them overlapping—they are not the same and habits were much harder to control than temptations, possibly because we are unaware of most triggers in daily life (Wood, 2017). Furthermore, in a subsequent study the authors tested strategies to counteract the unwanted behaviors and found that vigilant monitoring of cues to prevent them from triggering the behavior was the only—yet effortful—way (Quinn et al., 2010).

To sum up, habits make life easier by lifting cognitive load and, thus, leave more resources for executive functioning. Habits and U&G needs are neither the same nor completely distinct, but can both be at work when using smartphones. Also, self-regulation as is at the core of SDT is still viable when actions have become habitual since most started out directed towards goal pursuit. Media habits are considered special since they do not need a stable context to be cued but in fact have multiple triggers readily available. Habits also benefit us in everyday life as they reduce stress. However, also bad habits exist, though they do not pose an addiction. Addiction would take over one's life notably, whereas habits take over without us being aware of them most of the time. Also, repercussions of addiction are not even remotely comparable to bad habits. Despite their upsides, especially unfavorable actions, as opposed to those in pursuit of need satisfaction, are described in most literature on the use of smartphones. This might be because action is performed whether we like it or not and without evaluation of the outcome providing possible feedback, which theoretically could elicit habit-change: In the onset, goal-striving and active decisions might guide our behavior, but if the behavior is repeated and even rewarded in the beginning, the reward becomes less important once a habit has formed, as does negative reinforcement as effect of an unwanted behavior. Interestingly, the prefrontal cortex, used in active decision-making and executive control, is also the region active when self-control is executed or when we are planning to (not) do something (Wood, 2019). Brain regions involved in habits and goal-directed behavior are interconnected (ibid.), which is an explanation

from neuropsychology as to why we can still choose actively in one instance even though we are acting out of habit another time. Habits are very resistant to extinction, and it takes about as long to unlearn them as it takes to establish them. Bad habits do not pose short-term temptations which can be counteracted more easily but are cued outside of conscious awareness. One possible way to interrupt them at least, is to exert self-control (Quinn et al., 2010), as will be outlined in the following chapter.

2.5 Self-Control

> He who controls others may be powerful, but he who has mastered himself is mightier still.
>
> —Lao Tzu

So far, research suggests that needs or habits can lead to actions—those that benefit us as well as those that do not. Self-control poses an indisputable fundamental trait, responsible for a multitude of outcomes in all areas of life and crucial to tackle unwanted behavior. The most prominent name when it comes to research on self-control is surely Walter Mischel. He and his team developed the marshmallow test[21] in the 1960s and started what would become decades of seminal research on this important trait. They identified the mental processes and strategies through which one can "cool hot temptations, delay gratification, and achieve self-control" (Mischel, 2014, p. 8). With years of study, even implementing longitudinal analyses spanning over (four) decades, they lay the foundation for an array of factors in life that are influenced by self-control. In short, this innate trait is a great predictor of success and well-being much later in life (Casey et al., 2011). For instance, children with better self-control turned out to have better academic success, career outcomes, and interpersonal relationships (Duckworth, White, et al., 2016; Mischel et al., 1988, 1989; Tangney et al., 2004). Self-control can be seen as "the ability to delay immediate gratification of a smaller reward for a larger reward later in time" (Gillebaart, 2018). In general, "self-control is the ability to override or

[21] The marshmallow test constitutes an experiment in which a child is left alone in a room, sitting on a chair at a table with a treat of their choice on a plate in front of them, most prominently a marshmallow. The room is otherwise empty. The experimenter instructs the child that if it does not eat the treat, it will be doubled once the experimenter returns. The child is supposed to stay put and does not know when exactly the experimenter will return. The child is observed via a one-way mirror or filmed. Particularly the time that children can endure without or before eating the treat as well as their strategies to manage the situation have been studied and shown to be strong predictors for future success (the interested reader is recommended to read Mischel (2014) for a comprehensive introduction to this early in life measurement of self-control).

change one's inner responses, as well as to interrupt undesired behavioral tendencies and refrain from acting on them" (Tangney et al., 2004, p. 275).

Not just trait but also state self-control can be discerned. The trait poses the predisposition of a person, but it might fluctuate so that even someone who usually has high self-control might act uncontrolled at times. By being acknowledged as the "efforts people exert to stimulate desirable responses and inhibit undesirable responses (…), self-control constitutes an important prerequisite for self-regulation" (De Ridder et al., 2012, p. 77). Whereas both are sometimes used interchangeably (Baumeister et al., 2007; Hofmann et al., 2007), I use self-control as representing a more conscious, or reflected, resource and self-regulation involving broader, underlying, often more unconscious processes.[22] Accordingly, self-regulation is "a defining trait of the entire system of thoughts, feelings, actions, traits, and choices that make up the self" (Baumeister, 2018, p. 1) and guide one's actions towards desired goals (Carver & Scheier, 2012; Deci & Ryan, 2012; Gillebaart, 2018). If research on self-regulation assumes that people have norms, standards, or goals upon which they act, it then depends on their monitoring of these actions and the respective outcomes as well as their strength of self-control whether unwanted behavior can be interrupted and/or changed (Baumeister & Heatherton, 1996). Indeed, people can enact volitional control and thereby interrupt an unwanted action, but they cannot control habitual responses per se, since these are not susceptible to intentions (Wood, 2017). LaRose (2010a) even argued that "no media consumption behavior is purely habitual because 'executive control' may intervene at any time" (p. 215) and, as noted before, action scripts could consist of successive conscious and unconscious behaviors, thus mixing habitual and volitional behaviors. Even with strong self-control capacities, habits were found to mediate the effect on an outcome, desired or not. For instance, the effect of trait self-control on unhealthy snack intake was mediated by unhealthy snack habit strength and no direct effect from self-control on healthy snacking was found (Adriaanse et al., 2014). Similar results were obtained for stronger self-control predicting more exercising behavior, yet again mediated by stronger exercising habits (Gillebaart & Adriaanse, 2017). Many, if not most, studies on habit and self-control focus on health, that is, nutrition intake, weight, exercising, and so on; but similar results for media use could be detected. For instance, a diary study with 1.094 media use episodes (n = 215; aged 18 to 67 years with a mean age 29.8 years, SD = 9.7) found low state and trait self-control to be associated with more procrastinatory (thus, goal-opposed) media use. Additionally, more than

[22] This decision is based on e-mail communication with Roy F. Baumeister in 2017 and Wilhelm Hofmann in 2019 as well as personal communication with Joseph B. Bayer in 2019; see also, e.g., Hagger and colleagues (2010) for a corresponding use of the term.

half of the tracked media situations were accompanied by a media-related goal conflict, suggesting that media use often demands self-control as it tempts the user to act inconsistent to their current goals (Reinecke & Hofmann, 2016).

It can probably already be assumed that whereas higher trait self-control is associated with better well-being, more controlled thoughts, feelings, and impulses (Baumeister et al., 2018); so is low self-control associated with unbeneficial life outcomes, such as obesity (Fan & Jin, 2014; Schlam et al., 2013), substance abuse (Moffitt et al., 2011; Tangney et al., 2004), or undesired media use (Hofmann, Baumeister, et al., 2012; Reinecke & Hofmann, 2016), to just mention a few (for a more comprehensive review of associated factors, see e.g., De Ridder et al., 2012). Moreover, self-control failure was associated with fewer experiences of accomplishment (Meier, 2017) and, thus, could result in a thwarted need for competence, for instance (Halfmann & Rieger, 2019). But why would self-control fail? And, what about those low in self-control—are they fated to live with the consequences of not being able to exert control?

2.5.1 **Ego Depletion**

We need self-control to override impulses or habits that promise immediate gratifications but lead to losing focus on long-term successes, including gratification of basic needs—and also to enact in effortful tasks that require discipline and focus (Hagger et al., 2010; Loewenstein, 1996). Self-control strength is decisive in how good we are at exerting executive control. The limited strength model of self-control proposes that self-control is a limited resource, using the analogy of a muscle that weakens with continuing strain (Baumeister et al., 1994, 2018; Baumeister & Heatherton, 1996). So, after exertion of an effortful behavior a subsequent attempt of exerting self-control might fail; that is, all acts of self-control draw energy from the same resource, thus, each exertion limits strength and subsequent chances of a successful exertion of self-control (Muraven & Baumeister, 2000). Self-control describes the "overriding of one action tendency in order to attain another goal" (Carver & Scheier, 2016, p. 3), but according to the strength model, this executive control can wear down. This was dubbed *ego depletion* (e.g., Baumeister et al., 2018; Baumeister & Heatherton, 1996) and defined as "a temporary reduction in the self's capacity or willingness to engage in volitional action (…) caused by prior exercise of volition". When the self's capacity to control unwanted actions is low, we fall back on our habitual selves, because that is where "persistence sits" (Wood, 2019, p. 33). In fact, after executive control is worn down, people might be persuaded more easily (thus, altering their attitudes), but behavior-wise fall back on their habits nonetheless, as three experimental studies could show (Itzchakov et al., 2018). Five other studies, four experimental

(two laboratory and two field) and one correlational, also found that ego depletion increased habit performance (Neal et al., 2013). This might be the case because habitual behavior does not require as much energy as controlled behavior.

Despite over 600 independent studies (Carter et al., 2015) confirming an ego depletion effect (Baumeister, 2002; Baumeister et al., 2018), the paradigm has recently faced a lot of criticism, especially after failure to replicate the effect in a pre-registered multilab study (Hagger et al., 2016) and a meta-analysis raising fundamental doubt towards the effect's existence per se (Carter et al., 2015). However, responses to the critical studies, and especially the respective methodologies applied, put their validity in question (Cunningham & Baumeister, 2016; Dang, 2018; Inzlicht et al., 2015). Furthermore, subsequent studies also found the assumed depletion using a pre-registered[23] multilab approach (Dang et al., 2020). So, the effect might be small and underlying processes in need of clarification, but the existence of the assumed effects (i.e., a reduction of executive control following exertion of control) seems to date, despite the criticism (for a review on criticism, see e.g., Friese et al., 2019), still warranted (Inzlicht & Friese, 2019; Vadillo, 2019).

Based upon the reviewed research (Hofmann, Baumeister, et al., 2012), it is also relatively safe to assume that self-control is influenced by other variables and resisting a temptation or controlling one's behavior is more difficult under certain circumstances—under stress or fatigue, for instance (Hofmann et al., 2008; Ward et al., 2017; Wenzel et al., 2020). Neuropsychological research supports these findings: The brain areas responsible for learning, decision–making (thus, also goal-striving), and executive control are less active under stress, whereas the striatal neural system (involved in habitual responses) becomes more activated (Schwabe & Wolf, 2013). Similar to the self-control concept is the notion of vitality which was introduced within the SDT tradition as "a positive feeling of aliveness and energy" (Ryan & Frederick, 1997, p. 529) that a person is consciously aware of (Ryan & Deci, 2008) and that they "can harness or regulate for purposive actions" (p. 703). Whereas research on self-control and ego depletion addresses energy drain when executing control, it never focuses on maintaining or enhancing the respective resource. The SDT researchers assume that not all

[23] In all fields of science, but especially in social psychology, more often pre-registered studies are demanded—supposedly to reach a state of better transparency in research (according to the respective ethics one would assume to be standard): among those less inflation of effect sizes in published research and an option, with registration also a standardized, to find all studies on a topic, not just published ones. It might also be a means to provide a standard to overcome issues of non-replicability of previous findings by applying power estimates beforehand (Nosek et al., 2018; Nosek & Lindsay, 2018; Stroebe & Strack, 2014). I particularly recommend Roy Baumeister's comment on this *and* the related criticism on ego depletion in the appendix (i.e., pp. 28-43) of "The long reach of self-control" (Baumeister et al., 2020).

volitional behavior drains the self's energy as proposed by ego depletion, yet that autonomous self-regulation can enhance vitality. That is, actions autonomously performed in order to satisfy the three basic needs do not require effortful self-control (as self-controlling regulation does). For instance, Muraven and colleagues (2008) found effects of lowered self-control as cause of ego depletion to be mediated by vitality in three experimental studies, suggesting that the two concepts overlap. Moreover, it is suggested that satisfying basic needs restores and even enhances vitality and, thus, also self-control capacities (Deci & Ryan, 2012; Martela et al., 2016), since they are assumed to be "tapping into the same phenomenon" (Ryan & Deci, 2008, p. 711).

However, important for the present study is not the source of that "energy" or its name, but that self-control is well-documented to vary within and between individuals (Hofmann, Baumeister, et al., 2012) and that some persistently fail to control unwanted desires—especially and most often in the case of media use (Hofmann, Baumeister, et al., 2012). Thereby, they are giving in to short-term gratifications by possibly undermining long-term goals (Du et al., 2018; Meier et al., 2016). Moreover, and as mentioned before, when self-control is low, people fall back on their habits—which is problematic if those are goal-opposed. For instance, participants in a multinational tracking study (n = 793 students, mostly between 18 and 23 years of age, with 52 nationalities) stated that incoming notifications (i.e., calls, messages) would "sometimes feel like an emergency" (p. 67), urging them to direct their attention to the phone (Mihailidis, 2014). A habit to promptly check the phone in case of a notification can easily turn into a distraction from goal-pursuit (Wood, 2019), especially when self-control is low, because habits are always "there for us", even when executive control is down. As an innate trait, all hope might seem lost if someone is not born with high self-control capacities, but studies suggest that self-control can be improved through training (e.g., Gailliot et al., 2007). What sounds contradictory at first, might be more plausible using the muscle metaphor again: Using a muscle needs energy and this energy is not unlimited. So, directly after training it is drained, but exercising regularly strengthens it in the long run. The same principle might apply to self-control. The plasticity of our brains has proven to be impressive with brain regions taking over functions of others, such as the visual cortex processing auditory signals, for instance (Finney et al., 2001); and it could be shown that the brain can be trained even after injury (Johansson, 2011; Richards et al., 2008). So, if someone can regain skills (e.g., language skills, motor skills) after a stroke *just* through training, and keeping in mind that our brains' "capacity (…) to learn and adapt is unequalled" (Green & Bavelier, 2008, p. 698) as the respective review study concluded, then it should not be too far-reached to assume that a person could also learn to exercise more self-control. In fact, self-control can be practiced by engaging in small yet regular acts of

self-control and as little as two weeks of practice already led to changes which could not be attributed to self-fulfilling prophecies, awareness of practicing self-control, or heightened self-efficacy as this was controlled for in an experimental study (Muraven, 2010). Meta-analyses of mainly experimental research confirmed the training effect on self-control capacities (Beames et al., 2017; Friese et al., 2017). Moreover, it is presumed that strengthening self-control in one area improves it in general, so that a person would benefit in many aspects and not just the practiced field (Oaten & Cheng, 2007). Last but not least, the effect might be bi-directional as is familiar from habit learning (that is, repetition leads to habit forming and habitually doing something strengthens the respective habit; see Section 2.4): Higher self-control was found to promote exercising and persistence of it, but also regular training reinforced self-control (Boat & Cooper, 2019). So, there is hope.

2.5.2 **Self-Control and Habit**

The described classic view of self-control as volitional inhibitory power over unwanted impulses has recently changed with the emergence of research on so-called *effortless* (or, *initiatory*) self-control (Gillebaart & De Ridder, 2015). That is, people scoring high in trait self-control less often have to resist desires to begin with (Hofmann, Baumeister, et al., 2012) since they tend to avoid the respective tempting situations (Ent et al., 2015). Due to more beneficial habits, they are more likely to change their environment into one that reduces friction (e.g., less distraction by learning in a library as opposed to with friends at home while some are not learning at all; see also Ent et al., 2015), so that it is easier to perform a goal-oriented action without allowing cues to elicit habitual behavior that is not relevant in that moment (Duckworth, Gendler, et al., 2016; Verplanken & Wood, 2006). People with good self-control (unconsciously) create an environment that makes it easier to behave according to one's goals with cues for beneficial habits in place and those for unwanted behaviors not (e.g., having healthy snacks visible and unhealthy snacks not in sight, or turning off smartphone notifications that could lead to a distraction). Some argue that creating healthy habits might be the strength of self-control (Carver & Scheier, 1998) and in fact, high self-control supports the formation of good and bad habits alike, as a comprehensive meta-analysis could show (De Ridder et al., 2012). To form a habit, either good or bad, repetition is needed and people with more trait self-control might also like to be more in control, thus structuring their lives with more consistent behaviors, which benefits habit-formation (Baumeister & Alquist, 2009; Wood, 2017).

Since self-control can benefit both desired and unwanted outcomes, it was suggested that self-control might consist of two components, termed inhibitory and initiatory self-control.

In two Dutch studies (with n = 351 and n = 226 students participating, respectively), the former predicted unwanted behavior whereas initiatory self-control was better at predicting desired behavior (De Ridder et al., 2011). Moreover, no matter if the behavior was desired or undesired, the influence of self-control as a moderating variable was the largest effect found in the meta-analysis for automatic (as opposed to controlled) behaviors (De Ridder et al., 2012). So, higher self-control promotes both forming and breaking habits; with greater self-control also comes greater control of situations, thus also context cues (De Ridder & Gillebaart, 2017). For instance, people were observed at a Chinese all-you-can-eat-buffet and those with a lower body mass index (BMI) implemented behavior that would benefit eating less despite the option to eat as much as possible (e.g., sitting backwards to the buffet (thus avoiding seeing the food as trigger), putting napkins on their laps, or using smaller plates; Wansink & Payne, 2008). It was also found that those with lower BMI chose walkable neighborhoods as opposed to more obese people who lived in areas that promoted their preference for driving (Eid et al., 2008). Comparison of normal-weight to obese preschoolers' homes revealed that the former provided more options for their children to act healthier, such as no TV in children's bedrooms and fresh vegetables as well as more options to be active available (Boles et al., 2013). Just as self-control influences choice of situations, so does it influence the social context we choose: People can pose a friction to us just as they can benefit our goal-pursuit (this works both ways). Accordingly, those higher in self-control surround themselves more often with others who have similar aspirations, work ethics, and so on (VanDellen et al., 2015). In sum, our environment is the greatest help *and* distraction from focus on goals and self-control is a key factor helping us to make the best of it—even in an environment full of potentially distracting (media) cues.

2.5.3 **Self-Control and Media Use**

Mediatized as our everyday life has become by now, structuring it in a way to avoid the aforementioned possible distractions the devices have to offer is presumably a great challenge (see e.g., Section 2.1 and especially Section 2.1.3). Since they are always present, they also are in need of conscious regulation because their use does not regulate itself by being bound to a place as, for instance, the TV set or a desktop computer (Bayer, Dal Cin, et al., 2016). Moreover, mobile devices offer immediate gratifications and are often used habitually—these inner cues can trigger the desire to use the smartphone just as external ones, such as its ubiquitous availability and attention-demanding notifications. These four aspects make it presumably harder to resist the temptation inherent in the device and its affordances (Hofmann et al., 2017).

A recent experimental study with young adults ($n = 179$, mean age 21.65 years, $SD = 2.16$) found for instance that ego depleted participants preferred entertaining movies that were neither cognitively nor affectively challenging (Eden et al., 2018). The same is true for other media content. For instance, users lower in self-control spent more time on SNSs and with online videos (Panek, 2014). While, in line with the SDT-inherent vitality-concept as well as U&G assumptions, media can be used to replenish or re-energize a person (Reinecke et al., 2011), it can also lead to even more depletion by feelings of guilt accompanying the respective media use if that use is competing with other goals or attributed as unjustified time off (Meier et al., 2016; Reinecke, Hartmann, et al., 2014). If users feel less in control of choosing media, because they are depleted and habitually select the entertaining media content, they might feel less autonomous (Reinecke, Vorderer, et al., 2014). The need for competence could also suffer when content is chosen that does not challenge the user, thus preventing them from feeling as if they have mastered something (e.g., a complex movie, quiz, or chat; Johnson et al., 2020). However, especially the perception of having a choice (i.e., how much a person feels in control) seems to influence the extent to which depletion occurs (Muraven et al., 2008; Reinecke, Vorderer, et al., 2014) or a behavior can satisfy basic needs (Johnson et al., 2020). In a study measuring self-control and activities after work at two time points in the evening (first, between 5:00 p.m. and 7:30 p.m., and then between 10:00 p.m. and 01:00 a.m.), especially TV and social media use were associated with satisfaction of autonomy, whereas competence was linked to socializing with friends, and relatedness to socializing with friends both offline and using social media (Johnson et al., 2020). More importantly, higher levels of self-control at t1 predicted higher levels at t2, suggesting that those higher in self-control make choices of media use or other leisure activities that help to restore, maintain, or enhance self-control in the long run (ibid.), a finding that is in accordance with the aforementioned effortless self-control: People with more self-control capacity more likely make choices that benefit them in the long run (Hofmann et al., 2009), whereas those lower in self-control cannot benefit as much from those activities, accordingly not satisfy their needs, possibly because they feel less self-determined in their behaviors. Control is also affected when the smartphone interrupts us in daily life as these interruptions are perceived as unpredictable. Controlling them, for instance by only checking the phone at three fixed times per day, can improve well-being and lower cognitive cost while not leading to anxiety and FOMO as completely turning notifications off would (Fitz et al., 2019). Habit might be crucially influential in most cases. For instance, also self-control's negative relation to texting while driving (Moore & Brown, 2019; Panek et al., 2015) is mediated by habit. This is comparable to previously mentioned effects of self-control on health

behavior, which also was found to be mediated by habit (Adriaanse, Kroese, et al., 2014; Gillebaart & Adriaanse, 2017). These days, it has become a habit to be connected all the time, which might lead to stress (as introduced before, see e.g., Sections 2.1.2 and 2.1.3). People with higher self-control generally have better habits and less stress (Baumeister, 2018) than those low in self-control. Pursuing this line of thought, it is likely that feeling pressured to be available all the time (and by means of habit being permanently available) might lead to accumulated interruptions, which in turn negatively influence a person's productivity, thus their competence satisfaction, and self-control capacities as a result (Halfmann & Rieger, 2019; Hofmann et al., 2017). Recently, perceived stress was found to lead to self-control failure, which, in turn, reduces competence satisfaction (Halfmann & Rieger, 2019). The dark side of being permanently connected might be associated with a downward spiral via thwarted needs, lower self-control (due to more perceived stress) and to even more interruptions because of less control over the (habitualized) behavior. If needs are thwarted, people might attempt even more to fulfill those needs, yet fail because they are already depleted to begin with and cannot enjoy media use, thus cannot benefit from it (i.e., satisfy needs; Johnson et al., 2020; Panek, 2014).

Taken together, self-control is an invaluable trait, associated with a plethora of beneficial outcomes. High self-control, even when measured early in life, has good predictive value over decades. Self-control can inhibit short-term temptations and even habits but disruption by automatically cued behavior comes at a great cost (i.e., its draining energy) and is as such carefully weighed (Shenhav et al., 2017). Research on the limited strength model (ego depletion) has been criticized, but the main idea of self-control to vary within and between individuals is well-documented—and is what is important for the present study. Self-control interacts decisively with habitual behavior. In fact, not only can it interrupt unwanted desires in the form of a situational control, but research suggests that individuals with higher trait self-control facilitate their environments in ways that favor good habits to be enacted rather than engaging in effortful acts of controlling unwanted actions. So, instead of exerting effortful inhibition each time an obstacle appears, those high in self-control establish consistent patterns of behavior that are in accordance with long-term goals. When researching everyday temptations, desires to use media were the most frequent right after eating and sleeping and, more importantly, found to be the ones most often given in to despite them conflicting with goal-pursuit (Hofmann, Vohs, et al., 2012). Resisting media is not easy, especially mobile media that bring so many cues with them to trigger habitual use that creating an environment free of those temptations is almost unthinkable. Additionally, personality characteristics can contribute to engaging even more in detrimental media behavior, possibly because they are

associated with thwarted needs and lower trait self-control. Loneliness is one such predisposition that might lead to less rewarding media experiences as it is negatively associated with self-regulation and need-satisfaction (Hawkley & Cacioppo, 2010). Furthermore, loneliness is associated with unbeneficial health behaviors, such as less physical activity or alcohol abuse (Åkerlind & Hörnquist, 1992; Lauder et al., 2006). Therefore, I will introduce loneliness as a personality variable that might play a role in explaining our actions in relation to mobile phone usage and respective negative experiences.

2.6 Loneliness

> Loneliness is like an iceberg—it goes deeper than we can see.
>
> —John T. Cacioppo

It is important to distinguish that being alone is not the same as being lonely. One can be on their own and perfectly fine, while someone else can be surrounded by loved ones, yet feel lonely (Cacioppo & Patrick, 2008). As inherently social beings, most of us long to be connected to others. How pronounced this need is, however, differs across individuals and is in part genetically predetermined: One longitudinal study with Dutch twins (n = 8.387; spanning over 10 years) deduced a 48% contribution of heritability to differences in individual feelings of loneliness (Boomsma et al., 2005). Our genes only provide the capacity to experience loneliness, but beyond genetic disposition there are other factors that contribute to the manifestation of it—environmental conditions, for instance. Social context (family, friends, society, etc.) provides the means to develop healthy self-regulatory strategies so that situations that entail social isolation will not result in great distress for a person, which experienced loneliness would cause. This distress could lead to the same severe physical and mental health issues (cf. e.g., Hawkley & Cacioppo, 2010) already referred to when introducing stress (see Sections 2.1.2 and 2.1.3). Moreover, longitudinal research, for instance a study with older adults over six years (n = 1604), found loneliness to be a predictor of not just functional decline (e.g., walking, climbing stairs, or lifting ones upper extremities) but even death (Perissinotto et al., 2012). Corroborating results exist from a multitude of similar longitudinal and cross-sectional studies alike (e.g., Henriksen et al., 2019; Leigh-Hunt et al., 2017; Luo et al., 2012). Accordingly, it is argued that loneliness is not just the experience of being isolated or disconnected, but an evolving and possibly even fatal disease, especially in modern societies in which people often lead a more solitary life (Spitzer, 2019). Research on loneliness often focuses on older people

because with age social connections, or options to connect, decrease. Thus, loneliness posits a greater risk for this age group. Additionally, more deterioration of the body comes naturally when getting older and is already relevant on its own, but feelings of social isolation or disconnection are linked to an even faster decline of mind and body alike (Cacioppo & Patrick, 2008). Common belief is that only the elderly are affected, but also children, adolescents, and young adults suffer from this social distress quite often—with one exception: The age group from 25 to 55 years is less likely to experience loneliness (Spitzer, 2019). Though the reasons are less well known than for older adults (Luhmann & Hawkley, 2016), the effects are just as crucial: A longitudinal study with $n = 1037$ children in New Zealand found that early experiences of exclusion or isolation predicted unbeneficial life outcomes, such as a greater risk of cardiovascular diseases, 20 years later (Caspi et al., 2006). Taken together, loneliness can have quite the impact on someone's life, and everyone can feel lonely—it is a disease no one is immune to (Hawkley & Cacioppo, 2010).

2.6.1 **Loneliness and Needs**

According to Maslow's seminal hierarchy of needs (1943), basic physiological needs (food, water, warmth, rest) are crucial because of their importance for survival. Therefore, they need to be satisfied before psychological needs become important, too—so the assumption[24]. Hawkley & Cacioppo (2010) posit that loneliness would be located on this very first (i.e., basic) level because "loneliness is the social equivalent of physical pain, hunger, and thirst; the pain of social disconnection and the hunger and thirst for social connection motivate the maintenance and formation of social connections necessary for the survival of our genes" (p. 218). Research has indeed shown that loneliness—for instance initiated when ostracized by others—leads to arousal of the same brain area as does pain (the anterior cingulate cortex, or ACC; see also Section 2.3.2). So, social pain, which is pain that is evoked by social separation, rejection, exclusion, or loss, for instance, is physiologically detectable (e.g., Eisenberger et al., 2003; Eisenberger & Lieberman, 2004). Neuroimaging studies found that this pain can be reduced by showing the picture of a romantic partner (Master et al., 2009; Younger et al., 2010) or the name of a person that the participant feels securely attached to, defined as someone they would go to in case they needed help, as opposed to a person they did not feel attached to (Karremans et al.,

[24] Though Maslow's hierarchy of needs is seminal, plausible, and still taught in introductory psychology courses, their empirical foundation has been questioned. For instance, when a need would be satisfied was not defined, so the hierarchical structure itself is difficult to validate (e.g., Wahba & Bridwell, 1976).

2011). Thus, meaningful connection to others can positively counterbalance the negative effects of loneliness, yet even help to slow down the natural deterioration processes associated with age (Cacioppo & Patrick, 2008).

Not only in terms of an evolutionary perspective is it obvious that we need others to reduce or avoid the very real pain of loneliness, as alluded in previous sections (see e.g., Sections 2.3.2 and 2.3). Unsurprisingly, basic need satisfaction as proposed by the motivational framework of SDT, for instance (Wei et al., 2005), and the need for relatedness in particular, are closely and negatively associated with loneliness (e.g., Russell, 1996). Loneliness has also proven important to engaging in (computer-mediated) communication, accordingly (Tóth-Király et al., 2020). The cognitive discrepancy model of loneliness by Peplau and Perlman (1982, as cited in Martín-Albo et al., 2015) follows a similar logic as the U&G: "Predisposing factors", such as characteristics and cultural norms as well as "participating events" lead to both the need for social relations and actual social relations, each within a specific social context. Depending on the match of perceived and actual relations as well as cognitions and attributions, a certain "experience of loneliness" results. In brief, loneliness results from a mismatch of social relations and the need for them and, thus, can be defined as "subjective psychological discomfort people experience when their network of social relationships is significantly deficient in either quality or quantity" (Perlman & Peplau, 1998, p. 571). Accordingly, perceived quality and quantity of a network might differ so that "people may report having a small social network and still score low in loneliness because the perceived quality of such network satisfies their needs" (Martín-Albo et al., 2015, p. 1132), yet someone with a large network might indicate feeling disconnected. Just as individual as the balance of sought and obtained needs—or loneliness—is, so is our perception of the world. It is shaped by experiences and characteristic and our reasoning as well as expectations towards others depends upon them. This social cognition (namely, "the sense we make of our interactions with others", Cacioppo & Patrick, 2008, p.14) is biased in people who are lonely as they are more prone to be overly sensitive. That is, they often interpret interactions within their framework clouded by feelings of unhappiness and social threat (e.g., negative or hostile intent attributions, rejection expectations; Spithoven et al., 2017), and in combination with their disability to self-regulate these perceptions. If environmental conditions (e.g., parents, culture, politics, etc.) do not allow them to form safe connections and, thus, to develop capacities necessary to healthily self-regulate towards need-satisfying behaviors, these needs might not just be thwarted but make people even less able to escape this loneliness-reinforcing vicious cycle. That is, lonely people are motivated to satisfy their longing for connection yet are often unable to do so, and in turn, their (even more) thwarted

need for relatedness predicts (more) loneliness (Gallardo et al., 2018; Lin, 2016).

2.6.2 Loneliness, Needs, & Online Communication

Our lives are interwoven with media—media that can potentially help us to connect to others. So, the question is: Is the Internet helping lonely people or is it making things worse for them? Both might be true. First of all, lonely people prefer online over face-to-face communication (Kim et al., 2009; Lee & Stapinski, 2012; Song et al., 2014), assumedly because of more anonymity and more control—there is less to be afraid of compared to offline communication. On the one hand, however, the displacement hypothesis proposes that social Internet use displaces real-world-contacts (Kraut et al., 1998; Lee & Stapinski, 2012; Nie, 2001). Indeed, a two-year longitudinal study conducted in the beginning of the Internet with participants (n = 169, in 73 households) in their first two years of using it, found that it can have detrimental effects, such as increased loneliness and lowered well-being (Kraut et al., 1998). Only a couple of years later, detrimental effects could just be found for those lower in extraversion and social support to begin with, whereas those higher in those traits benefitted from use as indicated by lower loneliness-scores (Kraut et al., 2002). For those preferring online over face-to-face contacts because of the aforementioned greater control, this might lead to avoidance of real-life situations, as an Australian study with a general sample of n = 338 adults (mean age of 29.75 years, SD = 12.88) suggests (Lee & Stapinski, 2012). Signaling that they rely more on it, those who were less satisfied with their social lives also rated the Internet as more important to them than those leading a more balanced social life (Papacharissi & Rubin, 2000).

On the other hand, the stimulation, or reinforcement, hypothesis states that the Internet reduces loneliness by enhancing existing relationships as well as facilitating new ones (Gross et al., 2002; Valkenburg & Peter, 2007). In a longitudinal study spanning six months with a representative German sample (n = 460, mean age 43 years, SD = 15 years), Dienlin and colleagues (2017) found that SNSs and instant messaging reinforced each other and that SNS communication even reinforced face-to-face communication. Not only couldn't they find a detrimental effect on loneliness due to computer-mediated communication (CMC), but they also even found a slight improvement in life satisfaction. In another study with South Korean students (n = 285; mean age 21.81 years, SD = 2.19), crawled and self-report data from mobile Facebook users indicated that interacting more frequently and receiving faster replies was perceived as social support and, thus, alleviated loneliness (Seo et al., 2016). Facebook can also help to reduce loneliness when communicating directly with people a person cares about (Burke

& Kraut, 2016). Furthermore, excessive use can even be beneficial, relieving stress and loneliness—but only for those who communicate their feelings, anxieties, or problems, as a German longitudinal study employing a quota sample (n = 461 at t2) could show (Karsay et al., 2019). If use is passive, however, Facebook use, as mentioned before, can lead to even more loneliness (Verduyn et al., 2015).

Confirming these equivocal findings, Nowland, Necka, and Cacioppo (2018) derived from their review study that both can be true, because detrimental as well as positive effects of the Internet depend on the kind of usage: used more actively to maintain friendships or form new ones it helps to reduce loneliness, but use to withdraw from society in ways of escapism, for instance, leads to less social contacts and, thus, a lonelier life. Self-disclosure, communication competence, and social comparison were found to influence the experience of Facebook-based social support, which, in turn, has beneficial effects such as reducing loneliness (Gilmour et al., 2020). That is, only a healthy amount (i.e., not too much and deep, or even staged) of self-disclosure and good communication skills support beneficial effects, whereas social comparison is rather detrimental (see Section 2.3.3), especially because people often do not portray themselves in a realistic manner, which leads to upward social comparisons that are not necessarily beneficial (Dumas et al., 2017; Jang et al., 2016; Zhang, 2017). Of course, these skills and behaviors are also influenced by the individual characteristics of a person. With a biased social cognition, lonelier people might perceive others as leading much better lives than they do and are less likely to consider that profiles do not necessarily depict reality, probably just a glimpse of it (Bhagat, 2015). This might be because lonely people also often lack social, including communication, skills (or believe that they do). So, they are possibly not able to make contact as easily or to self-disclose sufficiently in order to benefit from online communication in a way that would satisfy their needs and lower their feelings of isolation (Jin & Park, 2013; Segrin, 2019). Although studies found evidence for both directions of influence, common ground seems to be that loneliness will become worse when using social media to compensate for lacking skills, especially when other disadvantageous moderators are at play.

Research has shown that loneliness is associated with a thwarted need for relatedness, but also with lower self-control; so, loneliness and basic needs contribute their part to self-control. As alluded before, pleasure of use that would possibly satisfy their basic needs could be spoiled for those low in self-control, because they might not be able to enjoy it. That is, they might feel guilty, because they could be working, practicing, or socializing in real-life instead, for instance, or they did not attribute using the web as intrinsically elicited (Hofmann et al., 2013; Johnson et al., 2020). Subsequently, studies showing that loneliness is positively related

to problematic smartphone use are not surprising (Nowland et al., 2018). Also in literature on addiction or problematic use the question of direction remains open, arguing loneliness is the cause (Durak-Batigün & Hasta, 2010; Mahapatra, 2019) or effect of problematic use (Moretta & Buodo, 2020), yet sometimes both directions were found in the same longitudinal studies (Lapierre et al., 2019; Zhang et al., 2018). These findings support the idea of a vicious cycle (e.g., Cacioppo & Hawkley, 2005) with worsening effects for those worse off in the beginning.

To sum up, loneliness is a disease no one is immune to. The interplay of genetics, our ability to self-regulate emotional experiences of being socially disconnected, and our social cognition defines its possibly severe consequences. Loneliness is, thus, a good indicator of well-being, with lonelier people being less well off (Burke & Kraut, 2016; Russell, 1996). If social skills and environmental factors permit, meaningful connections to other people can counter-balance the detrimental effects. According to the reviewed literature, someone less lonely should have better satisfied basic needs and those who are more resourceful also depend less on media to satisfy these needs, since they can employ several communication channels (Rubin, 2009a). They are better in self-regulating their use, too, potentially leading to less problematic experiences with the smartphone in turn. Conversely, if a person is inherently lonely and their environment does not allow them to develop the capacities needed to counterbalance this pre-disposition, it possibly also hinders the striving for healthy satisfaction of basic needs and development of sufficient self-control, leading to unwanted outcomes, among those possibly even more perceived isolation. How important loneliness as well as the other introduced variables and concepts in explaining this project's main question—as to why frequent use persists despite negative consequences—will be explored subsequently.

The literature review introduced a scope of negative experiences with media, a classic approach from communication studies as well as different approaches and theories from psychology. The following first study, however, is comprised of exploratory interviews and, thus, only assumes that negative experiences with media exist in everyday life and that a user can explain why they would report experiencing them frequently (as proposed by U&G). Basically, no more theoretical knowledge is needed until after the interviews are analyzed. Then, the findings will be reflected upon, also in light of further reviewed literature and, in combination, used to extend the model as well as to develop the methodology of the second study.

3 Objectives & Research Questions of Study I

The U&G postulates an active, purposive, motivated and goal-directed recipient seeking to satisfy their needs, but it also recognizes (Katz et al., 1974) that many, if not most, media effects are unintended or even detrimental (c.f. Haridakis, 2013). However, and as the literature review showed, everyday experiences, and especially those persistent negative ones, are not yet well-researched. To date, it is even unclear which experiences users would define as negative and why they would tolerate them persistently despite their predictability. Many studies have skipped negative everyday effects as if they already represented an acknowledged mental disorder though research on the former—and on most presumed media addictions—is still missing. Aside from general issues regarding clear definitions of concepts used in many studies, such as differentiating between addiction and dependency for instance, within the U&G framework, media dependency is—usually—identified as "a relation reflecting one's reliance on the Internet to achieve goals. Some become dependent on the Internet as a source of information, entertainment, and interpersonal connection" (Sun et al., 2008, p. 412). Hence, within U&G media dependency is considered normal: An individual depends on media to satisfy needs. Though they do not exclude the possibility of developing an actual addiction, the previously suggested spectrum from normal to problematic and maybe eventually pathological use is considered and rather than behavior easily labeled as if an actual diagnosis existed and was legitimate (cf. Haridakis, 2013). In line with this and with the argumentation of the present project, a longitudinal study found excessive use and dependence on texting via one's phone to be of distinct quality (Lu et al., 2014), further suggesting that addiction and excessive use are different from each other with many shades in between.

Additionally, context of use might make a difference as it might be evaluated as against the cultural etiquette to, for instance, keep on checking the smartphone while at dinner with one's partner or friends (see e.g., Montag & Diefenbach, 2018). Social context was mentioned and distinguished as an important factor influencing media selection; the U&G even "postulates that gratification can be derived not only from media content, but also from the very act of exposure to a given medium, as well as from the social context in which it is consumed" (Katz et al., 1974, p. 12), but social context was not part of the original U&G-model. Subsequent U&G studies, however, often integrated social context as an important factor (Roe & Minnebo, 2007) as did some later models (cf. e.g., Haridakis, 2013; Rosengren et al., 1985). Still, much is unknown about the individual's social context and its influence on media effects (e.g., Blumler, 2019). Therefore, also the social contexts of persistent negative media effects will be analyzed in this study.

In short, this first part of the study intends to find out which everyday experiences occur, which role the social context plays, and which explanations a media user has for this ambivalent behavior. Consequently, the research questions are as follows:

RQ 1: What media are negative experiences associated with?

RQ 2: Which persistent negative experiences with media are being reported?

RQ 3: What is the social context usually like when persistent negative experiences take place?

RQ 4: How are persistent negative experiences justified?

4 Methodological Approach of Study I

Explorative interviews were conducted to investigate these four questions. This approach was found most suitable for an initial analysis of quotidian persistent negative experiences, because, to the best of my knowledge, no previous study exists that analyzed everyday negative effects with media and left it completely open for the interviewees to define what they would describe as a negative experience as well as which media they experience them with.

4.1 Sampling Procedure

Twenty-six explorative interviews were conducted in winter/spring 2015/2016 in Hamburg, Germany. Recruitment took place according to a quota plan that was based on age (six groups), sex (female/male) and formal education (pre/post-secondary education certificate). Five groups (18-24 years, 30-39 years, 40-49 years, 50-59 years, and 60-69 years) consisted of four and one group (25-29 years) of six participants. Due to the fact that most adult media users are between 18 and 29 years of age (cf. e. g., Engel & Breunig, 2015; Koch & Frees, 2016), the quota plan was designed accordingly, with the younger age group somewhat overrepresented in this study. Nevertheless, since this is a qualitative approach, it wants to explore underlying reasons and neither intends nor claims to be representative.

4.2 Explorative Interviews

Initially, a short form was handed out, asking for sociodemographic data and media use (see appendix, Table A 1). Subsequently, participants were interviewed about their negative experiences with media, the social context of the experiences and their self-justifications for the persistent use despite negative encounters (see appendix, Table A 2). The questions were asked repetitively until no more experiences came to mind:

1.) *When you think about your use of mass media—has it ever happened to you as well that you had negative experiences during or after media use, but you used that medium again anyway?*

2.) *What is usually the social context like when those negative experiences occur?*

3.) *Do you have any idea why you use that medium repeatedly despite those negative experiences?*

4.3 Participants' Characteristics and Use of Media

Participants' age ranged from 18 to 65 years with a mean of 38.6 years (*SD* = 15.4). Half of the interviewees were male and half female, 50% had at least a university-entrance diploma while the formal education of the other half was lower. 27% of the sample consisted of students. The short form participants filled in prior to the interviews (see appendix, Table A 1) also asked for ownership and use of media. It aimed at describing the sample's use of media in comparison to the average media use of the German population at the time the study was conducted (Krupp & Breunig, 2015; Tippelt & Kupferschmitt, 2015).[25]

Most interviewees (92%) owned a smartphone at the time of the interview (all had owned one in the past), followed by radio (89%), and a television set (81%). Also, 81% owned a laptop, more than half of the sample a tablet (62%), and around one third a desktop computer (35%). Unsurprisingly, Internet (73%) and smartphones (65%) were used multiple times per day as compared to, for instance, television (3.8%) or newspaper (7.7%). The sample mostly indicated traditional use of media when it came to TV and radio. This means that most indicated to listen to the radio via radio set (89%), watch linear television (81%), and use streaming (46%) via television set, too. However, the smartphone was mostly used for access to the Internet (96%, as compared to 73% via laptop), and was used for newspaper consumption more often than an actual newspaper as well (54% via smartphone vs. 42% via newspaper). Moreover, WhatsApp was the most frequently used daily application (76.9%), followed by Facebook (38.5%; see Table 2, also for a comparison to the other surveyed applications). Use of social media was in accordance with more representative statistics for the German population, too (e.g., Tippelt & Kupferschmitt, 2015; We Are Social & Hootsuite, 2019).

[25] Socio-economic data and media use surveyed before the interviews were conducted as well as interview transcripts can be requested from the auhor. The codes (e.g., "W11" or "M7") are mentioned in the text as reference so that additional data or the respective interview can easily be looked-up.

Table 2

Frequency of Usage of Social Media

	multiple times per day	daily	multiple times per week	once per week	multiple times per month	once per month	rarely	never
WhatsApp	76.9	3.8	3.8		3.8			11.5
Instagram	3.8	3.8	3.8				3.8	84.6
Tumblr		3.8				3.8	3.8	88.5
Twitter	3.8						3.8	92.3
Xing			3.8			7.7	11.5	76.9
LinkedIn							3.8	96.2
Facebook	38.5	11.5	15.4	3.8		3.8		26.9
Google+		3.8	11.5				15.4	69.2
Pinterest								100

Note. Selection of social media was based upon social media use in Germany (Tippelt & Kupferschmitt, 2015). Frequencies in percent based upon a sample of $n = 26$.

4.4 Analysis of Interview Data

The interviews were explorative, so as little literature review as possible had taken place before they were conducted and analyzed. However, it is not possible to enter data analysis completely unbiased by prior knowledge (Kelle & Kluge, 2010) and analyzing qualitative data often is not as standardized as analyzing quantitative data either, especially when categories are built upon the material collected. Some scholars even say "there are no clearly agreed rules or procedures for analyzing qualitative data" (Spencer et al., 2003, p. 200). With the best possible openness towards potential findings (Gläser & Laudel, 1999) and following Gibbs' (2009) guidelines, "data-driven" (that is, based upon material, inductive) *and* "concept-driven" (that is, based upon theoretical assumptions, deductive) approaches were used to build the coding system, using MAXQDA software version 12 (VERBI Software, 2016). The four research questions were the only prior theoretical assumptions aside from the U&G framework and the presumed existence of negative experiences. The analysis of the transcripts followed quantitative as well as qualitative principles in order to tend to the aforementioned research questions (Gibbs, 2009). For instance, the first main category was "media", and the interviews were accordingly analyzed for the media mentioned in association with persistent negative experiences. Subcategories, such as "TV" or "Internet", were then built based upon the participants' replies. As the process of analyzing the data developed, initially allocated descriptive codes were replaced through categorizing and/or renaming of codes into analytic codes. Thus, the process of coding moved away from respondents' descriptions and terms to a

more analytical level of analysis (Gibbs, 2009). As a result, this procedure led to fewer and more distinct categories. For the final analysis approaches were combined; that is, analyzing the reasons for each negative experience, the social context of the experiences, and justifications for their persistence. (e.g., Früh, 2017; Mayring, 2010). Thus, analysis took place in a numeric (quantitative) as well as in a semantic (qualitative) manner (Gläser & Laudel, 1999). Like the construction of the code system, the final analysis combined different approaches of content analysis. Accordingly, analysis neither followed a strict qualitative (e.g., Mayring, 2010) nor quantitative (e.g., Rössler, 2010) approach, but a more open technique best serving the explorative character of the study (e.g., Gläser & Laudel, 1999). The procedure was not equally suitable for each of the research questions, so a more detailed description of the assessment of each question can be found in the corresponding results and discussion section (see Chapter 5). All codes can be found in Table 3 and Table 4 which substitute a traditional codebook.

5 Results & Discussion of Study I

The interviewees could access their memories of persistent negative experiences with media, though some needed a moment to think; four participants[26] in particular, who initially stated to never having had a negative experience with a medium. However, all interviewees reported persistent negative experiences eventually. With the definition of "medium" left open to their own interpretation, the interviewees could do so without a possible priming effect as to what they assumed was meant by the term medium. Most referred to daily mass media as they are often surveyed (for instance in the German national long-term study mass communication; Krupp & Breunig, 2015), namely, television, radio, newspaper, and Internet. One participant thought of books as well (W11, female, 24 years), another one of magazines (W2, female, 30 years); some (e.g., M2, male, 25 years; W3, female, 27 years; M6, male, 41 years) reported issues with specific content (e.g., disliking the topics covered by the news or advertisements they found annoying) or media personae (for instance, being annoyed by a person often portrayed in the media (e.g., M4, male, 31 years; W3, female, 27 years)). Many interviewees mentioned the device, especially in case of the smartphone. In order to analyze these different definitions of media, the participants' descriptions were analyzed on different levels: first, based on the mass medium mentioned according to the German national long-term study mass communication (i.e., television, radio, newspaper, and Internet) and then more specifically with regard to device and content. I followed this procedure because it is not precise to just differentiate between these categories anymore since watching television, listening to the radio, or reading a newspaper is not just possible via the associated devices these days. The Internet, for instance, subsumes a lot of different applications, some of which offer access to radio programs or television channels; and it can be accessed via many devices, such as personal computers, laptops, or smartphones.

5.1 RQ 1: The Media Negative Experiences are Associated with

Quantitative analysis was used to identify which media most persistent negative experiences were associated with. The medium that came to mind first *and* most often when asked "When you think about your use of mass media—has it ever happened to you as well that you had negative experiences during or after media use, but you used that medium again anyway?"

[26] Two male interviewees (M2 and M12, both 25 years of age) and two female participants (W4, 21 years of age, and W10, 26 years of age).

was the Internet (50% of interviews[27]), followed very closely by television (46% of interviews). These results are not surprising, considering that already approximately 50% of the world population (80% of the developed world) had access to the Internet at the time the interviews were conducted (International Telecommunication Union, 2016), with more than 2.5 billion people accessing it via mobile devices (GSMA, 2016). Accordingly, when analyzed for the medium mentioned most frequently regardless of order, the smartphone was associated with persistent negative experiences in 88% of the interviews (23 out of 26). Facebook (17 out of 26) and WhatsApp (15 out of 26) were the most frequently used applications. This is in accordance with tracked[28] smartphone behavior. That is, already in 2015 (with $n = 2.418$ participants and measured over at least four weeks) accounted WhatsApp for 20% of smartphone use time, whereas Facebook accounted for only around 9% (Montag, Błaszkiewicz, et al., 2015). Results are also in line with recent data for smartphone penetration and its main use for interpersonal communication (Halfmann & Rieger, 2019), for instance via texting (Roberts et al.,2014; see also Chapter 1 for further usage data).

5.2 RQ 2: The Persistent Negative Experiences

A total of 114 persistent negative experiences were reported across the 26 interviews which could be subsumed into 13 categories (see Table 3 for explication of and examples for each category). These 13 experiences were then ranked by frequency, which means that I counted each of the experiences *once* per interview. I adopted this procedure so that no experience would be overrepresented just because an interviewee mentioned it multiple times. As an example: An interviewee (W8, female, 25 years) mentioned one experience that I termed *Way of Communication* quite often during the interview—but for different situations in which she was exposed to that particular experience. For instance, she mentioned how communication via Facebook would feel impersonal to her: "(...) I think, it is stupid that that is the kind of contact and that it is not more personal. That you sit next to what others [actually] do (…); it is so different, when I sit here and listen to what another person says than posting it on Facebook. This is indirect and impersonal." But she also talked about how she thought that applications such as Tinder were no good way for meeting someone, referring to other peoples' use and also explaining why it is not for her: "(…) I don't use it, because (…) so many people use it and it

[27] A medium was likely mentioned multiple times per interview (for instance with respect to different negative encounters via the same medium), but for this analysis each medium was counted just once per interview, accordingly leading to a maximum total of a medium mentioned 26 times (out of 26 interviews).

[28] Via a tracking app called MENTHAL.

is normal to make contact this way but it is weird or unsocial to talk to someone face-to-face, because it is [now] normal to use Tinder (…)." She also talked from experiences where she told someone they could call her but the reaction to that was rather unexpected and, more importantly, unpleasant. With that example, she also highlighted the direct vs. indirect characteristics of these different forms of communication: "(…) I had unpleasant experiences telling someone they could call me—that just does not work anymore, because many people find it weird to call and talk in person. For many people, and in some situations also for me (but I think that is more out of laziness), it is, I think, more pleasant to say something indirectly via messaging or WhatsApp, or Facebook, or whatever, than to call someone directly (...). Even though that might be the better way [to communicate]." If I had counted each time when Way of Communication was the negative experience mentioned, this negative experience would be overrepresented because of too much weight of one interviewee mentioning it in relation to it being mentioned across all interviews.

In accordance with the most frequently mentioned media (see also analysis of RQ 1 in Section 5.1), a total of 79 (69%) of the 114 persistent negative experiences reported were associated with the Internet and at least[29] 47 (60%) of those explicitly experienced while using the smartphone, with WhatsApp and Facebook being the most frequently[30] associated applications, respectively. In the following, I will briefly introduce the extracted persistent negative experiences and discuss especially those concerned with the smartphone in more detail in Section 5.4 (see also Table 3 and Table 5).

The term I chose to describe people who are uncommunicative and walk about as if they are isolated when looking at their phones is *Media Bubble* (MB). It seems as if those users were immersed in their very own world for the time being. *Overkill* (OK) depicts the masses or flood of messages and the fast pace that they are received with, as well as the plethora of options to choose from (applications that come with lots of communicative opportunities, for instance). It is nice to be connected and to have unlimited access to the Internet, but it might also be stressful to always be reachable, to never disconnect, to get lots of messages (with not a lot of them being meaningful or even important), and to choose the most efficient of (too) many options. *Emotional Stress* (ES) describes the negative implications of this availability and the strain it might cause. *Auto Use* (AU) means usage that feels like a reflex, automatism, or a lack of self-control.

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[29] "At least" was chosen here because I only counted the explicit mentioning of "smartphone" as the device, so that is the minimum number of experiences associated with the smartphone.

[30] Explicitly 14 times via WhatsApp and seven times via Facebook—likely more, but those were not distinctly classifiable from the data.

Endangerment (EN) is similar to emotional stress but with an emphasis on developmental risks, threats to a person's physical health (for instance, due to paying attention to the phone instead of traffic), or mental well-being (e.g., when use is noticeably leading to feelings of sadness or loneliness). *Insignificance* (IS) describes all the unimportant messages, for instance photos of other persons' meals or their latest music choice, and so on. *Interruption* (IR) points to the smartphone as a device that interrupts tasks or distracts from them. *Loss of Time* (LoT) stands for the time spent with a mobile device instead of spending time in a more meaningful way. With *Way of Communication* (WoC), as exemplified elsewhere, interviewees pointed to a different quality of contacts to other people due to or with technology these days.

Four persistent negative experiences were excluded from further analysis because they did not represent phenomena of interpersonal communication: *Advertisements* are often studied in marketing rather than in communication studies and being, for instance, annoyed by advertisements was not mentioned once in relation to interpersonal communication. *Privacy* is important, especially when using the Internet and there is a lot of research covering this field already (Bartsch & Dienlin, 2016; Dienlin & Metzger, 2016; Masur et al., 2017; Trepte, 2020; Trepte & Reinecke, 2011). Also, interpersonal communication was never associated with privacy-related experiences reported during the interviews. *Credibility*, in most cases, referred to news media and was not mentioned once in association with the smartphone. Although *Reliance* emphasizes our bond with and dependence on technology and, thus, can clearly be seen as something that we cannot live without and, accordingly, must healthily live with, it also stresses the technological side rather than interpersonal reasons for usage.

Aside from more negative experiences reported with the smartphone than with any other medium, analysis of the short form filled in prior to the interviews highlighted the importance of the device in everyday life even more (as was reported before, see Section 4.3). That is, 76.9% of the participants reported using WhatsApp multiple times per day, which to date can only be accessed[31] via smartphones (https://www.whatsapp.com/). Also, fewer interviewees reported using Facebook multiple times per day (38.5%). As outlined in the literature review, multiple studies have examined Facebook and other social media for different aspects, such as motives for use, privacy, or addiction (e.g., Kuss et al., 2014; Wilson et al., 2012). However, to date comparably few studies have focused on interpersonal communication via the respective

[31] Even though WhatsApp can be used in a browser ("WhatsApp Web"; see https://web.whatsapp.com/), the smartphone application is necessary for connection and set-up. Additionally, the application can only be installed on a device with a valid SIM card inserted, and none of the interviewees reported using another device than their smartphone for it.

social media when using the smartphone (Ahad et al., 2014; Karapanos et al., 2016; Knop et al., 2016; Sánchez-Moya & Cruz-Moya, 2015; Sha et al., 2019; Wong et al., 2018). Moreover, the smartphone has become a constant companion influencing an enormous part of our daily routines (e.g., Maika et al., 2017); and, as outlined before, with the many affordances of the smartphone come possible negative experiences which can be expected to become more prevalent every day (Rosen et al., 2012; Vorderer et al., 2017b). Interpersonal communication appears to be the most important motive for persistent use despite negative effects (Vorderer et al., 2016), hence all subsequent analyses will focus exclusively on text-based communication via smartphone messengers and social networking apps.

5.3 RQ 3: The Role of Social Context on Evaluation of Experiences

For the third research question, I asked the interviewees about the usual social context in which those negative experiences would occur. Depending on context, smartphone use is not always deemed appropriate nor associated with need satisfaction (Al-Saggaf & O'Donnell, 2019; Towner et al., 2019). Accordingly, I had expected to find out about possibly different evaluations of media experiences depending on the current environment of smartphone use. For instance, would a text message always be evaluated as disruptive or just if someone were in a social situation (as opposed to being alone)? Is being immersed in one's own Media Bubble always perceived as impolite or just when someone is in company? Or is a friend's smartphone use only perceived as phubbing when in a smaller compared to a larger group setting?

To analyze this, the nine negative experiences were matched with the participants' replies regarding the social context of these experiences. Yet no noticeable patterns were found in the data. Participants' answers were just inconclusive. That is, when asked about the "typical" or "usual" social context of a persistent negative experience, the answer was either not distinct (e.g., "I was alone *or* with others") or could not be given at all, leading to incomplete data, too. In other words, based on the data collected, allocation of an experience to a distinct social context was not even possible on a very basic level, such as classifying into "alone" vs. "in company". Furthermore, the "company" was not separable into categories such as "friends", "partner", or "family". This was possibly an issue of the method used. That is, asking generally for social context of a persistent negative experience might have just been too vague. Some interviewees had trouble thinking of negative experiences to begin with and, thus, reflecting on and retrospectively thinking of the social context, even with a certain experience in mind by then, might not have been possible, or at least not accurately. Future research could try a different approach, such as implementing the experience sampling method (Csikszentmihalyi

& Csikszentmihalyi, 1988; Csikszentmihalyi & Larson, 2014; Hektner et al., 2007). This way, the experience would be more recent and the situation well-defined, instead of "some" negative experience that might happen repeatedly but does not have specific situations serving as reference points.

Analyzed quantitatively, interviewees mostly answered to be alone when experiencing negative effects of the smartphone (in fact, 63 times across all nine experiences, counted once per interview). Particularly Insignificance was experienced when alone (11 times) followed by Media Bubble (eight times). Whereas across all experiences, being in company (which is a category combining friends, relatives, and acquaintances) was reported a total of 35 times, with Media Bubble as the experience reported most often (11 times as opposed to, for instance, OK, ES, or AU which were reported for four times each). Media Bubble being experienced almost as often when alone as when in company clearly depicts the drawbacks of data apprehension once more.

To conclude, even though social context is most likely important for the evaluation of effects of smartphone use (see, for instance, the reviewed literature on SDT in Section 2.3), it also is a construct that is not easy to grasp because it is prone to changes and depends on many factors (e.g., Greenberg, 2001; Karikoski & Soikkeli, 2013). The interview approach used in this study was not suited to gather data that since the cognitive burden—that is, recalling a situation they typically would not consciously memorize—might have been too great (Boase & Ling, 2013). So, this study could not contribute to this interesting aspect of experiencing down-sides of media use in everyday life. An issue that future research should have in mind. The next section contains the examination of possible reasons for—or rather self-justifications of—persistent behavior despite negative experiences.

Table 3

Persistent Negative Experiences with Media in Order of Frequency

Code		Definition	Example	Translated Example	Frequency	
	Subcode				All Media	Sma Pho Only
Media Bubble		Using media in presence of others is rude, uncommunicative; people seem encapsulated or isolated, as if they were in their very own "Media Bubble".	„Marshall McLuhan sagt doch, Medien sind Ausdehnungen des Körpers und das erlebe ich bei ihr total. Das ist wie ihre dritte Hand (…), es ist ständig dabei, sie ist ständig dran, es gibt kein Gespräch mehr, wo das keine Rolle spielt und wenn sie einem nur Videos zeigt oder Fotos oder Nachrichtenverläufe oder wenn sie schnell jemandem erzählen möchte, was ich eben gesagt habe.—(…)Im Grunde baut sie eine Barriere auf zwischen uns und (…) auch generell in Bezug auf das Leben und die Welt [auf]." (W11, weiblich, 24 Jahre)	"Marshall McLuhan says media are extensions of the body. I totally see that with her: it [the smartphone] is like a third hand (…), she carries it with her always, continuously using it. It plays a role in every talk, even when she is just showing a video or photos or chat messages, or when she wants to share what I just told her.—(…) she is basically building a barrier between us and (…) in general also her life and the world." (W11, female, 24 years)	15	15
Overkill (too much of a good thing)	Pace of life	Someone emphasizes the permanent presence of media, never letting us get some peace of mind. No breaks exist anymore, maybe it is too much of a good thing, being "always on".	„Ich kann noch was sagen, was zu dem Stress führt; und zwar bin ich sehr schnell in allem, was ich tue und habe dann dort auch manchmal wahnsinnig viel parallel gemacht. Fünf Programme mit Nachrichten nebeneinander, dann noch parallel Mails checken und Musik läuft auch noch und man kommt einfach nie wirklich zur Ruhe." (W11, weiblich, 24 Jahre)	"I can say what leads to the stress. I am really fast in everything that I am doing and sometimes even manage many things simultaneously: following five news channels, checking e-mails, and listening to music, and thus you never get some peace." (W11, female, 24 years)	16	11

Code	Definition	Example	Translated Example	Frequency	
Subcode				All Media	Sma Pho Only
Flood of messages	Like the fast pace in that information flows and surrounds us these days, the masses of messages and information can be like a flood—figuratively drowning us or at least the capacities of our minds.	„…das ist zu viel schon (…), man möchte was anderes machen und ständig kommt [eine Nachricht] und dann guckst du [und überlegst], antwortest du oder nicht. Manche schreiben die ganze Zeit, zu viel, zu viel!“ (W6, weiblich, 57 Jahre)	“…it is simply too much (…), you want to address yourself to a task, but messages arrive constantly and then you look and think about replying or not. Some people send texts all the time, it is too much, too much!” (W6, female, 57 years)		
Plethora	There is just too much of a good thing, namely having too many opportunities of being connected—too many apps, options, channels.	„Es ist allgemein schon so, dass die Vielfalt sehr groß ist und man manchmal Probleme hat bei der Auswahl des richtigen Mediums zu überlegen, was machst du heute, welchen Weg wählst du—das kostet auch schon mal Zeit, sich da erst mal zu entscheiden. Das war früher einfacher, wenn man einfachere Wege hatte, um zu kommunizieren, die aber eben länger dauerten.“ (männlich, 59 Jahre)	“In general, the variety is huge and thus, it is not always easy to choose the adequate medium, what to do today, which way to go,…,—these decisions can take some time. That was easier in the past, with easier or more determined ways to communicate which took longer, though.” (male, 59 years)		

Code	Subcode	Definition	Example	Translated Example	Frequency	
					All Media	Sma Pho Only
Emotional Stress		Feeling stressed or pressured by being connected incessantly (or by having the "option" to be, though this does not feel to be a deliberate choice). Expectations of the outside world towards reachability or immediate response.	„...mir geht es so, dass wenn ich damit angefangen habe, ich mich dann nicht mehr abgrenzen kann. Also ich finde den Schritt zurück nicht—das ist auch generell ein Thema, nicht nur beim Smartphone, aber da zeigt sich das besonders stark. Einerseits ist es natürlich toll, wenn man jederzeit das Gefühl hat, alle erreichen zu können und Dinge mitzubekommen, aber sich dann nicht mehr da rausziehen zu können, selbst, wenn das Smartphone weg ist, mit den Gedanken völlig bei den anderen zu sein und so, das ist anstrengend." (W11, weiblich, 24 Jahre)	"…for me, it is hard to set boundaries once I have started. So, I can't draw back—that is an issue in general, not just with the smartphone, but it's especially extreme with it. On the one hand, it is great to have the feeling to be able to reach everybody and to not miss out on stuff; but on the other hand, to not being able to pull back from these things, even without the phone being there to have one's mind completely set on ones' contacts—that's exhausting." (W11, female, 24 years)	12	8
Auto Use		Frequency of usage is annoying or feels habitualized.	„Ich hatte ein Smartphone, habe das aber vor zwei Monaten abgeschafft, weil ich selber davon genervt war bzw. mich darüber geärgert habe, wie häufig ich es aus der Hosentasche, geholt und darauf geguckt habe." (M6, männlich, 41 Jahre)	"I had a smartphone but got rid of it two months ago because I was so irritated and annoyed by how often I took it out of my pocket just to check it." (M6, male, 41 years)	11	8

Code	Subcode	Definition	Example	Translated Example	Frequency	
					All Media	Sma Pho Only
Endangerment (Risks to Personal Health/Healthy Development)		Media are associated with endangerment of a healthy development (e.g., growing up with too much reliance on technology for learning or fun; content often not educational or even the opposite). Also, media pose a danger, if focus is on smartphone instead of on the environment (especially traffic).	„Einmal hier drücken, zweimal da. Da lernt man nichts. (…) Und wenn du sie fragst, wie viel ist fünf Mal fünf? Die wissen nicht, wie viel das ist, sondern brauchen einen Rechner. Und wenn du keinen Strom hast, dann hast du keinen Rechner. Ich guck mir manchmal die jungen Leute an, die entwickeln sich nicht so von alleine, sie sind abhängig von Maschinen.“ (M9, männlich, 55 Jahre)	“One touch here, two there. That way you don’t learn a thing. (…) And then you ask them what’s five times five—and they don’t know, they need their calculator. But without electricity a calculator is useless. Young people these days don’t develop on their own, they are dependent on machines.” (M9, male, 55 years)	8	7
			„Ich hatte das Gefühl, ich bekomme eine...eine soziale Störung oder so was. (…) Ich bin nur an meinem Handy und die anderen haben Spaß. (…) Alle anderen haben Spaß und ich sitze hier im Bett und auf Instagram und sehe nur, wie cool die anderen sind. Dann hat man ein bisschen ein schlechtes Gewissen. Auch weil ich weiß, dass das nur Instagram ist, aber das ist so die direkte emotionale Reaktion darauf. Es ist nicht unbedingt rational, aber das ist die Reaktion.“ (W8, weiblich, 25 Jahre)	“I had the feeling of getting a…a social disorder or something like that. (…) I am spending time on the smartphone while everyone else is having real fun. (…) Everyone else has fun but I am sitting on my bed, on Instagram, watching how cool everyone else is. You have a guilty conscience then and even though you know that it is just Instagram—that’s the direct emotional reaction to it. It might not be rational, but it’s the reaction.” (W8, female, 25 years)		

Code	Definition	Example	Translated Example	Frequency	
Subcode				All Media	Sma Pho Only
Insignificance (of Contents)	This code is used when prioritizing, insignificance, quality of or dissatisfaction with content is concerned.	„Da wird dann so ein Scheiß gepostet—das wird heute gekocht oder das gibt es bei uns oder blablabla (...).“ (W1, weiblich, 31 Jahre)	“They are posting so much crap—what’s for dinner today, we’re having this and that —just real blah blah blah (…).” (W1, female, 31 years)	22	6
		„Es ist häufig so, dass ich Medien nutze und mich dann über die Inhalte aufrege oder die Art und Weise, wie die Inhalte aufbereitet sind (die Unausgewogenheit, Oberflächlichkeit, prosaisches Erzählen, aber wenig Fakten, …). (…) Aber in Ermangelung von Alternativen, (...) trotzdem nutze ich diese Medien weiter. (…) Häufig ist es ja so, dass es einzelne Beiträge sind, die mich sehr stören, aber das Gesamtangebot ist so wichtig und wertvoll, dass ich es trotzdem weiter benutze sozusagen.“ (W3, weiblich, 27 Jahre)	“Very often when I use media, I am annoyed by the contents or the way content is edited (biased, superficial, prosaic narratives but few facts, …). (…) For lack of alternatives, (…) I still need to use these media. (…) Often, only single articles are annoying, but the overall news coverage is invaluable so that I keep receiving it, so to speak.” (W3, female, 27 years)		

Code	Definition	Example	Translated Example	Frequency	
Subcode				All Media	Sma Pho Only
Interruption	Media interrupt or distract from more important tasks (e.g., through ringing, push-messages, pop-up messages, and so on).	„…wenn ich die Möglichkeit habe, mich mit Menschen zu unterhalten, dann finde ich das ganz toll. Ich mag auch keine Lokalitäten, wo Fernseher überall hängen. Sei es für Sportnachrichten oder Musikclips—du wirst automatisch abgelenkt. Du musst immer hingucken. Ich weiß nicht, man sollte sich die Frage stellen: ‚Von was wollen wir abgelenkt werden?'" (M3, männlich, 43 Jahre)	"…when given the chance to talk to other people, I love to do that. Also, I don't like places with TVs on the walls. Be it sports or music clips—you get distracted either way and automatically. Maybe one should ask: 'What is it we want to be distracted from exactly?'" (M3, male, 43 years)	7	6
Reliance	This code is used when our bond with and dependence on technology is emphasized.	„…eben die technischen Erfahrungen, wenn denn man was nicht funktioniert und man sich dann ärgert, dass das nicht klappt." (M12, männlich, 60 Jahre)	"…just the technical experiences if something is malfunctioning and it really bothers you that it just does not work." (M12, male, 60 years)	7	6
Advertisements	This code is assigned when advertisements or commercials are reported as the negative experience.	„Ist halt schlecht, dass Medien sich einschalten, viel Werbung gemacht wird, aggressive Werbung—ärgerlich(!), aber die Medien selbst sind ja nicht schlecht und ich möchte mich informieren." (M6, männlich, 41 Jahre)	"It is really annoying that media just pop-up, there are so many advertisements, aggressive advertisements—annoying (!), but the media themselves are not bad and I want to keep myself up-to-date." (M6, male, 41 years)	13	5

Code / Subcode	Definition	Example	Translated Example	Frequency	
				All Media	Sma Pho Only
Loss of Time	Media use is associated with a loss of time, namely wasting time with the respective medium instead of spending it with other (more meaningful) things or face-to-face contacts.	„…irgendwo macht das auch ein bisschen süchtig, dass man jetzt ständig guckt, ob irgendwelche „Post“ angekommen ist usw. Das Leben wird sehr viel stärker durch dieses Medium [Smartphone] bestimmt finde ich, wenn man es auch häufig nutzt. Da hatte ich früher doch etwas mehr Freizeit für andere Dinge, viel Zeit geht jetzt tatsächlich dafür drauf.“ (M11, männlich, 59 Jahre)	“...it is somewhat addictive—one is constantly checking for messages etc. Life is strongly dictated by the smartphone if you use is frequently. I had more time for other things in the past than today, it’s time-consuming.” (M11, male, 59 years)	9	5
Way of Communication	This code is used, if an interviewee talks about the way media or communication via media has changed communication (e.g., people meet less often face-to-face, or communication is (feels) different).	„Man ist halt nur noch über das Internet miteinander verbunden und ist gar nicht mehr im JETZT und von Angesicht zu Angesicht. Und es ist ja auch einfach eine andere Kommunikationsebene, ob ich mit jemandem whatsappe oder ihm face-to-face was erzähle. Da kommt einfach was anderes rüber und ich finde, dass face-to-face viel wertvoller, viel echter, menschlicher [ist] und es bedrückt mich, dass das verloren geht.“ (W11, weiblich, 24 Jahre)	“One is only connected via the Internet and not in the moment anymore or face-to-face. And it is a different level of communication if I tell something via WhatsApp or face-to-face. The message conveyed is different and I think, face-to-face is much more authentic, worthwhile, and human. It really depresses me that we are losing that.” (W11, female, 24 years)	5	5

Code	Definition	Example	Translated Example	Frequency	
Subcode				All Media	Sma Pho Only
Privacy Concerns	This code is used when privacy concerns linked to media use are mentioned.	„Und zwar habe ich mich auch viel mit Themen wie Datenschutz beschäftigt und daher ist das, glaube ich, noch so ein Punkt, wo ich einfach ein negatives Grundbild vom Smartphone habe—weil ich weiß, ich kann permanent geortet werden, irgendwelche Firmen können wissen, wo ich bin und von wo aus ich auf welche Seiten zugreife, mit wem ich in Kontakt bin und so. (…). Wir hatten das auch in der Schule (…). Da war jemand da, der hat uns (…) nahegebracht, was die Gefahren so sind und was die mit unseren Daten machen (…). Heftig! (…) der wichtigste Satz, der mir da noch so im Gedächtnis geblieben ist: ‚Man muss bei der Nutzung denken können, wie ein Krimineller—einfach, um sich zu schützen.'" (W11, weiblich, 24 Jahre)	"I concerned myself with protection of data privacy and think that is why I basically have a negative image of the smartphone in my mind. I know I can be located all the time; companies know where I am, what pages I am accessing or who I am in contact with etc. (…) Back at school, some commissioner for privacy once informed us about the risks and what they would do with our data (…). Upsetting! (…) The most important phrase that I kept in mind was: 'You have to think like a criminal in order to protect yourself.'" (W11, female, 24 years)	12	2

Code	Definition	Example	Translated Example	Frequency	
Subcode				All Media	SmaPho Only
Credibility	When credibility of media is an issue, this code is assigned.	„Weil ich sie [Nachrichtenmedien online und Radio] für unausgewogen halte und die Fragen für suggestiv und auch schlecht recherchiert. Also manchmal finde ich die Darstellung sehr tendenziös und auch offenkundig tendenziös und das stört mich, weil ich keine Meinungen sondern Informationen möchte und wenn ich dann das Gefühl habe, dass ich diese Informationen mir erst selber noch nachrecherchieren muss, um sozusagen den Eindruck, den mir das Medium, das Radio zum Beispiel, vermittelt hat, zurechtzurücken, dann ist es für mich ein Mehraufwand und dann habe ich auch (...) es untergräbt ja auch mein Vertrauen in die, also ja, es ärgert mich einfach, weil ich dann mich nicht gut informiert fühle.“ (W3, weiblich, 27 Jahre)	“Because I think of them [news media online and radio] as being imbalanced, questions are suggestive and not well researched. Sometimes, the presentation is blatantly tendentious and that really bothers me because I want information not opinions and this makes me feel that I need to check the information for myself to adjust the impression the medium, the radio for instance, conveyed. That means additional work for me and (…) it also saps my confidence in them [in news coverage]. So yes, it makes me angry because I don’t feel well-informed.” (W3, female, 27 years)	10	0

Note. Frequency of medium was counted once for each interview, even though interviewees might have mentioned a medium more than once (referring to different negative experiences with it, for instance). So, “15 times” means that in 15 out of 26 interviews Media Bubble was mentioned as a persistent negative experience at least once. The column “SmaPho Only” shows how many of these experiences were explicitly reported with the smartphone. The table depicts the four excluded codes in gray font (i.e., Advertisements, Reliance, Privacy Concerns, and Credibility). Examples translated by the author. Base: n = 26 interviews.

Table 4

Justifications for Negative Experiences with the Smartphone

Code	Subcode	Sub-Subcode	Definition	Example	Translated Example
Needs	Unspecific Needs		Interviewee mentions needs, but they cannot be allocated to (just) one of the following (more specific) needs	„… das hat so viele Ebenen auf denen es einen faszinieren kann: Es kann einen ablenken, es kann einen unterhalten, man kann sich verbunden fühlen, …—das sind ja eigentlich so menschliche Grundbedürfnisse.“ (W11, weiblich, 24 Jahre)	“… it has so many levels and is fascination in so many ways: it can distract, entertain, make you feel connected, …—these are human basic needs, really. (W11, female, 24 years)
	Need for Safety		Media (smartphone) use is accompanied by a feeling of safety.	„…eine kleine, ja, „Heimsituation“ in der Außenwelt schafft, die ein bisschen Sicherheit gibt. So, ‚ich bin hier und habe mein Medium und das ist meine kleine Welt, wie ich sie zuhause auch habe‘. Das könnte gut sein, dass man das da versucht auch aufzubauen—einen kleinen Raum um sich.“ (M11, männlich, 59 Jahre)	“…to construct a little home-like situation in the outside world that provides a sense of security. Like, ‘I am here and I have my medium, this is my own little universe, similar to when at home’. Probable that one tries to construct this—some personal space.” (M11, male, 59 years)
	Need for Self-Presentation		The need for self-presentation describes the need to present oneself in a favorable way towards an audience.	„…das sind ja eigentlich so menschliche Grundbedürfnisse. Selbstdarstellung, alle darüber informieren, was man macht, Feedback kriegen.“ (W11, weiblich, 24 Jahre)	“…those are basic human needs. Self-presentation, inform everybody about what one’s doing, getting feedback.” (W11, female, 24 years)

Code	Subcode	Sub-Subcode	Definition	Example	Translated Example
	Need for Information		The need to stay informed about news as well as sports or information on other things that one deems to be important. This code does not apply to information on people or groups that belong to a person's network but applies when an interviewee gathers information on public personae.	„Ich wollte nichts verpassen, was in der Welt passiert, habe Informationen nachgelesen, Presseberichte, Kultur/Politik/Musik—alles—um informiert, up-to-date zu bleiben." (M6, männlich, 41 Jahre)	"I did not want to miss out on what happened in the world, read up on news, press releases, culture, politics, music—everything—to stay informed, up-to-date." (M6, male, 41 years)
	Curiosity		Medium is being used out of curiosity—about people or things (e.g., hobbies) one is interested in. Being curious about news would not be coded with this code but with "need for information".	„Was machen die anderen?" (M1, männlich, 27 Jahre)	"What are the others doing?" (M1, male, 27 years)
				„Dass man ganz gerne Neuigkeiten erfährt und deswegen dann, aus Neugier, wieder guckt und dann daran hängen bleibt." (M12, männlich, 60 Jahre)	"That one likes to get new information and one checks over again because of that, out of curiosity, and gets stuck eventually. (M12, male, 60 years)
		Social Comparison	This category is used when a person states that they would compare themselves and their lives to other people when looking at other people's posts or profiles.	„…keine Ahnung, was nach dieser Sekunde auf diesem Foto los war oder was echt los ist im Leben dieser Person. Das ist eine falsche Einsicht in das Leben einer Person und manchmal ist es wirklich nicht gut, dann denkt man so ... man kann sehr schnell schlecht von sich, über sich, dass man sich schlecht fühlt. Wenn man sich selber gegenüberstellt und du denkst „äh, ich bin nur an meinem Handy und die anderen haben Spaß" aber sie posten das auf diesem Ding und ich benutze es immer noch." (W8, weiblich, 25 Jahre)	"….no idea what was happening in the seconds after the photo was taken or what actually is going on in this person's life. It is a biased insight and sometimes it is not good. That is when you think like this…really bad of and about yourself. Then you compare yourself and think 'I am just spending time with the phone while the others are actually having fun', but they post this, and I am still on it." (W8, female, 25 years)

Code	Subcode	Sub-Subcode	Definition	Example	Translated Example
Interpersonal Commitment	Need for Relatedness		The basic need to feel related to others, to belong. It's the reason why a person would watch soccer even though they despise it or stay in a chat just to be able to join in a conversation although the chat is mostly annoying, etc. (e.g., Deci & Ryan, 1985, 2000; Ryan & Deci, 2000).	„Ich weiß, dass ich da aussteigen kann und das löschen [kann]. Aber ich weiß, ich entscheide mich damit auch raus aus diesen Kontakten zu kommen und (…) verliere dann den Kontakt zu vielen Menschen, zu denen ich den Kontakt nicht verlieren will." (W8, weiblich, 25 Jahre)	"I know that I can quit. But I also know that I would decide to quit on ties and, thus, would lose the contact to people I don't want to lose the contact to." (W8, female, 25 years)
		FOMO	Fear of Missing Out (FOMO)—the fear that one could miss out on things that friends and acquaintances are doing. Defined as "a pervasive apprehension that others might be having rewarding experiences from which one is absent" (Przybylski et al., 2013, p.1841).	„Man hat das Gefühl, was zu verpassen. Ist ja so, wie wenn man unbedingt am Wochenende weggehen will oder so. Manche haben das ja (…) denken, sie verpassen etwas. Eigentlich verpasst man nix." (M1, männlich, 27 Jahre)	"You feel like missing out on things. It's like those who need to go out each weekend. Some think they would miss out if they would not go out. In fact, one does not really miss out on anything." (M1, male, 27 years
	Social Pressure		It is normal, as in "norm" or "standard" to use a medium in a certain way, which means, it is expected that someone carries their smartphones and is available permanently. Pressure from "society".	„…es hat etwas mit diesem ständig abrufbereit sein zu tun. (…) dieser Zwang ständig zu antworten, gehört ja auch so zur Abrufbarkeit." (M10, männlich, 22 Jahre)	"…it has to do with being available all the time. (…) this obligation to reply is part of being persistently available, too." (M10, male, 22 years)
				„…gezwungen, das zu nutzen, gezwungen, zu antworten." (W8, weiblich, 25 Jahre)	"…forced to use it, forced to reply." (W8, female, 25 years)

Code	Subcode	Sub-Subcode	Definition	Example	Translated Example
Habit	Social Reliability		People feel obligated—just as in a face-to-face setting—to reply promptly or to be available (i.e., carrying the phone always). Sense of obligation or responsibility, coming from inside, or it has already been internalized.	„...Verantwortungsbewusstsein auch den anderen gegenüber. Ich rufe auch alle Leute zurück, die mich anrufen und nicht erreichen. Da rufe ich zurück, weil ich mir denke, vielleicht will der was Dringendes von dir. Ein bisschen, kann man sagen, übertriebene Disziplin vielleicht auch.“ (M7, männlich, 62 Jahre)	“…responsibility also towards other people. I call everybody back who called me. I do that because I think it might be important. One could maybe say that this is also sort of exaggerated discipline.” (M7, male, 62 years)
	Addiction/Automatism		Addiction describes the interviewees (here: laypersons, since no one was doctor, psychologist, psychiatrist, or the like) comparison of media use to an addiction. Signs could include loss of control over the behavior, persistence despite negative effects, automatism, dependence (cf. e.g., De-Sola Gutierrez et al. 2016) or comparing it to a substance associated with addiction (e.g., cigarettes).	„Ich habe das Gefühl, dass ich und auch andere Menschen davon abhängig werden oder süchtig sind…“ (W8, weiblich, 25 Jahre)	“I am under the impression that I as well as others get hooked or already are addicted to it…” (W8, female, 25 years)
				„Das ist so, wie wenn du abhängig davon bist vom Telefon.“ (M9, männlich, 55 Jahre)	“It is as if your addicted to your [smart-] phone.” (M9, male, 55 years)
	Routine		Habit/automatism describes the feeling of grabbing or checking the phone or turning on the TV, etc. out of habit; following a reflex without consciously deciding to do so.	„Macht der Gewohnheit, dass man das benutzt. Ich sag mal so, das Smartphone ist ja wie Hand und Fuß heutzutage...“ (M7, männlich, 62 Jahre)	“A force of habit to use it [the smartphone]. It’s like a part of the body these days.” (M7, male, 62 years)

Code	Subcode	Sub-Subcode	Definition	Example	Translated Example
Boredom/Pastime			This code describes media use out of boredom. So, if someone has no idea what to do with their time, they would just flip through channels or their smartphone applications.	„Zum Zeitvertreib“ (M8, männlich, 18 Jahre)	“To pass time” (M8, male, 18 years)
				„Ich langweile mich oft, wenn ich rumfahre oder auch mal zu Hause, dann ist das immer eine willkommene Abwechslung, auch Ablenkung, wenn man mal blöde Gedanken hat oder so.“ (W11, weiblich, 24 Jahre)	“I am often bored while going somewhere or even at home; it is a welcome distraction then, [and] also when you have unpleasant thoughts.” (W11, female, 24 years)
	Diversion		The medium is used for distraction or even escapism.	„…, weil man ja eine gewisse Ablenkung hat, aber man hat diese eigene Ruhe nicht.“ (M1, männlich, 27 Jahre)	“…because you have a certain distraction, but you miss out on your inner tranquility.” (M1, male, 27 years)
	Entertainment		The medium is used for fun and entertainment.	„…du hast eine Beschäftigung, da ist Unterhaltung irgendwie, obwohl man nichts selber macht, man klickt einfach und es ist so eine Hypnose: man kommt da rein und denkt, man macht was, aber man macht auch nichts wirklich.“ (W8, weiblich, 25 Jahre)	“…you are busy, there is entertainment somehow, even though you don’t do anything, you just click and it’s like hypnosis: you enter and think, you’re doing something but you’re not really doing anything.” (W8, female, 25 years)

Code	Subcode	Sub-Subcode	Definition	Example	Translated Example
Pragmatism			Media have improved connectivity or made it possible to communicate over a long distance (even internationally) in real time in the first place. Therefore, and in general, they are experienced as mainly beneficial and are used persistently despite some negative "side-effects"; they are, simply put, practical, nonetheless.	„…schon wichtig, dass wir über verschiedene Ebenen heute die Möglichkeit haben, uns auszutauschen. Manchmal ist es so, dass man über WhatsApp zwar niemanden erreicht, aber über E-Mail oder umgekehrt (…) zumal der Postweg auch immer schwieriger wird und zu langatmig ist." (M11, männlich, 59 Jahre)	"…it is important to have the option to be connected on so many levels. Sometimes, you don't reach someone via WhatsApp but via email or the other way around (…) and sending through the post is getting more complicated and takes too much time." (M11, male, 59 years)
Recreation			A medium is being used because its use brings relaxation/recreation, a person might rest their mind.	„…da kommt dann hin und wieder mal der Griff hin. Vor allem, wenn man an einer Sache nicht weiterkommt und so gerade aufgeben will. Dann denkt man so ‚ach, mach mal eben 'ne Pause, das gehört auch dazu'." (M10, männlich, 22 Jahre)	"…now and then you reach for it. Especially when you are stuck with something and are about to give up. Then you think 'you are allowed a break from time to time'." (M10, male, 22 years)
	Convenience		A medium is being used out of convenience because a person does not want to be actively choosing a channel or the like but simply chill out in front of the TV, for instance.	Wurde nur zu TV und Radio genannt.	Only mentioned for TV and radio but not for the smartphone.

Note. Examples translated by the author.

5.4 RQ 4: The Justifications for Persistence of Negative Experiences

Aside from social context, a multitude of other aspects might be influencing the evaluation of an experience with the smartphone, such as the sum of a person's experiences (which basically constitutes the self), their attention to the experience, their expectations, or their attitudes/beliefs (Baym, 2015; Csikszentmihalyi, 1990; Festinger, 1957; James, 1890). So, to analyze the "why" underlying the persistent negative media experiences, while still following the assumption of the conscious and active user, I simply asked interviewees for their reasons. Most participants were able to explain—or justify—this seemingly counterintuitive behavior.

A total of 15 reasons linked to smartphone use were extracted during the coding process and condensed into six clusters: needs, interpersonal commitment, habit, boredom/pastime, pragmatism, and recreation. Needs include some unspecified needs (i.e., not distinctly allocatable needs which were used as justifications) as well as needs for self-presentation, information, relatedness, and curiosity (which could have been called autonomy as well because SDT assumes curiosity to be intrinsically driven by the need for autonomy, therefore it was clustered with needs). FOMO, social pressure, and reliability subsume under the label interpersonal commitment, as they describe external and internal forces that assumedly drive persistent use. Habit subsumes reports of supposedly addictive or routinized behaviors. Boredom, pragmatic reasons, and recreation as justifications are self-explicable but a detailed description is provided in Table 4 (as are all definitions of justifications and coding examples, respectively).

For linking the experiences with the respective justifications, the code-relations-tool of MAXQDA was used and a contingency table extracted with the codings of the nine negative experiences overlapping with the justifications for persistency (see Table 5 for the justifications per negative experience). Again, each justification was only counted once per negative experience per interview so that a specific justification would not have more weight if it were mentioned more than once. Also, a combination of quantitative as well as qualitative methods was used to explore the most often as well as most important determinants of these behaviors. That is, after identifying and clustering the justifications, they were organized by frequency and examined semantically, which means that I focused on the reasons the participants stressed during the interviews. The text passages were ranked accordingly. The semantics were the decisive factor if frequency and semantics differed or if two reasons were mentioned equally often.

Social reasons were mentioned most often and interpersonal commitment (87 times), especially social pressure, played an important role. Needs, as additional reasons for persistent use, were mentioned 38 times; 21 times of which the emphasis was on a need for relatedness, which is yet another socially rooted aspect of smartphone use. Habitualized use was mentioned almost as often (37 times), followed by boredom (20 times), pragmatism (17 times) and recreation (four times).

The underlying motives per each of the nine different persistent negative media experiences differed, with none being equal to the one before. They will be elaborated in the following section. Aligned with the structure of Table 5, the main justification will be described first, followed by the next important to the least important justification for persistent use despite negative experiences. But first, pragmatism as reason for persistent use will be introduced separately.

5.4.1 **The Smartphone Makes Our Everyday Lives Easier**

Pragmatism seems to be a universally valid justification for smartphone use despite negative experiences and will, thus, be introduced briefly and separately in advance. It is simple and practical to stay in contact via WhatsApp, for example. The mobile phone application makes it easily possible to send pictures, emoticons or emojis, talk or text in real-time, and thereby share information worldwide in the fastest way possible; potentially to a lot of people at once and most of the time even without additional costs. Accordingly, across all persistent negative experiences—except *Auto Use*—seemed interviewees to trade-off the potentially annoying, stressing, uncommunicative, time consuming, or impersonal repercussions of mobile communication for its beneficial properties.

I will not discuss pragmatism much further because it does not add any more to the explanation of the persistence of negative experiences than was delineated in this section. In the following, I will introduce the other reasons for persistency of each of the nine negative experiences with the smartphone, ordered by their importance to the interviewees per negative experience.

Table 5

Persistent Negative Experiences with the Smartphone and Justifications for them

NEGATIVE EXPERIENCES	REASONS FOR PERSISTENT NEGATIVE EXPERIENCES (SELF-JUSTIFICATION OF BEHAVIOR)				
Media Bubble (impolite, uncommunicative)	**habit**	**interpersonal commitment**	**needs**	**recreation**	**pragmatism**
Overkill (fast pace, message flood, plethora)	**interpersonal commitment**	**needs**	**boredom**	**habit**	**pragmatism**
Emotional Stress	**interpersonal commitment**	**needs**	**pragmatism**	**boredom**	**habit**
Auto Use (habit/automatism)	**habit**	**interpersonal commitment**	**needs**	**boredom**	**recreation**
Endangerment (risks to health)	**interpersonal commitment**	**needs**	**habit**	**boredom**	**pragmatism**
Insignificance (of contents)	**needs**	**interpersonal commitment**	**habit**	**pragmatism**	
Interruption (of tasks)	**habit**	**needs**	**interpersonal commitment**	**recreation**	**pragmatism**
Loss of Time	**needs**	**interpersonal commitment**	**pragmatism**	**habit**	
Way of Communication	**interpersonal commitment**	**needs**	**habit**	**pragmatism**	

Note. Most frequent negative experiences from top (most) to bottom (least). Reasons are scaled from most important (on the left) down to least (on the right-hand side of the table). Interpersonal commitment includes social pressure/reliability and fear of missing out (FOMO); needs include different needs, such as relatedness, autonomy, information, or self-presentation.

5.4.2 **Media Bubble**

The phenomenon I termed Media Bubble was only one out of 15 times *not* reported from a third-person perspective. So, most interviewees (93%) attributed this disruptive behavior to others but not themselves. This is interesting since the third-person effect was only obvious for this most often reported experience (and for Endangerment) but not the remaining seven, though all of them should be considered negative and, thus, more of an issue for others compared to oneself. This would also be in accordance with research on the third-person effect (see Section 2.3.3).

The most obvious reason for isolation from the outside world by being immersed in one's smartphone seems to be attributed to a force of *habit*. That is, the smartphone is part of daily routines or even perceived as a part of one's body and, thus, its use rather automatic than intentional. Additionally, its use is perceived to be more immersive than, for example, reading

a book. Even the term "addiction" was used by the interviewees to justify this behavior. *Interpersonal commitment* is an equally important motivator for one's isolation and noteworthy is the attribution to *FOMO* as reason for this kind of behavior because it was *exclusively* reported from a third-person perspective. Interviewees reported other peoples' behavior (i.e., almost constantly checking their phones for more interesting content than what could be found in the respective vis-à-vis situation) to be disrespectful and it would often feel as if they would bore the other person who would then rather withdraw into their Media Bubble. *Needs* also were mentioned to be important for "disengaging" via smartphone as the device can serve a multitude of needs, such as feeling safe because someone is in their own world when carrying the smartphone in their hand. One also can gain information via this "mini-computer", stay in contact to others, and show oneself and the things or places one is up to do or go to. The smartphone might also be used for reasons of *recreation*, for example when playing an app-game or when reading about one's hobbies. At the same time, it was also described as a tool for "twosome lonesomeness", which means even though in the same place, people are sometimes engaging with their phones rather than pursuing a joint activity. Lastly, *boredom/pastime*—when analyzed semantically—does *not* seem to play an important role when it comes to repeated withdrawal into one's Media Bubble.

Similar behavior has been reported before and was called "absent presence" (Gergen, 2002), "cocooning" (Ito et al., 2010), or "transported state" (Potter, 2012), for instance. This also refers to the state people were observed in that led to calling them smombies (e.g., Appel et al., 2019; Hayashi et al., 2015; Lin & Huang, 2017; Panek et al., 2015; Spitzer, 2018). Especially research on the third-person effect never focused on negative experiences with the smartphone, or just this distracted behavior (that is, being immersed in one's Media Bubble). Reasons matched those for habitual and need-driven behavior as well as possible motivators for a third person engaging in media contact instead of contact to people surrounding them ("maybe I bore them and that is why they grab their smartphone"; W5, female, 41 years). Interviewees in this study also compared the smartphone to something that would provide a sense of security, especially regarding the Media Bubble phenomenon, e.g.: "…because you use it at home and it is transportable, so you can create sort of a "home-situation" in the outside world that provides security. Like, I am here, and I have my medium and this is my own small world, as I have it at home, too. Might be that one tries to construct that there—a space for oneself." (M11, male, 59 years). According to Ryan and Deci (2000b), a need for safety-security results from unsatisfied basic needs (see also e.g., Ryan & Deci, 2000c), and that having a smartphone in one's pocket might convey a sense of safety has been found in prior research as well (Ahad

& Anshari, 2017; Keefer et al., 2012). This feeling of psychological security through attachment to an object (Keefer et al., 2012) might be better explained by research showing that just thinking about the smartphone primes relationship concepts and lowers the need to belong (Kardos et al., 2018). Thus, the smartphone might have become an integral part of everyday life insofar as it has been conditioned to replace real contact by eliciting a feeling of connectedness, thereby also providing a feeling of security.

5.4.3 Overkill (Too Much of a Good Thing)

Most of the interviewees mentioned *interpersonal commitment* as main reason to take on the plethora and commotion mobile messages or notifications might entail. Particularly *social pressure* and *reliability* seem to be important. Accordingly, staying in touch and the chance that one out of many messages may be worthwhile is what presumably drives people to carry their smartphones with them constantly. Likewise, *relatedness* was referred to as a reason for condoning the stress smartphone use involves; *curiosity* and *social comparison* were, too, mentioned but with less emphasis (as compared to relatedness). Some also mentioned to take on the negative side effects for reasons of *boredom/pastime*, which means, they use the smartphone nevertheless because it might ease boredom. Interviewees mentioned to be drawn to their phone *automatically* even though they felt stressed by the pace and plethora of messages. They could not specify this sensation any further, though.

Similar experiences have been documented before. For instance, smartphone use was associated with an accelerated speed of information as well as their processing, which is part of the clustered experience I termed *Overkill*. This has also been found to lead to stress (Hofmann, 2018) or a feeling of incapacitation (Maier et al., 2015). That is, due to its constant availability and interconnectedness, "[mobile phone use] can (…) feel overwhelming and imprisoning" (Baym, 2015, p. 125). It might be that with the phone being integrated in everyday life as it is, habit research can help to explain these ambivalent feelings because the device has become a part of our routines (see Section 2.4). In other words, it is used no matter how stressful it, too, might feel once we reflect upon our own use and its possible effects.

5.4.4 Emotional Stress

Again, *interpersonal commitment* was the main justification for enduring emotional stress caused by one's smartphone use, especially perceived in form of *social pressure***.** This means, a person feels obligated to this sort of smartphone usage, to behave responsibly and

reliably because of standards set by society. Aside from relatedness, in this case accentuated as an obligation to use the smartphone if one wants to stay connected with others, only one other *need* was mentioned: curiosity, with a clear emphasis on social comparison. People are socialized this way nowadays and other forms of staying in contact seem to be outdated. *Pragmatical* reasons were discussed in 5.4.1, but it is noteworthy that they seem particularly important when it comes to the experience of *Emotional Stress* (and *Loss of Time* as well)—as justification for why it is still worthwhile to continue the unfavorable behavior. It is "convenient to send a few short texts" all negative aspects notwithstanding (W6, female, 57 years).

Moreover, even though its use comes with costs in the form of stress or feelings of obligation, it still provides the opportunity to counteract *boredom* and to distract from even more stressful tasks—some interviewees justified their persistent use this way. At least during one's everyday routines, an *automatic* usage was mentioned—a reflex to grab the phone, feeling obliged to reply instantaneously; sometimes even compared to addictive behavior (e.g., M5, male, 30 years; M10, male, 22 years; W11, female 24 years). The perception that one has to always be available seems prevalent (see, e.g., also Chan, 2018) and might even be considered an obligation (Licoppe, 2004) because of the implicit expectation of availability as a premise for relationship maintenance (Hall & Baym, 2011). Emotional Stress is, thus, a persistent negative experience linked to the importance of feeling connected to others (e.g., Baumeister & Leary, 1995; Ryan & Deci, 2000b).

5.4.5 **Auto Use**

Some interviewees justified their smartphone behavior through *addiction*—of course, there is no explanatory value in explaining addiction with addiction and even though the information obtained during the interviews is subjective and presumably also influenced by the existing media coverage on technology addictions, I mention this here, because addiction as a motive for automatic behavior was mentioned most often. Interviewees seem to attribute their persistent use despite negative effects *externally*—in the exact same manner as they attributed withdrawing into a media bubble to addiction (or habit); or "blamed" automatic behavior for frequent interruption of tasks; or endured emotional stress because of social pressure. Again, based upon the introduced literature, people would assume that negative experiences are all undesirable and thus attributed to external reasons as well as more often observable in others than in themselves (Davison, 1983; Perloff, 1999). It seems that differences might exist, making some experiences more externally attributable, whereas attribution of other experiences, to needs, for instance, is not regarded as "too undesirable"; or (true) reasons for some experiences

might just not be available to the conscious self (Keefer et al., 2012; LaRose, 2010a).

Interpersonal commitment was also mentioned as a factor explaining this self-acting smartphone behavior. *FOMO* as subcode of interpersonal commitment is peculiar because, this time, it is reported from a first-person perspective (as opposed to the experience of being in a Media Bubble, where it was mentioned from a third-person perspective). Even though Auto Use does not feel good, *needs* seem to be stronger—especially the need for information and for relatedness were associated with a feeling of involuntary use, as well as reasons of social comparison. Again, the smartphone is a welcome distraction from other things and even entertains (*boredom/pastime*). *Recreation* was mentioned here as an "appreciated break" (M10, male, 22 years) from what one is doing—but rather as an excuse for automatically reaching one's phone and looking something up than a conscious reach for the phone to have some off-time. No interviewee justified the supposedly fully automated use by reasons of *pragmatism*, making this the only negative experience for which pragmatism was *not* reported. This is interesting since habit formation was presumably fostered by the devices practicality, hence, integration into everyday life and repeated use respectively (e.g., Wood, 2019).

5.4.6 **Endangerment (Risks to Personal Health/Healthy Development)**

Keeping up with others might be a risk for a person's own healthy living. That is, interviewees mentioned *interpersonal commitment* once more as main reason for risky smartphone behavior, as something imposed by our society. Being "always on" might, for instance, prevent someone from introspection or tranquility (Diefenbach & Borrmann, 2019) an interviewee reflected on smartphone overuse of his friends and linked it to developmental tasks: "…it is nice to leave the smartphone once in a while. I think, it is a routine and once you break that routine, the smartphone becomes irrelevant. (…) it is really good if someone, [for instance when] on vacation can concentrate on themselves and (…) when they come back (…) know who they are" (M10, male, 22 years). Two interviewees thought people were "enslaved" to their phones. One of them (M9, male, 55 years) was concerned about society going dumb, because no one can calculate, navigate, or even write without their phones, not to mention, work with their hands anymore. Supporting research exists, arguing that this constant use (namely constantly having the phone available) not only portrays a habit but that it supplements thinking (Barr et al., 2015). Contacts to others were perceived to be less rewarding compared to face-to-face encounters, but people are curious and want to follow the "trends"—and thus use the social applications nonetheless (*social pressure*). Recipients also weigh negative effects and possible immediate *need* gratifications—and thus, use the phone despite everything that might be

detrimental. *Social comparison* was particularly stressed. That is, a person just sits in front of a medium in order to watch other people live their lives instead of going out themselves. Watching others supposedly great lives, even though fully aware that people often post positive aspects or perspectives only, made interviewees feel bad but they still could not resist logging-on again.

It might also be due to *habitualized* behavior and, as one interviewee (W8, female, 25 years) put it, "hypnotizing effects" of smartphones, that many people use it persistently despite possible consequences. Even though mentioned in just as many interviews as were needs, habits or addictive properties of smartphones were not elaborated as much—basically just mentioned and compared to drugs or extensions of the body (e.g., Barr et al., 2015). Also, important developmental tasks, such as learning to feel and show empathy cannot be obtained via technology and, thus, need real contact to other people. Interestingly, many children are almost instantly fascinated with smartphones and since it calms most of them, parents hand over mobile devices to even the youngest, not thinking about possible consequences for their development (e.g., Spitzer, 2018). Of course, the smartphone also is a means to ease *boredom* and, thus, its use was justified by this, the assumed risks notwithstanding.

5.4.7 **Insignificance (of Contents)**

Even though messages might be rather meaningless, news might be implausible, or prioritization contrary to one's own agenda, we keep reading the news and do not mute WhatsApp groups. Why is that? *Need* gratification might be a factor—especially a *need for information* (no matter how many sources one might have to consult in order to find some truth, see e.g., W3, female, 27 years); the *need for relatedness* (even though the plethora of messages is insubstantial, there might also be an important one once in a while—and one wants to stay connected to others regardless); and *curiosity* also seems to play its part. Closely related, *interpersonal commitment* is an important reason, too: a feeling of obligation towards others to read and comment their messages. Deriving from a force of *habit*, it is not easy to set one's boundaries, which means to disconnect occasionally. For instance, one interviewee (W11, female, 24 years) felt as though someone else might feel entitled to "raise a claim" on her (reachability). Plausibly, *boredom/pastime* was *not* mentioned as reason for the recurring negative experience of Insignificance. Content fatigue or exposure to undesired topics were reported as unsatisfying (as opposed to need satisfying) experiences with Facebook before (Karapanos et al., 2016), but reasons for persistence, to the best of my knowledge, were not. With the smartphone, however, habitual use was found to be associated with continued use

despite it being experienced as meaningless—as which it was evaluated when the phone was used for entertainment, to pass time, or to passively use social media. Moreover, lower feelings of autonomy when the phone was used this way were reported (Lukoff et al., 2018). According to SDT, this would lead to more exposure to obtain the sought for gratification and, thus, explain persistence, nonetheless.

5.4.8 Interruption

Smartphone notifications can interrupt other tasks—doing homework, talking to others in person, sports, or even use of other media. Especially *habits* seem to provide an important explanation for a persistent interruption of tasks. One interviewee (M7, male, 62 years) mentioned to put all phones far away occasionally—to have some quiet time to read without the chance of a diversion. He talked about the need to break the habit many of us have formed. *Needs* are also a factor contributing to persistent use despite negative effects in form of interruptions (in case of smartphones especially the need for relatedness and curiosity). Interpersonal commitment in terms of *FOMO* was reported to play a role as well.

Conversely, not only does the device interrupt social interactions in real life (Vogelgesang, 2018), it was also found that such distractions lower the benefits of these encounters (Dwyer et al., 2018). Thus, it can have the opposite effect of what some would argue it was meant for. In two cases, *disruption* was evaluated as something *good*—to evade a yet even more displeasing task or to, as already mentioned regarding Auto Use, explain the interruption as an option for taking a break, for ("accidental") *recreation*. This sort of break was, indeed, found to be a reason of usage before (Quan-Haase & Young, 2010; Smock et al., 2011), but has also been found to impair attention and productivity both in work and private life (David et al., 2014; Duke & Montag, 2017b; Kushlev et al., 2016; Rosen, Carrier, et al., 2013). Less ability to relax and, thus, recover can be the consequence of these supposedly welcome breaks, too, potentially due to the arousal elicited by use of the device (Levenson et al., 2017; Rieger et al., 2017). Literature even suggests that a persistent arousal elicited by use of the device exists in a sense that even brief periods of use come with a lowered relaxation experience (Rieger et al., 2017). Furthermore, recovery can be impeded when use is less self-directed, leading to a lowered feeling of control, or mastery experience as well as less autonomy (Allaby & Shannon, 2020; Rieger et al., 2017). Though it was also discussed that options for beneficial (as opposed to detrimental) use depend on the way the device is used—passively vs. actively (Lukoff et al., 2018; Verduyn et al., 2015) or more vs. less intentional (Allaby & Shannon, 2020), for instance—interruptions in the literal sense were evaluated negatively by the interviewees.

5.4.9 Loss of Time

Media use costs a lot of time and some interviewees reported to be bothered by how much time they "wasted" with media instead of spending it with their hobbies or friends and family (e.g., M12, male, 60 years). The *needs* for relatedness and for self-presentation were main reasons for usage—the time loss notwithstanding. Additionally, curiosity, particularly about information, and social comparison were mentioned. *Interpersonal commitment* was a reason for spending time with the smartphone, too: Interviewees reported to feel obligated to use this medium to communicate (so, also *social pressure* was coded). Additionally, some degree of *FOMO* was mentioned—the phone usage costs time, but a person would also have a feeling of missing out in case they would not stay connected. Despite the devices' time-consuming characteristics, *pragmatism* as an important quality was stressed as motive for usage, in a similar fashion as it was a reason for enduring the Emotional Stress. *Habits* or, in this case, "addictive properties" were also blamed for spending too much time with mobile media. Understandably, *boredom/pastime* and *recreation* were *not* mentioned as justifications for persistently experiencing Loss of Time. Maybe, Loss of Time is a consequence or the "guilty conscience" *after* interruptions and/or automatic use of the smartphone. Less productivity or more focus on the medium instead of face-to-face contacts have been discussed as side-effects of interruptions and automatic use (Johnson et al., 2020; Kraut et al., 1998, 2002). So, and also in line with the displacement hypothesis, it might be that a break is appreciated in the moment but eventually leads to lost time with people in real-life settings. Interestingly though, research has also found the opposite to be true (Dienlin et al., 2017), depending on way of use (passive vs. active, for instance; e.g., Verduyn et al., 2015).

5.4.10 Way of Communication

The way we communicate has changed and some interviewees were annoyed or even quite concerned by that. Still, they communicate via mobile phones but in a nonverbal matter via corresponding applications most of the time, even though they perceive it to be less binding and feel that interpersonal relations might even suffer because of fewer face-to-face interactions. *Interpersonal commitment* was the strongest motive, and *social pressure* in particular, since communication via media is the "normal" means of communication that "everybody" uses these days (e.g., W8, female, 25 years). So, most interviewees reported to feel obligated to follow this standard means of communication. Among the *needs*, the need for relatedness falls in line with the aforementioned reasons. That is, a person wants to stay connected and therefore has to act conform to current trends or norms. Novelty was another

reason as to why the smartphone catches a person's attention easily. *Habits* are an underlying motive insofar as these trends have become habitualized already—the mobile phone has become an extension of the body (literally described this way by some interviewees (e.g., W11, female, 24 years; M7, male, 62 years); and it was also compared to drugs by a few participants (e.g., M1, male, 27 years; M9, male, 55 years). No interpersonal communication would take place without the phone at least being present (on the table) and presumably more communication via smartphone than vis-à-vis. Despite all trade-offs of mobile or mediated communication—its indisputable benefits when it comes to communication were acknowledged, nonetheless. For instance, long-distance video-telephony that would not be possible if it were not for the technology (e.g., W8, female, 25 years).

Prior research noted unwanted effects on communication quality caused just by the phone's presence (Allred & Crowley, 2017; Przybylski & Weinstein, 2013), making a real-life conversation feel more distant (Rotondi et al., 2017). Also, behavior was described that lowers appreciation of the people present, such as phubbing (e.g., Roberts & David, 2016). This (still) new Way of Communication might also lead to insecurities because new norms and boundaries have not fully established yet, leaving the user at a loss from time to time (Campbell & Ling, 2009).

5.5 (Discussion of the) Significance and Limitations of Study I

The present study identified the medium most quotidian negative experiences were associated with. Unsurprisingly, the medium most frequently used was also the one the most negative experiences were reported with: the smartphone. I argued that the U&G could not explain persistent use despite negative experiences and although the definition of what would constitute a "negative experience" was also left open, nine persistent experiences could be detected across the interviews. Furthermore, the nature of these experiences and reasons for persistent use despite negative consequences were analyzed, with six final clusters of justifications. Additionally, the influence of social context on evaluation of these experiences was regarded.

Not only does the smartphone enable access to the Internet, but to one's friends and acquaintances in particular (Vorderer et al., 2016, 2017b). So, to satisfy our needs for social connection (Baumeister & Leary, 1995; Ryan & Deci, 2000b) and to prevent missing out on things (Przybylski et al., 2013; Wolniewicz et al., 2018), we just have to have it readily available all the time—which often is the case already. Burdening us with all these detrimental effects

might be inherent in human nature since "we are driven to maximize our communication satisfaction" (Baym, 2015, p. 57), and this drive might just push us to use all communication channels possible to do so, discarding unwanted side-effects in that moment (e.g., Verduyn et al., 2015). Some use was described to happen automatically and might be experienced negatively because of a lack of control over the action. Research supports this notion by findings of less appreciation of smartphone use when passive or out of habit, for instance (Lukoff et al., 2018). Less controlled use might also be detrimental because it lowers feelings of control and autonomy. With these needs thwarted, the intention to gain a sense of relatedness via means of the device's affordances might just as well suffer—its presence already disrupts from real-life and impairs the benefits of face-to-face encounters, as interviewees have reported (e.g., W1, female, 31 years; W11, female, 24 years; M9, male, 55 years) and also previous research has pointed to (e.g., Dwyer et al., 2018; Vogelgesang, 2018).

The analyzed experiences were briefly discussed in the respective results section, and I will, thus, only add at this point that it seems that most experiences have individually been discussed in previous literature. For instance, some (e.g., OK and ES) were described as precursor to stress experiences with the device (e.g., Hofmann, 2018; Maier et al., 2015) and others (e.g., MB, AU) as outside a person's awareness (LaRose, 2010a; Potter, 2012; Wood, 2017). However, to the best of my knowledge, neither does a study exist that surveyed persistent experiences with the smartphone in daily life like the present study, nor does one point to the possible distinction of the third-person perspective in case of (some of those) negative experiences. Justifications for use have not been analyzed in as much detail as in this study either. Rather, single aspects such as automaticity, self-control, or mindfulness (Panek et al., 2015); or FOMO (Appel et al., 2019) were analyzed for some negative aspects of use, such as texting while walking or while driving. People are suggested to justify their behavior even if it took place outside their conscious awareness in that specific moment. This way, they would still feel in coherence with their inner statutes even though the behavior might have been contrary to them (see Section 2.3.3. for cognitive dissonance theory).

Social reasons were the most prominent but also needs and habitual use emphasized. Especially social pressure was stressed as a social justification, though not just externally attributed. That is, interviewees (e.g., M7, male, 62 years; M10, male, 22 years) also noticed their own part in this—as sort of an internally felt social responsibility. This responsibility might be rooted in social norms that guide behavior (Hall et al., 2014). "Externally imposed constraints" (Ruggiero, 2000, p. 11) are known from all media, though with smartphones they might still be in the process of development. Nonetheless, many interviewees reported to feel

that they "had" to be permanently available and felt stressed by that. This perceived pressure to be connected on the one hand and the expectations for immediate responses by others on the other hand have become a new norm of our time and for many users constitute indeed both a blessing and a curse (Fox & Moreland, 2015; Hall & Baym, 2011; Utz, 2017). More often these days, people tend to behave this way because they feel obligated to answer immediately and might expect this from others in return (Mai et al., 2015; Mascheroni & Vincent, 2016). Such social pressure has been found to increase the risk of self-control failure (Halfmann & Rieger, 2019) and is, thus, also responsible for a thwarting of basic needs. As outlined before (see Section 2.1), a thwarted need for competence is suggested to result from self-control failure and a lower feeling of accomplishment. So, this inner and/or outer pressure to be reachable might lead to less need fulfillment and lower self-control, respectively. Moreover, social pressure and FOMO are suggested to lead to even more use of CMC, thus more stress (Reinecke et al., 2017), and consequently an accumulation of the mentioned detrimental effects in the long run. Among needs, particularly social needs were stressed during the interviews, such as the need for relatedness—a finding supported by literature (for instance, need to belong and self-presentation were found to be motives for FB use; Nadkarni & Hofmann, 2012). It seems possible and plausible that even if needs are not satisfied entirely or each time when use takes place, the prospect of satisfaction or the prospect of social contact (as strongest driving force despite negative implications) would lead to usage, nonetheless (Verduyn et al., 2015). It might also be possible that immediate gratifications outbalance long-term goals when it comes to CMC, especially considering that many cues trigger smartphone use, which might therefore be particularly hard to resist (Bayer & LaRose, 2018; LaRose, 2010b). Boredom and entertainment (recreation) are common motives in daily use as studies can attest (e.g., Allaby & Shannon, 2020; Lukoff et al., 2018). Moreover, boredom prompts the pursuit of novel and even negative experiences (Bench & Lench, 2018). So, it is unsurprising that use out of boredom is frequent, though boredom is not always also alleviated by usage (Allaby & Shannon, 2020; Lepp et al., 2017). Lastly, functional uses of media have been investigated before (e.g., Papacharissi & Rubin, 2000), so pragmatism is not just in this study an appreciated justification.

Limiting must be added that the sample is neither representative nor must the found experiences be exhaustive, though a sample size of 26 interviews is within the recommended range for qualitative studies (Marshall et al., 2013; Mason, 2010; Ritchie & Lewis, 2003) and the initial quota plan made sure that the sample was at least balanced with regard to gender, age, and education. Additionally, most experiences and justifications were mentioned repeatedly over the course of the interviews. This could be interpreted in terms of saturation,

which is an often used guideline in qualitative research to determine a sufficient sample size (Guest et al., 2006; Mason, 2010). However, self-selection to participate and interviewer-effects could have biased the study, of course. Still, the interviews were a means to explore everyday negative experiences to build upon in a subsequent study; and they provided the sought for data necessary for planning study II.

5.6 Summary Study I

The seminal U&G assumes an actively and consciously choosing user and only persistent use of a medium in case of need gratification, but "other consequences" if needs were not met. Negative experiences with media can, accordingly, not be explained using this approach yet nevertheless appear to be persistently experienced by users. Twenty-six interviews were conducted to explore four research questions asking about the nature of persistent negative experiences in daily life, the medium they were associated with, the social context, and why these negative experiences would still be experienced persistently despite possibly being anticipated.

The smartphone was the device most negative experiences were reported with. Nine experiences were associated with the device and ranked from most to least often. These were: Media Bubble, Overkill, Emotional Stress, Auto Use, Endangerment, Insignificance, Interruption, Loss of Time, and Way of Communication. Interestingly, Media Bubble and Endangerment stood out as being reported from a third-person rather than a first-person perspective. Justifications for persistent use were categorized into six clusters: Interviewees justified persistent negative experiences first and foremost with interpersonal commitment, followed by needs, and habit. Pragmatism was an important factor across all negative experiences. However, as with boredom or recreation, this factor was not emphasized as much or as often as the first three reasons. Moreover, no experience was justified with the exact same combination as the other (see Table 5). These results are based on qualitative interviews as a means to provide a first impression of users' everyday negative experiences. The next step is therefore to extend the classic U&G model with these findings and test its applicability with a broader sample, utilizing a standardized survey.

6 Objectives of Study II

Findings from study I have led to the assumption of nine different negative persistent experiences with the smartphone, justified by an individual combination of justifications per experience. If the findings from study I can also be found in a broader sample will be explored in the next part. Moreover, the former classic model will be extended and tested empirically. The interview study was exploratory and only guided by the assumptions derived from the U&G. The second study, however, assumes a combination and interplay of different variables working in concert, thereby contributing to the persistence of negative experiences with the smartphone in everyday life. These were introduced in the literature review and will now be included to extend the model.

In the following, the hypotheses will be derived, and the extended model introduced as well as the methodology of the study. Just as above for study I, I will report and analyze the results before I continue to discuss them more broadly in a general discussion including their limitations, implications, and an outlook for future research.

6.1 Hypotheses

The classic U&G as introduced in Section 2.2 (see also Figure 1) comprises of social and psychological origins of needs that generate expectations towards mass media (amongst other sources), which lead to media exposure that results in need gratifications or other consequences. These other consequences are the focus of this bipartite study: Negative experiences occur persistently and, considering the frequency of smartphone usage in everyday life, presumably often. The U&G would assume that no further exposure takes place since only gratifications of needs would lead to repeated—or persistent—use. Similarly, Maier and colleagues (2015) also found that if use is associated with social overload—and social reasons were stressed the most in the study I—it should lead to a lowered intention to use the device. But, as derived from research on habits, intentions and actions do not always correspond (see e.g., Wood, 2019, for comprehensive research on this) and often, users would not use their smartphone less despite negative consequences—which also the interviews (study I) as well as still increasing numbers of social media users indicate (see Chapter 1). Accordingly, the derived first hypothesis is as follows:

H1: The more negative experiences someone reports, the more frequent they use the smartphone.

This is opposed to what the U&G proposes. To repeat, without need gratification, future usage should not be pursed anymore. Since people keep on using their smartphones nonetheless, they should presumably feel conflicted as proposed by cognitive dissonance theory (Adriaanse & Prinsen, 2017; Cooper, 2007; Festinger, 1957). That is, condoning negative outcomes of use persistently despite "knowing better" is not a logic way to act, yet observed and reported quite often. Naturally, when people realize this and the more often they experience the respective negative outcomes, they should wish to resolve this conflict. Having a reason, or *justification*, could be a way of doing this (Adriaanse & Prinsen, 2017). Six different justifications became apparent analyzing the interview data. Boredom and recreation were not as accentuated as interpersonal commitment, needs, and habit during the interviews; and in previous research often subsumed under U&G needs (Blumler, 2019). Therefore, and for pragmatic reasons (e.g., duration of the survey), I combined them with needs and called the cluster "uses outweigh the detriments"; describing that the previously mentioned uses (e.g., recreation, less boredom, contact to others, self-expression, feeling safe) outweigh the detriments at least to some extent. This is derived from findings of the interview study, suggesting that a "need-balance" is a tangible option—maybe even one explanation—for continuing use despite negative experiences. Though U&G assumes that needs are either satisfied or not, Maslow (1943) introduced the idea of "relative satisfaction": "In actual fact, most members of our society who are normal, are partially satisfied in all their basic needs and partially unsatisfied in all their basic needs at the same time. A more realistic description of the hierarchy would be in terms of decreasing percentages of satisfaction as we go up the hierarchy of prepotency" (p. 389). Pragmatism as mostly universal yet least important justification (except for ES and LoT) was measured individually, assuming that users would evaluate the uses and detriments as well-balanced mostly. This way, a purely pragmatic view or justification of use would not mix with social reasons (namely, interpersonal commitment) or a "non-evaluation" of use (that is, the fact that a person simply does not reflect on uses and consequences at all). This is, for instance, the case when behavior has become automatic (see e.g., Adriaanse & Prinsen, 2017). Consequently, the following hypotheses are derived:

H2: The more negative experiences someone reports, the stronger their justifications for persistent exposure, more specifically:

H2a: The more negative experiences someone reports, the more they justify this by interpersonal commitment.

H2b: The more negative experiences someone reports, the more they justify this by

uses that outweigh the detriments.

H2c: The more negative experiences someone reports, the more they justify this by a non-evaluation of needs.

H2d: The more negative experiences someone reports, the more they justify this with uses and detriments being counterbalanced.

So, more negative experiences are in need for better justifications to stay in balance with a person's norms. As a result, the stronger those reasons to condone negative consequences, the more frequent will smartphone use be (and, consequently, also negative experiences).

H3: The stronger the justifications, the more smartphone exposure.

As outlined before, satisfied basic needs (as proposed by the SDT) lead to an array of positive life outcomes, whereas thwarted needs are associated with less beneficial outcomes and, translated to media, even problematic smartphone use (see Section 2.3). Naturally, the more satisfied the three basic needs are, the less need satisfaction (referring to the U&G framework) will be sought for using the mobile device. Also, the more satisfied a person's basic needs are, the more positive are their expectations (also, U&G) towards media use and respective outcomes. As research has shown (Johnson et al., 2020), more content users can gain the expected gratifications from media. They will use the device more frequently, respectively. Conversely, negative outcome expectations should lead to less frequent use of the device (LaRose et al., 2001). So, expected positive gratifications should accordingly be negatively associated with negative experiences. This leads to the following three hypotheses:

H4: The more satisfied the basic needs are, the less need gratification is sought via smartphone.

H5: The more positive expectations someone has towards need gratifications through the smartphone, the more frequently they use it.

H6: The more the expected need gratifications occur, the fewer negative experiences are reported.

Media use is not always preceded by a conscious decision or action—a suggestion that is opposed to the core idea of the U&G (Haridakis, 2013) yet pointed to by the interviewees in study I and former research alike (e.g., Schnauber, 2017). Instead, media use can take place out of habit. Even though the behavior might have led to need gratification at first, it does not matter anymore if that is still the case once the habit has formed (e.g., Bayer & LaRose, 2018; Wood, 2017). So, a behavior is cued without conscious awareness and if the respective behavior is

goal-directed or -opposed will not have an influence on its execution either. Habits also form for smartphone use (Bayer, Campbell, et al., 2016). This has been suggested to be the case because the circumstances of usage differ due to their mobility, resulting in even more cues for triggering habitual behavior (e.g., LaRose, 2015). As a result, smartphones are not just used often, but also simply out of habit. Accordingly, the following hypotheses are postulated:

H7: The more habitualized the use of the smartphone is, the less it is actively used for need-gratification.

H8: The more habitualized the use of the smartphone, the more frequent the use.

H9: The more habitualized the use of the smartphone, the more negative experiences are reported.

Habit research assumes that control over behavior is not internally elicited since environmental cues trigger our actions (Verplanken, 2012). This is an invaluable mechanism, saving much effort and energy in everyday life. However, in case of bad habits might self-control be the best way to interrupt or inhibit these behaviors (Hofmann, Vohs, et al., 2012; Quinn et al., 2010). In accordance with this and the previously reviewed research on self-control (see Section 2.5), higher self-control should be associated with less habitual use, fewer negative experiences, and better satisfied basic needs. Thus, the following hypotheses are derived:

H10: The higher someone indicates their trait self-control to be, the fewer habitual use of the smartphone they report.

H11: The higher someone indicates their trait self-control to be, the fewer negative experiences they report.

H12: The higher someone indicates their trait self-control to be, the less they intend to fulfill their needs via smartphone use.

Moreover, interviewees (study I) stressed social reasons of use. For instance, as reaction to the question as to why one interviewee (W6, female, 57 years) would not simply uninstall WhatsApp though she perceived it to be very time intensive and was annoyed by the application's notifications, she replied: "Oh no, I still want to have some contact [to others]." Similarly, another interviewee (M10, male, 22 years) stated: "Once again, because of networking purposes" as response to further inquiry regarding the interruptive nature of WhatsApp messages. They did not mention loneliness literally but pointed to social aspects of smartphone use as most important feature. Therefore, the subsequent deductions were derived to further research and explain detrimental yet persistent use: Satisfaction of basic needs, as

noted before, is related to the development of beneficial as well as detrimental life outcomes (see Section 2.3). Loneliness, for instance, is negatively associated with self-regulation and need-satisfaction; and might therefore lead to less rewarding smartphone experiences (Hawkley & Cacioppo, 2010). The need for relatedness is imperative for most people when it comes to the use of social media, and not just study I but also previous research has stressed its significance (e.g., Chan, 2018; Karapanos et al., 2016; Ryan & Deci, 2000c). Loneliness causes real pain—just as being ostracized by others does (Eisenberger, 2015; Eisenberger et al., 2003; Eisenberger & Lieberman, 2004). Thus, participants of study I may not have felt lonely then, but the (subconscious) fear of being lonely could suffice as a reason to endure negative experiences in favor of not being disconnected. Due to the social importance of messenger and SNS use as concluded from study I, and based on the research reviewed (especially in Sections 2.1.3, 2.3.2, and 2.6), the following hypotheses are derived:

H13: The more loneliness someone experiences, the less well satisfied are their basic needs. More specifically:

H13a: The more loneliness someone experiences, the less well satisfied is their need for relatedness.

H14: The more loneliness someone experiences, the less trait self-control they indicate to have.

H15: The more loneliness someone experiences, the more negative experiences they report.

H16: The more loneliness someone experiences, the more they expect the smartphone to be a remedy by gratifying thwarted needs.

Before these hypotheses will be tested, a brief introduction of the proposed model, which results from the interview study and the research reviewed, will follow. I will only elaborate on the extension to the classic model and assumptions of possible directions of paths that cannot be derived from the hypotheses. The model containing the bivariate hypotheses as well as the assumed linear paths is depicted in Figure 2. The model including the correlation coefficients is depicted in Figure 11.

6.2 Extension of the Model

The model depicted in Figure 2 incorporates the classic model, but “the origins of needs” and “needs” are replaced by the basic needs according to SDT. Because these needs are inherent in every human being, their origin is specified when extending the model utilizing the

SDT. Moreover, SDT differentiates between needs and motives; and U&G needs manifest in motives that lead to media use. Thus, the SDT supplements the findings of the interviews and the classic approach as well as facilitates their integration. U&G needs are often the result of gratifications sought *as well as* obtained (see Section 2.2), so only "expectations" are adopted from the classic model, standing for both "gratifications" and "expectations" alike (see classic model, Figure 1). These expectations are rooted in the (dis-)satisfaction of the underlying basic needs, amongst other factors. Other factors that might influence the respective expectations towards smartphone use for need gratification are: habit, justifications, self-control, and loneliness, as was derived from study I (see Chapter 3) and theory (see Chapter 2). Further, "other consequences" from the classic model are specified in this extension as "negative experiences" and media exposure is more distinct, too, referring solely to "smartphone exposure".

The model consists of four parts, with negative experiences at the heart of it. However, a linear flow with assumed antecedent variables on the left that affect the DV on the right is the most logic way to comprehensibly describe the construction of the model. The analysis and report of the results, however, will follow the order of hypotheses and literature review, respectively. SDT, loneliness, and self-control present the first part. These three are independent from media use. Loneliness is assumed to influence basic need satisfaction and self-control negatively, lonely people are also assumed to experience more negative experiences (e.g., because of a greater want for connection yet limited skills to reach this goal, leading to unsatisfying experiences). Basic needs, in turn, influence the expectations towards media with thwarted needs leading to more U&G expectations than satisfied needs. Self-control is decisive when it comes to habitual (as opposed to need-driven) use of the smartphone since better self-control is proposed to lead to more beneficial outcomes (i.e., less automatic use, less negative outcomes, and fewer expectations of need-satisfaction via smartphones, because basic needs are better met). The second part consists of the U&G expectations, habitual smartphone use, and the negative experiences. In other words, the desired and unwanted outcomes of use as well as habit as potentially influencing the assumed volitional use since either actions that lead to the respective outcomes may become habitual. Habit can take over and lead to both goal-directed and -opposed outcomes of use, respectively. The third part is smartphone exposure, the dependent variable (DV) in this model, consisting of messenger use as well as use of SNSs for communication purposes. The fourth part of the model contains the justifications as an additional, inherent mechanism that defines how a person attributes experiences and behavior that conflict with values and norms of the self. These justifications, so the assumption, influence persistent exposure despite negative experiences positively.

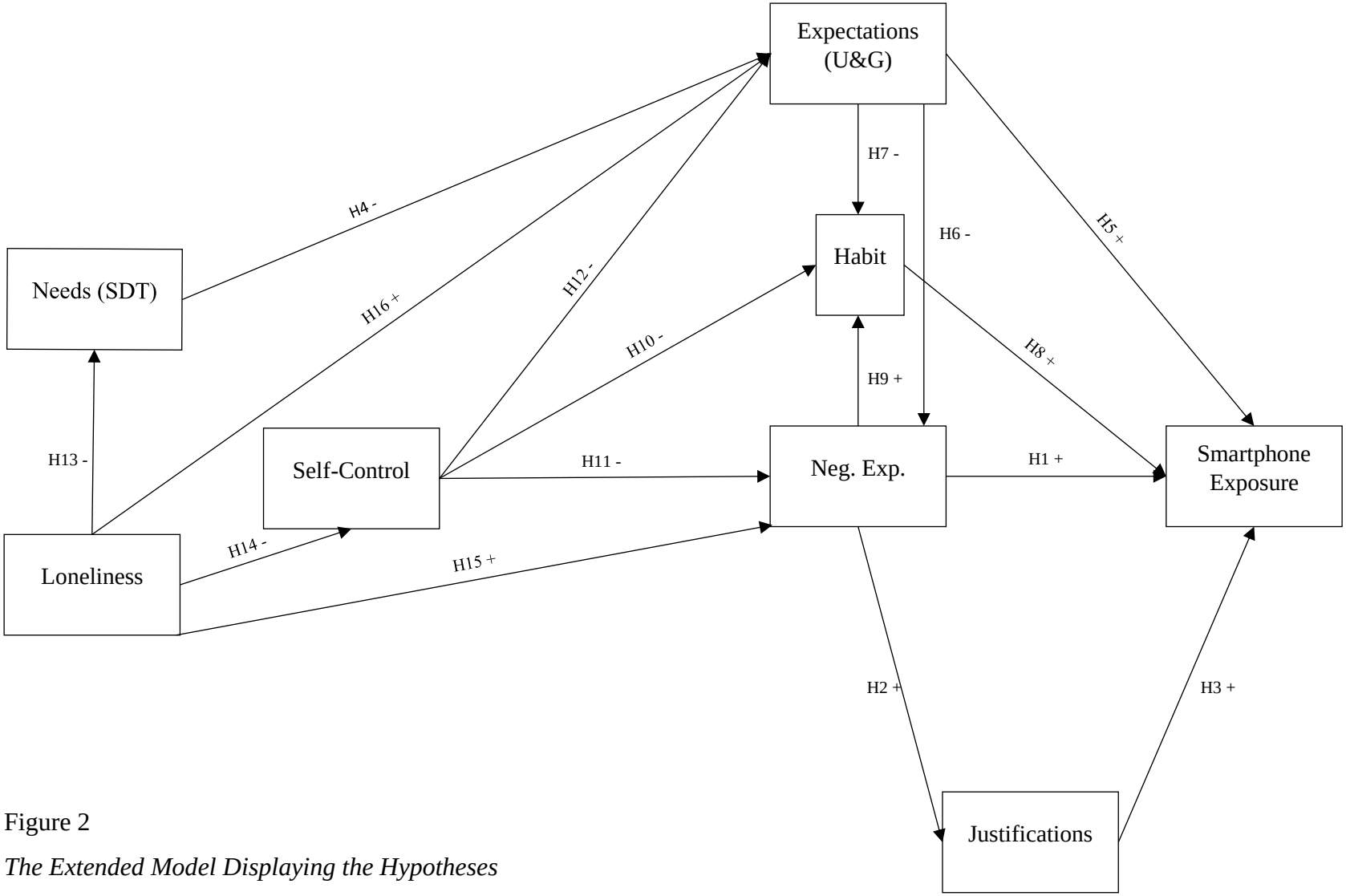

Figure 2

The Extended Model Displaying the Hypotheses

Note. The plus (+) following a hypothesis indicates an assumed positive and the minus (-) a negative relationship of the variables, respectively.

7 Methods Employed in Study II

To date, research has not comprehensively examined everyday negative experiences with media, particularly with the smartphone. So, semi-standardized interviews were the first choice to initially explore them from a user perspective. For the next step, a standardized questionnaire is presumed to be the best-suited and most practical way to check the derived assumptions while, in combination with the interview study, also following the call to "explore interpersonal and qualitative aspects of mediated communication in a more holistic methodology" (Ruggiero, 2000, p. 3). Furthermore, only smartphone use for communication purposes will be in focus. This decision was based on two reasons: First, SNS were found to be a stronger predictor of addiction than entertainment use (e.g., Jeong et al., 2016); and second, the communicative affordances of the device were clearly deemed most important during the interviews. This way, the study also follows claims to research features of the device individually instead of "the smartphone" in its entirety (Billieux, 2012b; Dienlin & Johannes, 2020; Pontes et al., 2015).

The first part of the project was conducted with a German speaking sample. Since usage of messengers and social networking platforms differs across countries (Pew Research Center, 2019a; We Are Social & Hootsuite, 2019) would an international study lead to results not suited for a comparison to and extension of study I. Consequently, the same language was chosen for the second study and recruitment took place in Germany as well. The intention was to survey users of smartphone messengers and/or social networking sites accessed via the mobile device, so an online survey was used for data collection. Questback EFS software[32] was utilized for programming the questionnaire and the link was circulated via different online platforms (e.g., WhatsApp, Facebook, Instagram, Survey Circle, e-mail) as well as offline (via postings, for instance on bulletin boards at the University of Hamburg). Recipients were also asked to share the link. It is impossible to reconstruct the distribution of the survey and the sample is self-selected with the results not being statistically representative, accordingly.

7.1 Sample Characteristics

A total of 273 participants completed the questionnaire during summer 2019. Nine individuals stated to neither use messengers nor social networking sites and were, thus, excluded from further questioning. Consequently, and if not indicated otherwise, all data

[32] https://www.unipark.com/

subsequently presented will refer to the remaining sample of 264 participants.

The sample was German speaking and 33 years of age on average (*SD* = 13 years). More than two-thirds (68.9%) identified as female, 30.7% as male and .4% as diverse. Most (79.5%) were well-educated as they held at least a university-entrance diploma, with 32% of those even holding a university degree. Fifty-five percent of the participants were employed (7% unemployed), 38% students and the rest (1%) were attending school at the time of data collection.

7.2 Measures

The questionnaire was structured according to importance of questions (or scales) for this project. So, if someone would not finish the questionnaire because of length and many similar (hence rather tedious) questions, I could still use the data up to that point as long as questions about the most important variables of the study were answered (i.e., persistent negative experiences and justifications, respectively). This idea worked for five more individuals than the final sample is consisted of and, therefore, only complete data sets were used for the analysis. Most participants dropped out after having entered the first page of the survey, thus giving no reason for concern about systematic dropouts.

The questionnaire started with media use as a filter variable: If both messengers and social networking apps were *not* used, a participant was kindly thanked for their participation and the survey ended at this point. If a participant used at least either app, the next questions asking for sociodemographic data, negative experiences and justifications; smartphone-related needs and habits; and finally, media-independently for needs, loneliness, and self-control. Possible limitations resulting from this decision will be discussed. Items that were not available in German were translated by the author and translated back by a bilingual colleague (for the German and English items as well as details about the corresponding translations see appendix, Table A 3). Further, to provide the best possible equivalent to the original, we assessed and discussed differences in translations carefully (Behr, 2017). The survey was available in German language only and it took approximately 20-25 minutes to fill it out. As an incentive, participants had the chance to win one out of four Amazon vouchers (each worth 25 €). The operationalization of the constructs and the corresponding scales are presented in more detail in the following section.

7.2.1 Use of the Smartphone for Communication Purposes

Two items measured the frequency of smartphone use for communication purposes: one

for messengers (such as WhatsApp or Facebook messenger) and the other for social networking applications (for example, Facebook or Instagram). Participants could answer on a seven-point scale how often they used either of these social media, ranging from (1) *never* to (7) *multiple times per hour*. The two items were combined into one measure respectively, subsuming smartphone exposure for communication purposes, referred to as *smartphone exposure* in the following (Cronbach's alpha = .54).

7.2.2 Persistent Negative Experiences

Each of the nine persistent negative experiences was measured for their frequency of occurrence, for instance: "Due to the use of messengers and/or social networking apps, I don't take notice of the world around me. I experience this…". The frequency was measured using a 6-point Likert scale, ranging from (1) *never* to (6) *very often*. Additionally, respondents' appraisal of negative emotions associated with each experience were collected asking them as to whether they perceived an experience also as being emotionally stressful, using a 6-point Likert scale, ranging from (1) *does not apply at all* to (6) *fully applies*.

During the interviews, two experiences (MB and EN) were mostly reported from a third-person perspective instead of a first-person point of view. So, these two were measured using this perspective additionally: "Due to the use of messengers and/or social networking apps, *others* no longer take notice of the world around them" and "I see smartphone use that might endanger the health of *others*—for example, if someone is using it while walking or even driving, or in children, who are too young for the use of smartphones", respectively.

7.2.3 Measurement of Justifications

For each of the nine persistent negative experiences, six different justifications were assessed which were based upon the interviews. For instance, if asked for reasons as to why persistently report to find oneself as in a Media Bubble, the wording of the justification prompt was: "When I don't take notice of the world around me due to the use of messengers and/or social networking apps, I still tend to continue this usage behavior…" and then each of the six response options (see Table 6) could be rated on a scale from (1) *does not apply at all* to (6) *fully applies*. Justifications were measured for the reported "first-person-experiences" only. If combined into a general measure of justifications, Cronbach's alpha is acceptable for the combined six justifications per experience (MB α = .74; OK α = .80; ES α = .82; AU α = .81; EN α = .85; IS α = .83; IR α = .79; LoT α = .79; WoC α = .82). Part-whole correction only

pointed to the exclusion of one item ("…because I don't think about possible negative consequences") to improve consistency *minimally* for Interruption (α =.786 to .793), Loss of Time (α =.794 to .809), and Way of Communication (α =.822 to .830). However, to check the assumption of different justifications, an explorative factor analysis was conducted (see appendix, Table A 10) for factor structure and respective reliability.

Table 6

Response Options for Justification of Persistent Negative Experiences

When I do not take notice of the world around me due to the use of messengers and/or social networking apps, I still tend to continue this usage behavior, because…
… **others** in my private environment **expect from me** to be always reachable. ("Pressure")
… it is **my social responsibility** to be always reachable. ("Responsibility")
… this way, I will **not miss out** on what my friends and acquaintances do. ("Fear of Missing Out")
… it is **practical** and **uses and detriments** keep **in balance.** ("Pragmatism")
… I **don't think about** possible **negative consequences.** ("Non-Evaluation")
… the **uses** (e.g., recreation, less boredom, contact to others, self-expression, feeling safe) **outweigh the detriments** at least **to some extent**. ("Need-Balance")

Note. To exemplify the response options (which are the same for each persistent negative experience), the statement heading for this table is the item asking for the persistent negative experience called Media Bubble. See Table A 3 for all items.

7.2.4 Expectations (U&G)

Only U&G needs as identified in the interview study were measured. The items were selected and combined from existing scales (Krupp & Breunig, 2015; Naab & Schnauber, 2014; Schnauber, 2017) and one item was constructed anew to measure the need for safety since it was not included in the utilized scales. In total, 14 items measured need gratification via smartphone on a 6-point Likert scale ranging from (1) *does not apply at all* to (6) *fully applies.* One example item is: "I use messenger and/or social networking applications on my smartphone, to communicate with other people". Cronbach's alpha for the scale is good (α = .86).

7.2.5 Basic Psychological Needs Scale (BMPN)

To measure state basic need satisfaction as SDT posits, which means satisfaction of the three basic needs (i.e., autonomy, competence, and relatedness), the Balanced Measure of Psychological Needs (BMPN; Sheldon & Hilpert, 2012) was used in its German translation by

Neubauer and Voss (2016). The scale was found to be of better construct validity than the often suggested Basic Psychological Needs Scale by Gagné (BPNS; 2003). Critical properties of the latter include: different items per need and, hence, a possibly different weight and reliability of one need (subscale) over the other; an inconclusive factor structure; and no clear indication if the needs should be interpreted separately or if they could be combined into an overall need satisfaction score (see also Johnston & Finney, 2010; c.f., Neubauer & Voss, 2016). These were considered be taken care of with the new instrument. The scale consists of 18 items in total, six for measuring each of the three basic needs. A sample item measuring the need for autonomy is "I was free to do things my own way", for competence "I took on and mastered hard challenges", and for relatedness "I felt a sense of contact with people who care for me, and whom I care for". Participants could answer on a 6-point Likert scale ranging from (1) *does not apply at all* to (6) *fully applies.* Internal consistency of the scale as an 18-item-measure is good with a Cronbach's alpha of .84.

7.2.6 **Self-Report-Habit-Index (SRHI)**

The 13-item Self-Report-Habit-Index (SRHI) by Orbell & Verplanken (Orbell & Verplanken, 2010; Verplanken & Orbell, 2003) was used to measure habitualization of smartphone behavior. The items of the 2010-version of the scale were chosen due to better psychometric properties (Bayer & Campbell, 2012) and I extended the questionnaire by one item (that is, "Texting is something I do without meaning to do it") like Bayer & Campbell (2012) did as reaction to LaRose's criticism on a missing "lack of intention" dimension of the scale (2010a). Furthermore, Bayer and Campbell decided to exclude three items measuring the frequency dimension of habit because repetition is just a necessary but not sufficient criterion for habit-strength (see e.g., Schnauber, 2017; Verplanken & Wood, 2006). However, repetition is, per definition, necessary for habit formation and the smartphone being evidently implemented in everyday life, is used repetitively. Even if an external cue is necessary to trigger an automatic behavior (Bayer & Campbell, 2012), literature suggests that a "direct assessment of context-response associations is probably most valid" (Wood & Rünger, 2016, p. 296) to measure habit strength. This was not possible in this study, especially since the mobile use of the smartphone is triggered by manifold cues and different contexts, too (e.g., Bayer & LaRose, 2018). Additionally, the frequency-items have been found to be an effective measure of habit strength in the past (see e.g., Wood & Rünger, 2016) and were argued to be necessary for habit-detection in a measurement (Orbell & Verplanken, 2015; Rebar et al., 2018). Correspondingly, I did not exclude them from the scale. A sample item is "I have no need to think about grabbing

my smartphone to use messengers and/or social networking apps". Participants could answer on a 6-point Likert scale ranging from (1) *does not apply at all* to (6) *fully applies.* Cronbach's alpha for the 13-item measure is excellent (α = .93).

7.2.7 **Self-Control (SCS-K-D)**

Dispositional self-control was measured using Tangney, Baumeister, and Boone's (2004) self-control scale in its German version by Bertrams and Dickhäuser (SCS-K-D; 2009). The scale consists of 13 items, with an example item being "I am good at resisting temptation". Participants could indicate their answer on a 6-point Likert type scale ranging from (1) *does not apply at all* to (6*) fully applies.* Cronbach's alpha in this sample is good (α = .85).

7.2.8 **UCLA Loneliness Scale (ULS-8)**

For the measurement of loneliness, the UCLA Loneliness Scale in its short version (ULS-8; Hays & DiMatteo, 1987), consisting of eight items, three of which are reverse coded, was applied. The German items by Bortz and Döring (1993) were used. Following the example of Neubauer and Voss (2016), items could be answered on a Likert type scale, in this study—consistent with the other scales in this study—ranging from (1) *do not agree at all* to (6) *fully agree.* A sample item is: "I feel left out". Cronbach's alpha is good (α = .85).

8 Results & Discussion Study II

Data were downloaded and imported to SPSS (IBM SPSS Statistics for Windows, version 26.0), adjusted (i.e., variables renamed and labels defined), and reversed items recoded. All scales were tested for reliability and factor structure, using explorative factor analysis (EFA). I will outline the descriptive statistics first and then continue with the model as well as the respective hypotheses in the section concerning the respective part of the model.

8.1 Smartphone Use

Data on use of the smartphone for communication purposes showed that more participants used messengers than social networking apps, and that they would also use them more frequently (see Table 7 and Table 8).

Table 7

Frequency of Use of Social Networking and Messenger Apps

	Use of Social Networking Apps		Use of Messenger Apps	
	n	%	*n*	%
never	43	16.3	-	-
less than daily	29	11.0	3	1.1
daily	33	12.5	8	3.0
on average 2-4 times per day	47	17.8	29	11.0
on average 5-10 times per day	51	19.3	80	30.3
on average one per hour	31	11.7	61	23.1
multiple times per hour	30	11.4	83	31.4
total	264	100	264	100

Table 8

Measures of Central Tendency for of Use of Social Networking and Messenger Apps

	Use of Social Networking Apps	Use of Messenger Apps	Smartphone Exposure
n	264	264	264
mean	3.94	5.66	4.80
median	4.00	6.00	5.00
mode	5.00	7.00	5.00
SD	1.93	1.18	1.33
variance	3.73	1.40	1.76

Note. Smartphone Exposure depicts the combination of the two frequency items into one measure.

8.2 Negative Experiences

Two items measured each of the negative experiences individually, one asking for frequency and the other for the strain associated with the experience. The data showed that the participants indeed expose themselves to the nine negative experiences found in the interview study (see Table 9), but not all participants indicated to find these experiences stressful (see Table 10). Interestingly, Endangerment from a third-person perspective was the only experience that could not be found for the entire sample (see also Table 9). However, those who indicated to experience it, reported it to be the most frequent and most stressful one. The nine experiences can be categorized as daily annoyances rather than as clinically relevant and, as such, were not evaluated as being very stressful overall. It is also possible that it is not consciously accessible how much of an impact they have on our everyday lives. For instance, Auto Use is among the three most frequent negative experiences but was not reported as being particularly stressful. The frequency of experiences differs in comparison to the interview study (see appendix, Table A 4). This is, at least in part, due to the third-person experiences which were not ranked separately from first-person experiences in the first study and might also be explained due to the distinction of frequency and strain in the quantitative study only.

Interruption, Loss of Time, and Auto Use are the three most frequent experiences in the second study, with Loss of Time, Interruption, and Overkill being the ones experienced as most stressful. If the third-person experiences are included, Endangerment appears to be the most frequent and straining persistent negative experience, followed by Media Bubble. Media Bubble was the most frequent experience across all interviews, but also mostly reported from a third-person perspective, so this might explain the different order when the perspectives are considered separately.

Yet another order appears when frequency and strain are correlated with each other: The frequency and strain of Emotional Stress show the strongest linear relationship, followed by Overkill and Interruption, with Media Bubble and Endangerment (also true for the third-person perspective) residing on the lower ranks. So, in combination, Interruptions are still among the top three most frequent and stressful experiences, but it is even more of a strain to always be available and to get numerous new messages.

Table 9

Frequencies of Negative Experiences

	Media Bubble	Media Bubble 3rd	Overkill	Emot. Stress	Auto Use	Endangerment	Endangerment 3rd	Insignificance	Interruption	Loss of Time	Way of Comm.
M	2.43	4.62	3.50	3.20	3.61	1.97	4.87	3.53	3.70	3.63	3.54
SD	1.26	1.22	1.53	1.61	1.69	1.22	1.14	1.62	1.65	1.74	1.44
n	264	264	264	264	264	264	142	264	264	264	264
n %	100	100	100	100	100	100	53.8	100	100	100	100

Note. Scale ranges from 1 = *never* to 6 = *very often.*

Table 10

Strain of Negative Experiences

	Media Bubble	Media Bubble 3rd	Overkill	Emot. Stress	Auto Use	Endangerment	Endangerment 3rd	Insignificance	Interruption	Loss of Time	Way of Comm.
M	2.83	3.86	3.54	3.53	3.18	3.32	4.34	3.26	3.82	3.84	3.41
SD	1.40	1.44	1.38	1.37	1.55	1.59	1.37	1.49	1.59	1.55	1.45
n	189	263	238	219	225	142	141	234	237	224	248
n %	71.6	99.6	90.2	83.0	85.2	53.8	53.4	88.6	89.8	84.9	94.0
missing	75	1	26	45	39	122	123	30	27	40	16

Note. Scale ranges from 1 = *does not apply at all* to 6 = *fully applies.*

8.3 Negative Experiences & Smartphone Exposure

In this paragraph, the question as to whether to continue the analyses using the frequency or strain measure, or both combined will be discussed. So far, I have reported the descriptive properties of the negative experiences: Intercorrelations of the frequency and strain measures for Overkill, Emotional Stress, Insignificance, Interruption, and Loss of Time (for details see appendix, Table A 5) show high coefficients (above $r = .7$ and even $r = .8$). This is a possible indicator for multicollinearity and, thus, could mean that—at least for these five—frequency and strain do not explain different variance of the respective negative experience, so that one measure would suffice. Multivariate regression analyses will be conducted to test if and to what extent the frequency and the strain measures share common explanatory value or

complement each other in relation to the dependent variable *smartphone exposure*. Prior to that, this section will continue with the analysis of the relationship of frequent smartphone use and negative experiences.

8.3.1 Assumptions for Linear Regression

First, necessary assumptions for linear regression analyses were tested (Field, 2018)[33]: Additivity and linearity are anticipated, which means that predictor and criterium variables should be correlated. All negative experiences, but Overkill, Insignificance, and Way of Communication, show at least a small correlation with frequency of smartphone use for communication purposes (see also appendix, Table A 5). However, a non-significant correlation between predictor and dependent variable does not necessarily mean that there is no association or explanatory value to find since the reason could lie in measurement errors or in sampling variance, for instance. The assumption that there has to be a statistically significant correlation in the first place, as proposed and widely used in the causal steps approach (Baron & Kenny, 1986), has been widely discussed and scientists argue that it is not necessary since an association might be explained by another variable or could be based in errors, as mentioned earlier (see e.g., Hayes, 2018). Bollen summed this up very concisely: "The old saying that correlation does not prove causation should be complemented by the saying that *a lack of correlation does not disprove causation* [emphasis in the original]. (…) correlation is neither a necessary nor a sufficient condition of causality" (1989, p. 52).[34] The present study is mostly explanatory, so even if there is no significant correlation in the data and most of them are small, their potential explanatory value will still be analyzed in more detail.

The residuals of the predictor variable(s) should have the same variance (homoscedasticity). This was tested graphically for all negative experiences and no scatterplot gave reason for concern. Statistically testing for autocorrelation, which is the assumption of independent errors, is only an option when there is a meaningful order of the cases since the Durbin-Watson test statistic changes with a changing order of cases, too. The sequence of cases is not meaningful in this study and, thus, Durbin-Watson not applicable. The VIF and tolerance values are used to check for multicollinearity statistically. All values were below 10 for the VIF

[33] The assumptions were always checked before a regression analysis was conducted but will only be reported once for reasons of brevity.

[34] To be clear, the data of this study do not fulfill the requirements for causal inferences but regression analyses (and, thus, the later used mediation analysis, too) assume a cause-and-effect-connection and (as derived from theory) directions of effects were assumed, of course.

and well above .2 for the tolerance statistics. The average VIF is supposed to be close to 1. This was only the case for Media Bubble, Auto Use, and Endangerment; and could be cause for concern with regards to multicollinearity (Field, 2018). I mentioned strong intercorrelations of the frequency and strain measure for five negative experiences in the beginning of this section. These five, and a sixth one (WoC; which also correlates considerably high: $r = .66$) are those with a rather concerning average VIF—which is not surprising and even more reason to analyze them this closely. If only frequency *or* strain would predict the outcome variable, this would justify using one measure instead of two since the other would not contribute significant predictive value.

8.3.2 Multiple Regression Analysis of Frequency vs. Strain

Twenty-seven multiple regression analyses were conducted—once for each negative experience and the combined as well as the single-item-measures for frequency of smartphone use. More precisely, Media Bubble frequency and Media Bubble strain were used as independent variables in three models, one calculated with messenger use frequency, one with frequency of social networking application use, and one with frequency of smartphone exposure (frequency of messengers and SNS combined) as dependent variable. This was done to analyze the construct validity of the dependent variable as well, since the internal consistency in this sample was relatively low for this two-item-measure ($\alpha = .54$) and Cronbach's alpha is not a sufficient indicator for unidimensionality or construct validity of a scale (Field, 2018; Schmitt, 1996). Results showed (see appendix, Table A 6) that the combined items were a valid indicator of smartphone use frequency for communication purposes. The common variance for this construct was better explained by the experiences than for the frequent users of messengers or SNS separately. One could argue to use them separately as some data (e.g., outliers not using SNS but messengers) might be averaged and get lost in the process but the underlying construct is communication frequency via smartphone and the respective common variance, as the analyses show, seemed to be explained just fine.

In each regression, just one measure (frequency or strain) was significantly predicting the dependent variable (see also Table A 6). Except for Insignificance (but the model was not significant), it was consistently either frequency *or* strain predicting the three DVs. Frequency is explaining more variance of the DVs than strain, but no clear pattern was obvious. Combination of the respective frequency or strain measures into one multiple regression analysis to predict smartphone exposure (DV) with only these (namely, Media Bubble frequency, Emotional Stress strain, Auto Use frequency, Interruption frequency, Loss of Time

frequency and Way of Communication strain) led to a significant regression model (n = 210; $F(6, 203) = 15.204$, $p < .000$), with an R^2 of 29%. However, Auto Use was the only significant predictor (see Table 11) in this model. Indeed, analysis of Auto Use frequency as only predictor led to 25% explained variance already ($F(1, 262) = 88.259$, $p < .000$). The correlation of Auto Use and smartphone exposure was the strongest among all negative experiences (r = .5, $p < .000$) but others were moderate as well (i.e., at least > .4). This could be explained by its very nature: Nonconscious use is typical for a persistent everyday behavior like smartphone use since automaticity is one prerequisite of habit formation (e.g., Wood, 2019). Also, interviewees as well as the participants in the second study reported to experience more negative facets of everyday usage than just this particular one. Measurement issues or the statistical characteristics of regression analysis can lead to this effect. That is, the variable with the strongest correlation is best suited to predict variance of the DV and might cancel the influence of other variables out, so no other negative experience influences the DV in a statistically significant way. To conclude, strain and frequency are of different quality and to combine them should not lead to reasonable results. If frequency and strain items measured the same, they would not just correlate highly but perfectly. Therefore, I also conducted an EFA: Strongly correlating variables might complement each other in describing one or several negative experiences and thereby form a cluster of negative experiences that loads on one factor. The analysis and results are outlined in the following section.

Table 11

Multiple Regression of Significant Predictors for Smartphone Exposure

		Unstandardized Coefficients		Standardized Coefficients			95% CI for B		Correlations			Collinearity Statistics	
Model		B	SE	Beta	*t*	*p*	LL	UL	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	2.760	.291		9.471	.000	2.185	3.334					
	MB freq	.052	.071	.049	.734	.464	-.088	.192	.281	.051	.043	.755	1.325
	ES strain	-.013	.063	-.013	-.204	.839	-.138	.112	.183	-.014	-.012	.786	1.272
	AU freq	.294	.057	.367	5.193	.000	.183	.406	.508	.342	.303	.682	1.467
	IR freq	.078	.074	.098	1.058	.291	-.067	.224	.431	.074	.062	.394	2.539
	LoT freq	.111	.068	.143	1.630	.105	-.023	.246	.417	.114	.095	.441	2.267
	WoC strain	.054	.059	.059	.914	.362	-.063	.171	.175	.064	.053	.830	1.205

Note. Dependent variable: Smartphone Exposure; confidence intervals and standard errors based on 5000 bootstrap samples. MB = Media Bubble 1st person. OK = Overkill. ES = Emotional Stress; AU = Auto Use. Endangerment 1st person= EN. Insignificance = IS. Interruption = IR. LoT = Loss of Time. WoC = Way of Communication.

8.3.3 Explorative Factor Analysis of the Nine Negative Experiences

An EFA was conducted on nine negative experiences using orthogonal varimax rotation to test for a possible underlying factor structure of the persistent experiences as suggested by the correlation coefficients and the multicollinearity statistics (see also appendix, Table A 5). It is usually a method to reduce data and mostly used for scale construction (namely, identification of subscales) as well as for generating hypotheses. EFA assumes that there are underlying (latent) variables that were measured using the items of a scale (as opposed to the assumption of principal component analysis (PCA), which does not assume this but builds the components it consists of as different subscales). So, I chose EFA for further analysis, but before I report the analyses, I will briefly introduce the guidelines that should be regarded.

8.3.3.1 Guidelines for Conducting Explorative Factor Analysis

A comprehensive study by Guadagnoli and Velicer (1988) led to guiding principles before an EFA is run. A sample size of $n = 150$ is sufficient if at least 10 items define a factor. The sample size is irrelevant to obtaining an accurate solution if loadings of at least four variables are above .6 per factor. The same is true for 10 to 12 variables per factor with loadings of at least .4. In cases with only few variables or variables with low loadings (i.e., .4) per factor, these should only be interpreted if the sample size is $n > 300$. In other cases, a repeated measure is recommended. According to MacCallum, Widaman, Zhang, & Hong (1999), even smaller sample sizes (i.e., $n < 100$) are sufficient if all communalities are above .6. With all communalities around .5, samples of 100 to 200 can still be adequate if there are "relatively few factors each with only a small number of indicator variables" (Field, 2018). With communalities well below .5 and many underlying factors, sample sizes of $n > 500$ are recommended (Field, 2018; MacCallum et al., 1999). With a sample size of $n = 264$ in the present study and not too many items per scale in the first place, the assumption will not be met if factor loadings are below .5 or a component is composed of less than four items. This kept in mind, I still conducted explorative factor analyses for two reasons: first, to explore the possible underlying factors of the negative experiences and the justifications alike as this is a new measure and little to no data exist on everyday persistent negative experiences; and second, because these are just guidelines (cf. Rudolf & Müller, 2012).—Considering construct validity, calculations with subscales might be more revealing and/or appropriate than using a scale in its entirety. For instance, the items of the U&G scale consist of a variety of needs and combining them into one U&G scale might result in losing important information on which needs are relevant for variance explanation of the DV. Whereas, sometimes it might be more appropriate to use a scale with all

its subscales as one measure. For instance, if it consists of subscales that measure the same construct in its entirety and, thus, are a better predictor than the subscales alone could be. Factor analyses and measures of internal consistency are only indicators and as such not flawless, but they can point to issues with reliability or item-structure and, thus, provide valuable insights.

8.3.3.2 EFA of Nine Persistent Negative Experiences

An orthogonal varimax rotation was used and, as shown in Table 12, the Kaiser–Meyer–Olkin (KMO) measure (Kaiser & Rice, 1974) verified the sampling adequacy for the analysis of each experience, as did Bartlett's test of sphericity (Field, 2018; Rudolf & Müller, 2012). Measure of sampling adequacy (MSA) was perfect for each of the analyses reported in this section, as all anti-image correlations were well above .5 and the criterium for positive definiteness (< .000) was met each time as well (Kaiser & Rice, 1974; Weiber & Mühlhaus, 2014).

An initial EFA was run to obtain eigenvalues for each factor in the data. Explorative factor analyses of the frequency of the experiences led to two factors with eigenvalues over Kaiser-Guttman's criterion of 1 and in combination explained 57% of variance after the first run; and 61% after Endangerment was removed from the scale and analysis repeated without this variable (because of an inconclusive loading of around .4 on either factor). For the item loadings per factor see appendix, Table A 7. The scree plots (Cattell, 1966) justified retaining two factors as well.

When analyzing for strain of the nine experiences, the results were inconclusive. That is, two factors explaining 55% of variance were extracted but the scree plot suggested one factor—and factor loadings were ambiguous, too (see also appendix, Table A 7). So, an analysis containing all items (strain and frequency, 18 in total) was run. Five factors explaining a total of 71% variance were found—with ambiguous loadings on both factors again. The inconclusive items were removed from analysis iteratively and the remaining four-factor structure explained 74% (containing 12 items, six negative experiences respectively) with three factors consisting of two items each. On the one hand, this is interesting, because the three factors contained measures for frequency and strain of the same negative experience each (e.g., ES frequency and strain constituting one factor, as did IS and EN). For one, this could implicate that the(se) experiences are different ones; and secondly, also that the high loadings on the same factor justify transforming them into one measurement explaining frequent usage better combined than separately (see Table 12). However, the guidelines for conducting an EFA in mind with regards to the sample size for factors consisting of only a few variables, this might not be the

best solution to follow. Additionally, 12 remaining variables, or six negative experiences, explain 71% of variance as opposed to the two frequency factors already have an R^2 of 61% (eight experiences still included, each factor consisting of four variables each with loadings well above .6). The latter solution is, therefore, the one I will use for further analysis.

To clarify, the following two factors, instead of the nine negative experiences individually, will be used in subsequent analyses: Factor 1 contains the negative experiences Interruption, Auto Use, Loss of Time, and Media Bubble (M_{F1} = 3.34, SD_{F1} = 1.26). Mobile technologies have become an essential part of life, naturally embedded in daily routines, and this factor represents the automatic, nonconscious, and (at least, retrospectively) unintended checking of the smartphone which results in feelings of interruption, loss of time, and temporary isolation of others that is due to this "adaptation" of the device into everyday life. Since these smartphone-related behaviors were adapted by most users within our society over time, they have even become mostly nonconscious for many people. The second factor consists of the negative experiences Overkill, Emotional Stress, Insignificance, and Way of Communication (M_{F2} = 3.44, SD_{F2} = 1.17). Thus, the immense amount of—often—insubstantial messages that reach us constantly as well as the pressure coming from being incessantly connected these days; and lastly, the respective effects on our interpersonal communication not taking place in the moment (i.e., the feeling that face-to-face-conversation decreases and CMC feels less worth-while/meaningful/authentic). I termed this the "acceleration-factor" because these experiences cluster together as negative experiences due to an accelerated CMC that comes with a plethora of messages and less time to be in the moment or simply offline.

Table 12

Sampling Adequacy and Factor Extractions for the Negative Experiences

	KMO	Bartlett-Test of Sphericity χ^2 (*df*); $p < .000$	No. of Factors	No. of Items	Variance Explained
Neg. Exp. freq. (all nine experiences)	.81	780.179 (36)	2	9	57%
Neg. Exp. freq. (excl. EN)	.79	695.103 (28)	2	8	61%
Neg. Exp. strain (all nine experiences)	.79	261.623 (36)	2	9	55%
Neg. Exp. freq. and strain (18 items)	.77	986.885 (153)	5	18	71%
Neg. Exp. freq. and strain (excl. MB, OK, WoC)	.73	700.135 (66)	4	12	74%

Note: Kaiser-Meyer-Olkin (KMO) is supposed to be .5 or higher; MB = Media Bubble, OK = Overkill, ES = Emotional Stress; AU = Auto Use, Endangerment = EN, Insignificance = IS, Interruption = IR, LoT = Loss of Time, WoC = Way of Communication.

8.3.4 **Negative Experiences Reinforce Smartphone Exposure**

To test how the experiences and smartphone exposure are associated, a correlation followed by a multiple regression analysis were conducted. Correlation of the two factors of negative experiences and smartphone exposure as DV show a positive linear relationship: a strong (Cohen, 1988) Pearson correlation of smartphone exposure and the adaptation experiences ($r = .54$; $p < .000$) and a small correlation of smartphone exposure and the acceleration experiences ($r = .12$, $p < .05$). The bivariate correlations supported H1 (“The more negative experiences someone reports, the more frequent they use the smartphone”). This is only surprising according to the U&G, since negative experiences should be negatively related to persistent—here measured as frequent—smartphone exposure and, thus, no future use of that medium should occur. However, this is exactly what inspired the present thesis: Many people do not quit using their smartphone even though persistent negative experiences occur frequently. The question remains: Why is that? To get closer to an explanation, a multiple regression analysis was conducted (see Table 13): The unstandardized coefficient for the first factor (adaptation experiences) was relatively high ($b = .62$). More interestingly though, the formerly small, but positive, correlation of the second factor (acceleration experiences) turned

into a negative coefficient[35] (though small as well) when both variables were entered into one model[36]. Taken together, more frequent negative experiences explained 30% of variance of more frequent use of the smartphone, whereas the adaptation experiences (which means factor 1, namely, Interruption, Auto Use, Loss of Time, and Media Bubble) contributed the main explanatory value (adjusted[37] R^2 = .29). However, and more importantly in sense of explanatory contribution, the negative coefficient of the acceleration experiences (factor 2, namely, Overkill, Emotional Stress, Insignificance, and Way of Communication) might be a hint for as to why smartphone exposure remains frequent despite persistent negative outcomes: Some negative experiences (as those constituting the second factor, for instance) could actually lead to a reduction of smartphone use or at least the wish to do so might become apparent with these kinds of experiences. The greater explanatory value of factor 1 might be rooted in its habitual nature, as indicated by a strong correlation of factor 1 and the 10-item habit scale of r = .77, p < .000, whereas especially the correlation with the first ("automatic") factor of the SRHI was strong (r = .76, p < .001; vs. the second ("routine") factor: r = .58, p < .001). This supports the assumption of an automatic component being a strong driver of this behavior even though it might be evaluated as detrimental afterwards—but possibly the uses in daily life balance this out. Habitual use could help to understand, why frequent negative experiences are taking place even though they were reported as being detrimental and mediation[38] analysis supported this

[35] Since collinearity does not seem to be a problem in this model (correlations not high (i.e., r < .8); VIF and tolerance values according to the guidelines), some might argue that the change of sign could be an indication for a suppressor effect. That is, a new variable added to a model leads to an increase of the coefficient(s) of another variable or variables in a regression model as error variance diminishes. Hayes (2018) agues, however, that this is just a label and not an explanation for what this means—and an explanation is usually easy to find (as is the case in this study as well). Since this is not a study on different types of effects that might occur in regression analyses, possible suppression effects will not be elaborated in more detail. I refer the interested reader to other literature on this topic, for instance Bortz and Schuster (2010) and Tzelgov and Henik (1991) for an introduction; Cohen et al. (2003), Lewis-Beck et al. (2004), MacKinnon et al. (2000), and Paulhus et al. (2004) for journal articles discussing these effects further.

[36] The option "enter" is used throughout the study unless reported otherwise. That is, because it forces all variables into the model simultaneously and "like hierarchical, (…) relies on good theoretical reasons for including the chosen predictors, but unlike hierarchical, (…) no decision about the order in which variables are entered [is made). Some researchers believe that this method is the only appropriate method for theory testing (Studenmund & Cassidy, 1987), because stepwise techniques are influenced by random variation in the data and so seldom give replicable results if the model is retested" (Field, 2018, p. 529).

[37] I will only report the adjusted R^2 for multiple regression analyses since it adjusts for the number of variables in the model and its value, accordingly, only increases when a new term improves the model fit more than expected by chance alone. Output of mediation analyses does not provide an adjusted R^2, so that for these analyses R^2 will be reported.

[38] Mediation analysis is a good way to identify indirect effects as it is the method of choice when the question revolves around the "how" of a connection between variables—in this case: how does a negative experience (X) explain persistent smartphone use (Y), and what happens to this explanation if a mediator variable (M),

(see Figure 3). The first factor mediated the negative effect of factor 2 partially, resulting in a positive total effect (even though a very small one: $b = .14$, $p < .045$). So, the indirect positive effect through the items subsumed under factor 1 and, thus, the respective acquired usage patterns, seem to have a strong influence and might—nonconsciously—lead to persistent use, disregarding the benefits or detriments of it. Also, the items subsumed under factor 1 (adaptation experiences) might just measure something very similar to the SRHI. I will analyze this and the role of habit in more detail in Section 8.7, but first analyze one distinctive feature of negative experiences (see Section 8.3.5), followed by the justifications and their connection to persistent negative experiences as well as frequent use.

Table 13

Multiple Regression Analysis of Smartphone Exposure and Negative Experience Factors

	Unstandardized Coefficients		Standardized Coefficients			95% CI for B		Correlations			Collinearity Statistics	
Model	B	SE	ß	*t*	*p*	LL	UL	Zero-order	Partial	Part	Tolerance	VIF
1 (Constant)	3.20	.24		13.401	.000	2.733	3.674					
Neg. Exp. F1	.62	.06	.59	10.347	.000	.504	.741	.54	.54	.54	.822	1.217
Neg. Exp. F2	-.14	.07	-.12	-2.191	.029	-.270	-.014	.12	-.13	-.11	.822	1.217

Note. Dependent variable: Smartphone Exposure; confidence intervals and standard errors based on 5000 bootstrap samples, F = factor.

habitualized behavior, is added? Mediation assumes causality, too, which I do not—considering the data collection process—but it is a helpful method to find out if and to what extent another variable influences the predictor variable's influence on Y. Aside from the indirect effect, the total effect as opposed to the direct effect of X on Y is interesting, too. If the total effect is greater than the one caused by X alone, this points to an influence of the mediator variable, explaining more variance than the predictor alone can. The equations of mediation are basically the same as for regression analysis, thus, the same issues of collinearity that can occur with regression can arise in mediation analyses as well, so that variables not explaining unique variance of Y will not significantly predict this variable.

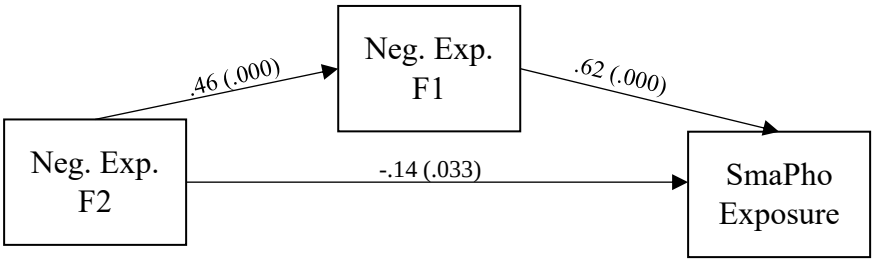

Figure 3

Model of Acceleration Experiences Predicting Frequent Smartphone Use Mediated by Adaptation Experiences

Note. Unstandardized regression coefficients are reported. The *p*-values are in parentheses after *b*-coefficients. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 5000 samples.

The model explains 30.2% of variance of smartphone exposure. Total effect $b = .14$, $p < .045$. Indirect effect $b = .28$, 95% BCa CI [.197, .379].

8.3.5 Media Bubble and Endangerment as Third-Person Effects

Consistent with the results of the interviews, more participants reported to experience Media Bubble and Endangerment from a third-person perspective than to expose themselves to either of these two experiences. Correlation of first- and third-person variables are small to moderate and means differ evidently (see Table 14). However, to test if there is a statistical difference in the intra-individual perception of them being different experiences and the third-person experiences reported, a *t*-test for dependent samples was used. The *t*-statistics is usually applied to test whether two means differ significantly and can be used for independent (e.g., to compare men and women) or dependent samples (for instance, in matched or paired long-term studies). For the dependent *t*-test, the measured values base on the same sample and can be collected via the very same items. The comparison of two different means on two items indicated by the same persons should accordingly be a possible application of the *t*-test as well. Assumptions for the test (i.e., normality of sampling distribution, interval level of data, and independence of the participants) were met.

Table 14

Correlations and Means of First- and Third-Person Effects

		Media Bubble 1st person		Media Bubble 3rd person		Endangerment 1st person		Endangerment 3rd person	
		frequency		frequency		frequency		frequency	
			strain		strain		strain		strain
Media Bubble 1st person	frequency	-							
	strain	.43**	-						
Media Bubble 3rd person	frequency	.23**	.22**	-					
	strain	.17**	.35**	.43**	-				
Endangerment 1st person	frequency	.31**	.31**	ns	ns	-			
	strain	.24**	.36**	ns	.21*	.43**	-		
Endangerment 3rd person	frequency	ns	.24**	.48**	.20*	ns	.18	-	
	strain	.17*	.26**	.34**	.31**	ns	.45**	.62**	-
M		2.43	2.83	4.62	3.86	1.97	3.32	4.87	4.34
SD		1.23	1.34	1.20	1.44	1.22	1.59	1.14	1.37
n		264	189	264	263	264	142	142	141

Note: Pearson correlation; *indicates a significance level of p <.05 (two-tailed[39]); ** indicates a significance level of p <.01 (two-tailed).

Media Bubble frequency

On average, participants reported that they experienced the Media Bubble effect more frequently from a third-person (M = 4.62, SE = .07) than from a first-person perspective (M = 2.43, SE = .08), $t(263) = -23.3$, $p > .000$, $r = .82$. According to Cohen (1988), an $|r| \geq .5$ constitutes a large effect.

Media Bubble strain

The same is true for the perceived strain of these two variables: The perception of strain was significantly lower for the first- (M = 2.83, SE = .10) than for the third-person perspective of the experience (M = 3.92, SE = .11), $t(188) = -9.21$, $p > .000$, $r = .56$.

[39] All tests for significance were two-tailed throughout the study unless reported otherwise.

Endangerment frequency

On average, participants evaluated Endangerment to be more frequently known from a third-person (M = 4.87, SE = .10) than from a first-person perspective (M = 2.80, SE = .10), $t(141) = -16.45$, $p > .000$, $r = .81$.

Strain Caused by Endangerment

The same is true for the perceived strain of Endangerment depending on perspective: The perception of strain was significantly lower for the first- (M = 3.32, SE = .13) than for the third-person perspective of the experience (M = 4.34, SE = .12), $t(140) = -7.70$, $p > .000$, $r = .55$.

8.3.6 Conclusion—Negative Experiences

The negative experiences identified in the interview study (analyzed to address RQ 2, see Section 5.2) could be found in this standardized second study as well. Moreover, Media Bubble and Endangerment stood out as distinguishable third-person experiences. In a ranking of the experiences reported most often and most stressful, interruptions are among the top three experiences. A slightly different ranking appears when the measures are analyzed using correlation analysis: it is even more of a strain to always be contactable and to get numerous new messages.

Strain and frequency are, from an analytical point of view, two distinguishable aspects: How frequent I expose myself to a negative experience with my smartphone is not the same as experiencing it as being particularly stressful. In this sample and with the measures employed, however, strain did not explain more variance in persistent exposure to the smartphone than frequency of a negative experience on its own. So, the supposed indirect effect (frequency → strain → DV) could not be detected. Strain did only appear to be to be more important than frequency for three experiences, which are Emotional Stress, Endangerment, and Way of Communication. A multiple regression model of the significant predictors for smartphone exposure combined (i.e., frequency and strain, as depicted in Table 11) led to inconclusive results by Auto Use frequency explaining most of the variance of the DV. Analysis of the frequency and strain measures in more detail via EFA led to a frequency-based two-factor-solution which still contains eight experiences and explains a total variance of 61%. Multiple regression analysis showed that the two factors explain 30% of variance in smartphone use—which means that frequent use takes place even though negative experiences occur. Habitualized use seemed to be driving the behavior despite its negative outcomes. This and the influence of other

variables will be elaborated on later in Section 8.7.

8.4 Justifications

During the interviews, participants justified (see Section 5.4 for the analysis of justifications, addressing RQ 4) their persistent use despite negative experiences first and foremost with a perceived responsibility to be reachable, with needs (especially the need to feel connected to others), and as simply being caused by habit. Unsurprisingly, the quantitative analysis did not show the same order as derived from the qualitative data (as depicted in Table 5), but also indicated that the same reasons are the most important ones and that they might differ as well, depending on the kind of negative experience (see Table 15).

Descriptive statistics showed that all justifications (as a reminder, they could be rated on a scale from (1) *does not apply at all* to (6) *fully applies*) were answered rather low on average, ranging from 2.06 to 3.56 (see appendix, Table A 8). The results of correlation analyses showed that the justifications depicting interpersonal commitment were significantly correlated with eight of nine experiences (not applicable for Responsibility as justification for MB), followed by Non-Evaluation as reason for seven of them. Needs[40] and Pragmatism did not seem to be quite as important. Pragmatism was sort of a general justification during the interviews. Needs, as derived from theory and the interviews, were expected to play a more important role in justifying persistent maladaptive practices. The results of the correlation analysis did not suggest this to be true for this sample, though. However, as one focus of this study is the extension of the U&G, needs were not just measured as possible justifications but as general needs (according to the SDT) and as expectations/positive experiences according to the U&G tradition. So, further analyses regarding the role of needs will follow (see Section 8.7).

[40]Recreation and boredom were subsumed as needs in the one item measure for Need-Balance as justification (item: "…because the uses (e.g., recreation, less boredom, contact to others, self-expression, feeling safe) outweigh the detriments at least to some extent.").

Table 15

Correlation of Negative Experiences with Justifications for Persistent Exposure

Neg. Exp.	Justifications						
	Non-Evaluation	Need-Balance	Pressure	Responsibility	FOMO	Pragmatism	n[41]
MB	.28***	.20**	.15*		.30***		189
p	.000	.005	.036		.000		
OK			.27***	.18**	.14*		238
p			.000	.005	.026		
ES	.23**		.32***	.16*	.18**		219
p	.001		.000	.019	.008		
AU	.37***	.33***	.27***	.29***	.44***	.33***	225
p	.000	.000	.000	.000	.000	.000	
EN	.45***	.29***	.34***	.50***	.57***	.40***	142
p	.000	.000	.000	.000	.000	.000	
IS	.17**		.26***	.26***	.13*		234
p	.008		.000	.000	.048		
IR	.30***	.22**	.36***	.38***	.52***	.21**	237
p	.000	.001	.000	.000	.000	.001	
LoT	.31***	.30***	.26***	.30***	.38***	.30***	224
p	.000	.000	.000	.000	.000	.000	
WoC			.23***	.15*	.19**		248
p			.000	.022	.003		

Note. Shown are correlations of frequency of each negative experience with each justification for that specific experience (only significant correlations are depicted).
* $p < .05$, ** $p < .01$, *** $p < .000$.

8.4.1 **Qualitative Justification Patterns in the Quantitative Study**

When comparing the correlations to the pattern derived from the interviews (illustrated in Table 5), the three justifications depicting interpersonal commitment are the only significant correlations for Overkill and Way of Communication; they were similarly emphasized during the interviews as well. They are also significantly correlated to Emotional Stress, except for Non-Evaluation, which also correlates with Emotional Stress in the second study but was not evaluated as this important during the interviews. For Endangerment and Loss of Time, the pattern was quite different compared to the one derived from the interviews: All justifications were somewhat important, even though the social ones were still showing the strongest

[41] The sample size is not the same for each experience since not each participant reported to ever expose themselves to all of them. Respectively, not everyone justified their persistent use.

coefficients. The correlation coefficients for Non-Evaluation were smaller for Media Bubble, Auto Use, or Interruption, as was derived from the interviews, whereas FOMO showed a stronger linear relationship with these experiences. Compared to the interviews, needs were *not* most important for Insignificance and Loss of Time—but social reasons dominated, especially for Insignificance.

The data derived from this analysis points to interpersonal commitment and habit as associated drivers of persistent use disregarding the quality of the outcome. However, most correlations were (very) small, which could be explained by using only single-item measures or sample size. Strong to moderate correlations could be found for FOMO ($r = .57$, $p < .000$), responsibility ($r = .50$, $p < .000$), and habit ($r = .45$, $p < .000$) as justifications for Endangerment as well as for FOMO as reason for condoning interruptions by the smartphone ($r = .52$, $p < .000$) persistently. This is quite interesting, considering that Endangerment did not fit to either factor during the EFA of the negative experiences and was excluded from the final factors, respectively. This might be due to sample size, which is the smallest for Endangerment compared to all other negative experiences, or maybe Endangerment is of a different quality and possibly a factor of its own. Endangerment stuck out as a third-person variable during the interviews which could explain its rather inconspicuous role when analyzed from this first-person experience.

These correlation coefficients gave a first impression of the connections between the negative experiences and the justifications for them, but they could not answer the question whether using the smartphone persistently, and thus experiencing negative outcomes with a greater chance, can be explained by one (or a combination) of these justifications. Hence, six justification-variables were computed (e.g., FOMO as justification for MB, OK, …, WoC were averaged into one variable, Need-Balance items also for each negative experience averaged into one variable, and so on; see appendix, Table A 9) and a multiple regression analysis conducted. This way, the analysis could still focus on the individual justifications, but also on a more aggregated level (i.e., the model).

8.4.2 **Justifications for Frequent Smartphone Exposure**

In the previous section, the relationship of negative experiences and justifications were analyzed and compared to the qualitative study. In this section, the role of justifications in explaining persistent exposure will be examined. For that, correlation as well as linear regression analyses were conducted.

Correlations of the negative experiences factors and the justifications (which will be reported in more detail in Sections 8.6 and 8.7, and depicted in Figure 11) support the H2 ("The more negative experiences someone reports, the stronger their justifications for persistent exposure") only for the first factor of the negative experiences, since Pragmatism and Need-Balance did not significantly correlate with the second factor. H2a ("The more negative experiences someone reports, the more they justify this by interpersonal commitment") was supported for both factors, as was H2c ("The more negative experiences someone reports, the more they justify this by a non-evaluation of needs"). H2b ("The more negative experiences someone reports, the more they justify this by uses that outweigh the detriments.") and H2d ("The more negative experiences someone reports, the more they justify this with uses and detriments being counterbalanced."), however, were only supported for the negative experiences subsumed under the first factor.

Linear regression analyses with each of the six justifications individually and the dependent variable smartphone exposure were calculated as well (results can be found in detail in Table 16), finding that each justification explains up to 16% of variance with FOMO and Need-Balance explaining the most. So, not wanting to miss out on what friends and acquaintances do as well as the uses (according to U&G) outweighing the negative "side-effects" weighed heavier in the prediction of frequent use than the other justifications did. But, are the six justifications six *different* justifications? If so, which one helps to explain best, why negative experiences would be condoned persistently? To analyze this, a multiple regression containing all six variables was computed.

The multiple regression model with all six justifications as IVs led to a different picture compared to the linear models before: FOMO was the only predicting variable and the other justifications did not contribute uniquely to explanation of variance of the DV with the model still only explaining 16% of variance (which is the same amount FOMO already explained before individually (see Table 17).

Table 16

Linear Regression Models for each Justification Predicting Smartphone Exposure

Model		Unstandardized Coefficients		Standardized Coefficients			95% CI for B			
		B	*SE*	ß	*t*	*p*	LL	UL	R^2	*r*
1	(Constant)	3.968	.197		20.190	.000	3.581	4.355		
	Non-Evaluation	.320	.070	.273	4.596	.000	.183	.457	.07	.27
2	(Constant)	4.120	.182		22.629	.000	3.761	4.478		
	Pressure	.270	.066	.247	4.123	.000	.141	.399	.06	.25
3	(Constant)	4.115	.169		24.422	.000	3.783	4.447		
	Responsibility	.295	.065	.271	4.565	.000	.168	.422	.07	.27
4	(Constant)	3.677	.173		21.260	.000	3.336	4.017		
	FOMO	.453	.063	.405	7.173	.000	.328	.577	.16	.41
5	(Constant)	3.840	.220		17.468	.000	3.407	4.272		
	Pragmatism	.358	.077	.276	4.656	.000	.207	.510	.07	.28
6	(Constant)	3.770	.206		18.260	.000	3.364	4.177		
	Need-Balance	.365	.068	.314	5.358	.000	.231	.499	.10	.31

Note. Dependent variable: Smartphone Exposure. Six models from six individual linear regression analyses are shown in this table. BCa based on 5000 bootstrap samples. For *r*, all *p*s < .000; differences in *r* and R-squared due to rounding errors.

8.4.2.1 The Issue of Multicollinearity

Correlations were small as were the *b*-coefficients, and only one predictor significantly explaining variance of the DV could also point to a measurement issue: Predictors in multiple regression should be sufficiently independent (since completely is almost never the case in social sciences) to explain unique variance of the outcome variable. If that is not the case, the model can still be significant but the *p*-value per each coefficient will not be, since the respective variable does not explain unique variance of the DV. VIF and tolerance were checked beforehand for multicollinearity but did not give reason for concern since the guidelines state that the VIF value should not exceed 10 or the tolerance be below .1 (Bowerman & O'Connell, 1990; Myers, 1990, as cited in Field, 2018 p.533). However, other guidelines according to Bowerman and O'Connell (1990, as cited in Field, 2018, p. 533) state that if the VIF is

"substantially greater than 1 then the regression may be biased". These indicators are not flawless, as noted before, and others should better be checked as well: The standard errors might point to collinearity as they were in most cases of the same size as or even bigger than the *b*-coefficient itself (not the case for FOMO, and possibly not of concern for Need-Balance as well; see Table 17). The presumably easiest method is to check correlations, as those above .8 could indicate collinearity: Pressure and Responsibility correlated highly ($r = .85$, $p < .000$) which was unsurprising since they were intended to measure aspects of interpersonal commitment, but they would be interchangeable with regards to their unique explanatory value in a regression model with both entered. Additionally, Pragmatism and Need-Balance correlated a bit too high, too, with an r of .76 ($p < .000$). This could be due to very similar wording and, thus, should unfortunately not be surprising, too. The intercorrelations of the other justifications were all below $r = .6$ and should, correspondingly, not cause concern for collinearity (Field, 2018). Hence, an EFA was run before further analyses were conducted to test for the justifications' influences on the DV.

Table 17

Multiple Regression of Justifications and Smartphone Exposure

		Unstandardized Coefficients		Standardized Coefficients			95% CI for B		Correlations			Collinearity Statistics	
Model		B	*SE*	ß	*t*	*p*	LL	UL	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	3.396	.237		14.308	.000	2.929	3.863					
	Non-Eval.	.086	.081	.074	1.060	.290	-.074	.246	.273	.066	.060	.658	1.521
	Pressure	-.095	.119	-.086	-.793	.429	-.330	.140	.247	-.049	-.045	.267	3.745
	Resp.	.141	.117	.130	1.207	.228	-.089	.370	.271	.075	.068	.275	3.635
	FOMO	.339	.089	.303	3.809	.000	.164	.514	.405	.231	.215	.502	1.993
	Pragm.	-.080	.119	-.062	-.673	.501	-.315	.155	.276	-.042	-.038	.374	2.671
	Need-Bal.	.166	.103	.143	1.605	.110	-.038	.369	.314	.100	.090	.401	2.495

Note. Dependent variable: Smartphone Exposure. Method: enter. BCa based on 5000 bootstrap samples. Each justification variable was computed using the average for each negative experience (see text for details and Table 6 for exact wording). VIF and tolerance values (test for multicollinearity) were within the recommended range. Abbreviations: Non-Eval. = Non-Evaluation, Resp. = Responsibility, Pragm. = Pragmatism, Need-Bal. = Need-Balance.

8.4.3 EFA of Justifications

An EFA was conducted on six items with orthogonal varimax rotation to test for possible underlying factors of the tested six justifications. This was done for each of the nine negative experiences separately. As shown in Table 18, the Kaiser–Meyer–Olkin (KMO) measure

(Kaiser & Rice, 1974) verified the sampling adequacy for the analysis of each experience, as did Bartlett's test of sphericity, which measures the null hypothesis that the correlation coefficients are zero, $p < .000$ (Field, 2018; Rudolf & Müller, 2012). An initial explorative analysis was run to obtain eigenvalues for each factor in the data. Aside from one negative experience (that is, EN), all other explorative factor analyses led to two factors with eigenvalues over Kaiser-Guttman's criterion of 1 and in combination explained at least 63% of the variance for each experience (see appendix, Table A 10). The scree plots (Cattell, 1966) justified retaining two factors as well. The eigenvalue of 1 criterion led to only one factor explaining the reasons of persistently exposing themselves to dangerous smartphone behavior (i.e., EN) but the subsequent eigenvalue was .983 and explained 16% more variance. Therefore, I ran the test again with two fixed factors and the same pattern that had been found for the other variables became apparent, too. The Measure of Sampling Adequacy (MSA) was perfect for each analysis as all anti-image correlations were well above .5 and the criterium for positive definiteness (< .000) was met each time as well (Kaiser & Rice, 1974; Weiber & Mühlhaus, 2014). Table A 10 in the appendix also depicts the factor loadings after rotation. As a criterion on which factors to include, I surpassed Stevens' (2002) recommendation of at least .4 (so the factor explains 16% of variance of the variable) and raised the threshold to include only those above .5 to get a better-defined factor solution.

The items clustering on the same factor suggest that factor 1 (for all experiences but LoT; for LoT, factor 1 and 2 are inversed, with the social factor explaining more Eigenvalue than the functional factor) consists of these four justifications: "…because it is practical and uses and detriments keep in balance"; "…because the uses (e.g., recreation, less boredom, contact to others, self-expression, feeling safe) outweigh the detriments at least to some extent"; "…because I don't think about possible negative consequences"; "…because this way, I will not miss out on what my friends and acquaintances do". The factor, thus, represents internally attributed reasons for persistent use or a "functional" factor; whereas factor 2 (consisting of the two items: "…because others in my private environment expect from me to be always reachable" and "…because it is my social responsibility to be always reachable") represents an externally attributed "social" factor. So, as suspected in study I, also the quantitative data back the assumption that some reasons are attributed internally and others externally. It is worth mentioning that the social factor was extraordinarily distinct across all nine negative experiences. The item measuring FOMO should be excluded from some subscales (factors) after reliability analyses suggested a better consistency without it. That is, part-whole-correction showed no improvement for the first six negative experiences (MB, OK, ES, AU, EN, IS), but

the exclusion of Non-Evaluation from the first factor of Interruption improved reliability from α = .72 to α = .75, and after a second analysis again from α = .75 to α = .80 through exclusion of the FOMO item. The same was the case for Way of Communication. That is, the exclusion of the habit-item from the first factor led to a slight improvement of alpha (α = .70 to α = .71) and subsequent exclusion of also FOMO to α = .73. The found factor structure for Loss of Time is, as mentioned before, different from the other eight. However, also in this case lead the exclusion of FOMO from the first (here social) factor to an increased reliability (α = .82 to α = .88); and exclusion of the habit-item from the second (functional) factor increased alpha from α = .64 to α = .73.

Combining Non-Evaluation (as representing a mechanism operating rather unconsciously) and Pragmatism as well as Need-Balance (both representing more conscious characteristics) into one factor would—with regards to meaning—not really fit, especially with ambiguous FOMO joining this factor for most negative experiences. Maybe, it was their functionality that combined them during the analysis but there should be more to the justifications individually; and especially the unconscious characteristic of habit and the social component of FOMO raise the question of their similarities to justify combining them into one subscale. To explore this, I also tested for a three-factor structure and analyses of three fixed factors revealed that habit constitutes one individual factor for all nine experiences, each time with a very high factor loading (> .9). FOMO varied even more in these analyses: it loaded highest on the functional, then on the social, or even the habit-factor. It might be that FOMO would also constitute its own factor if measured by more than one item and/or in a study with more participants. On the one hand, the role of FOMO, as first analyses pointed out, seems to be too important to exclude this justification from further analyses. On the other hand, FOMO was ambiguously loading on the functional factor of six out of nine experiences and a corresponding ex- or inclusion from the functional factors, calculated per respective negative experience, would be reasonable as long as the functional justifications would not be combined, for instance for the two negative experiences factors. If this were the case, FOMO and Non-Evaluation would not be included in the factors for Interruption, Loss of Time, and Way of Communication; or, the functional factors could only be computed without FOMO and Non-Evaluation in general.[42]

[42] It is important to note that communalities should be at least .6, especially with a sample as small as in this study. Communalities of Non-Evaluation ("I don't think about negative consequences") were low (< .5, sometimes even below .2) in all cases; and for FOMO in all but one (EN); for Need-Balance in two cases (EN and LoT). Very low communalities can indicate that a variable constitutes their own factor, so this should be analyzed using a bigger sample and more items than just one in future research. In scale construction, these items would be removed or redefined (Rudolf & Müller, 2012).

Table 18

Sampling Adequacy for Factor Analysis (per Scale for the Six Justification Items)

Negative Experience	KMO	Bartlett-Test of Sphericity χ^2 (*df*); $p < .000$	*n*
Media Bubble	.71	269.069 (15)	189
Overkill	.74	483.557 (15)	238
Emotional Stress	.78	471.696 (15)	219
Self-Acting-Use	.74	507.828 (15)	225
Endangerment	.74	424.123 (15)	142
Insignificance	.76	648.073 (15)	234
Interruption	.68	546.782 (15)	237
Loss of Time	.76	476.438 (15)	224
Way of Communication	.74	707.160 (15)	248

Note. Kaiser-Meyer-Olkin (KMO) is supposed to be .5 or higher.

To recap, the EFA helped to gain a better understanding of the collinearity among the justifications and results led to two interesting factors. The analyses also showed that justifications might not be the same for every daily negative experience and pointed to interesting patterns of justifications, and a clear social factor applying for all experiences. However, the discussed ambiguous item-loadings and the fact that this study is about exploring possible justifications instead of constructing a scale of them as well as the limitations of EFA as a heuristic measure (particularly, regarding the scale length and this study's sample size), led to the decision not to use the functional factor in the following calculations.

8.5 EFA of the Remaining Scales

The possible underlying factor structure was analyzed for the remaining scales used in this study as well (i.e., U&G, SRHI, SDT, SCS-K-D, and ULS-8). For each scale, the rotation method used was the same as before: orthogonal varimax with Kaiser normalization. As shown in Table 18, the Kaiser–Meyer–Olkin (KMO) measure (Kaiser & Rice, 1974) verified the sampling adequacy as did Bartlett's test of sphericity (Field, 2018; Rudolf & Müller, 2012). The assumption of positive definiteness was met as well (determinant > 0)—with one exception: it was violated (i.e., the value was .000) in the first EFA of the SRHI but not in the second run, after the removal of items as suggested by the analysis. An initial explorative analysis was run to obtain eigenvalues for each factor in the data and the justification of a factor structure was

based upon factors with eigenvalues over Kaiser-Guttman's criterion of 1, the scree plot (Cattell, 1966), and—most importantly—the meaning of a cluster of items that was suggested to constitute a factor.

Table 19

Sampling Adequacy for Factor Analysis (U&G, BMPN, Habit, SCS-K-D & ULS-8)

Scale	No. of Items	KMO	Bartlett-Test of Sphericity χ^2 (*df*); $p < .000$	*n*	α	No. of Factors	Variance Explained
U&G	14	.87	1419.306 (91)	264	.86	-	58%
U&G (post-EFA)	11	.83	844.321 (55)	264	.81	3	60%
Habit	13	.93	2198.896 (78)	264	.93	-	68%
Habit (post-EFA)	10	.92	1579.418 (45)	264	.91	2	69%
ULS-8	8	.85	855.272 (28)	264	.85	-	63%
ULS-8 (post-EFA)	7	.84	732.647 (21)	264	.83	2	67%
SCS-K-D	13	.87	1058.263 (78)	264	.85	-	56%
BMPN	18	.85	1696.038 (153)	264	.84	-	65%
BMPN	16	.83	1432.648 (120)	264	.83	6	71%

Note. Kaiser-Meyer-Olkin (KMO) is supposed to be .5 or higher. All statistics also calculated for redefined scales (better psychometric properties) according to results of explorative factor analysis (U&G based upon 11 instead of 14 initial items (excl.: "to be able to join in on a conversation", "boredom" and "escapism"), Habit 10 instead of 13 items (excl. "That would require effort not to do"; "That makes me feel weird if I don't do it"; "That is typically 'me'"); ULS-8 with seven instead of eight items (excl. item "I can find companionship when I want it"); EFA did not suggest for BMPN and SCS-K-D to be modified to obtain better explanation of variance and/or reliability). Requirement for positive definiteness (> .000) was met in each but one case (not for the first run with all items of the Habit-Scale, but after exclusion of two ambiguous items), all anti-image-correlations were well above .5.

8.5.1 **EFA U&G**

The U&G measure was based upon the different needs mentioned during the interviews and an EFA conducted on the 14 items. The initial analysis led to three factors with eigenvalues over Kaiser-Guttman's criterion of 1 and explained 58% of variance initially (see appendix, Table A 11). The scree plot (Cattell, 1966) justified retaining three factors as well. Two items ("…to pass time" and "…to escape my daily routine") loaded ambiguously on factors 1 and 3 in the beginning and were excluded from the analysis. A successive EFA suggested to remove one more ambiguous item ("…to be able to join in on a conversation in my circle of friends/acquaintances"), which also loaded on both factors 1 and 3 (.505 and .393 respectively), to retain a better factor structure. Exclusion led to an improved explanation of variance (60%; for details

see appendix, Table A 12). The items that clustered on the same factor suggested that factor 1 represents needs for social interaction and self-presentation, factor 2 represents a need for entertainment-relaxation, and factor 3 a need for safety and not feeling lonely—which the smartphone as a constant companion or connection to the "outside world" might provide (see Table 20). Cronbach's alpha is acceptable (> .7) for the first two factors, but poor (< .5) for the third factor[43].

Table 20

Final Solution of the Explorative Factor Analyses of the U&G Scale

	Component		
I usually use messenger and/or social networking applications on my smartphone, …	Social Interaction - Self-Presentation	Entertainment - Relaxation	Safety - Loneliness
… to express myself.	**.738**		
… to communicate with other people.	**.724**		
… to stay informed with regards to (developments in) my circle of friends/acquaintances.	**.710**	.314	
… to get to know certain things about friends/acquaintances.	**.702**		
… to show others things about me (e.g., things I do or places I am visiting.	**.585**		
… for entertainment.		**.799**	
… to use exciting content.		**.781**	
… to relax.		**.732**	
… because it's fun.	.317	**.688**	
… to feel safe when I am out.			**.830**
… to not feel lonely.			**.726**
Eigenvalues	3.98	1.54	1.06
% of variance	36.19	13.96	9.67
α	.77	.79	.49

Note. Factor solution based on rotated component matrix. Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Rotation converged in four iterations. Factor loadings over .5 that constitute one factor for reliability analysis (Cronbach's alpha) appear in bold, no factor loadings under .3 are shown. Part-whole correction did not suggest the exclusion of any other item to improve alpha.

[43] Cronbach's alpha always depends on the number of items per scale and not just its dimensionality or the intercorrelations of the items. For instance, a long scale can have more than one factor and just low intercorrelations, yet a high alpha. Intercorrelations of > .5 can lead to a good alpha (that is, α > .75) with only a few items. So, alpha can only be interpreted with number of items in mind and, thus, a low coefficient with only two items must not lead to a dismissal of a subscale per se. Additionally, the alpha coefficient is a guideline and has to be treated with caution like all coefficients (see e.g., Cortina, 1993; Field, 2018).

8.5.2 **EFA BMPN**

Extensive explorative factor analyses were conducted to test for the suggested and repeatedly replicated (see e.g., Neubauer & Voss, 2016; Sheldon & Hilpert, 2012) factor structure of three or even six subscales (three for each need, measured for satisfaction/dissatisfaction by three items each respectively). The initial EFA found five factors based upon eigenvalues of each factor that were greater than 1 (see appendix, Table A 13) explaining 64.6% of variance. According to the scree plot, a three- or six-factor solution would be appropriate (see appendix, Figure A 2). In a second step, three ambiguously loading items were excluded (aut d1, aut d2, aut s2, comp d2—for the items see appendix, Table A 14) and the analysis was conducted again. This resulted in four factors with relatedness dissatisfaction and two items measuring competence dissatisfaction loading on the first factor, and the remaining autonomy satisfaction and autonomy dissatisfaction items loading on factor 4. Only factors 2 and 3 remained stable, as the three relatedness satisfaction and the three competence satisfaction items clustered on one factor each, again (see appendix, Table A 15). The scree plot was in favor of three factors in this analysis (see appendix, Figure A 3). To follow the previous literature on the BMPN, analyses for a fixed three- and six-factor structure were conducted as well: Three factors explained only 51.5% of variance. Even though the scree plot was in favor of this solution, the factor loadings and variance explanation were not. All items measuring dissatisfaction clustered on factor 1, with two of them (aut d2 and d3) also loading on factor 2. Factor 2 consists of the items measuring autonomy satisfaction and relatedness satisfaction, with the latter loading also on factor 3 which consists of the competence satisfaction items (see appendix, Table A 16). The six-factor-solution explained the most variance (68.8%), with the items clustering almost as described in previous literature. Only two items (autonomy dissatisfaction, aut d1, and competence dissatisfaction, comp d2) loaded ambiguously again (see appendix, Table A 17). Exclusion of these two items led to an improved explanation of variance (71.1%) and almost the six-factor structure as it was meant to be but with factor 5 and 6 only consisting of two items each (see Table 21, also for internal consistency of the subscales).

Table 21

Fifth EFA With a Six-Factor-Structure Without aut d1 and comp d2

	Component					
	1	2	3	4	5	6
BMPN_comp_s1v3	**.878**					
BMPN_comp_s2v3	**.849**					
BMPN_comp_s3v3	**.735**			.334		
BMPN_relat_s3v3		**.838**				
BMPN_relat_s2v3		**.796**				
BMPN_relat_s1v3		**.789**				
BMPN_relat_d3v3_r			**.810**			
BMPN_relat_d2v3_r			**.788**			
BMPN_relat_d1v3_r			**.658**			
BMPN_aut_s2v3				**.765**		
BMPN_aut_s3v3				**.658**	.322	
BMPN_aut_s1v3				**.620**	.419	
BMPN_aut_d3v3_r					**.852**	
BMPN_aut_d2v3_r			.361		**.651**	
BMPN_comp_d3v3_r						**.918**
BMPN_comp_d1v3_r			.398			**.596**
Eigenvalues	4.74	2.34	1.34	1.27	.96	.74
% of variance	29.60	14.63	8.40	7.91	5.97	4.60
α	.83	.82	.71	.67	.60	.58

Note. Factor solution based on rotated component matrix. Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Rotation converged in six iterations. Factor loadings over .5 that constitute one factor for reliability analysis (Cronbach's alpha) appear in bold, no factor loadings under .3 are shown. Variance explanation of this solution: 71%. Part-whole correction did not suggest the exclusion of any other item to improve alpha.

8.5.3 **EFA SRHI**

For the SRHI, the EFA (eigenvalues and scree plot) pointed to an underlying structure of two factors, explaining 65.3% of variance. However, three items loaded on both factors ambiguously (see appendix, Table A 18) and the assumption of positive definiteness was violated (determinant = .000, although supposed to be > 0). Exclusion of the suggested items ("That makes me feel weird if I do not do it", "That is typically 'me'", and "That would require effort not to do it") led to a 10-item-solution, consisting of two factors explaining 68.9% of variance (see Table 22). The items that clustered under factor 1 suggested an automaticity component of

habit and the items of the second factor pointed to regular smartphone use in everyday life (i.e., routine). The SRHI is supposed to have a single-factor-structure (Verplanken, Myrbakk, & Rudi, 2005, as cited in Rebar et al., 2018), but recently even a three-factor structure was reported in a study on the use of the television set. In the study, the third factor was called "controllability factor", representing a lack of a conscious decision of media selection (cf. Schnauber, 2017). The two items loading on the respective factor in the present study are "[Using messengers/SNS is something] that I would find hard not to do" and "…that would require effort not to do". The first loaded on the second factor in this analysis and the second was excluded due to its ambiguous loading on both factors. This demonstrates an importance of factor analyses in each study as the structure depends on the habitualized behavior (or medium) and the sample, for instance. Also, factor analysis is a tool that should be used as an indicator, as an aid to make an informed decision on how to work with a scale while always focusing on the interpretability of the factors (Rudolf & Buse, 2019). The resulting 10-item scale of this study showed an excellent Cronbach's alpha of .91 and a somewhat better explanation of variance in comparison to the 13-item scale.

Table 22

Second EFA Resulting in Two-Factor SRHI

	Component	
	1	2
I have no need to think about doing.	**.854**	
I do without meaning to do it.	**.835**	
I start doing before I realize I am doing it.	**.817**	
I do without having to consciously remember.	**.775**	.371
I do automatically.	**.764**	.423
I do without thinking.	**.698**	
I do frequently.		**.835**
I have been doing for a long time.		**.779**
That belongs to my daily routine.	.374	**.753**
That I would find hard not to do.	.309	**.666**
Eigenvalues	5.60	1.30
% of variance	55.97	12.96
α	.92	.81

Note. Factor solution based on rotated component matrix. Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Rotation converged in three iterations. Factor loadings over .5 that constitute one factor for reliability analysis (Cronbach's alpha) appear in bold, no factor loadings under .3 are shown. Variance explanation of this solution: 69%. Part-whole correction did not suggest the exclusion of any other item to improve alpha.

8.5.4 **EFA SCS-K-D**

The EFA of the 13-item SCS-K-D suggested three factors based on the eigenvalues over 1 but clearly just one factor according to the scree plot. The three factors explained 56% of variance, but the rotated factor matrix showed six items loading too low (in case of one item) or ambiguously on the factors (see appendix, Table A 19). Exclusion of only the ambiguous items ("I am lazy", "I wish I had more self-discipline", "I do certain things that are bad for me, if they are fun", "I have a hard time breaking bad habits", and "Sometimes I can't stop myself from doing something, even if I know it is wrong") led to two factors explaining almost 50% of variance. Additional exclusion of the low-loading item ("I often act without thinking through all the alternatives") also led to two factors while explaining almost 53% of variance. So far, exclusion of items loading ambiguously on factors led to an improvement of variance explanation, but not for the SCS-K-D.

Research literature on the SCS (e.g., De Ridder et al., 2011) discusses different aspects of self-control, such as inhibitory self-control. When inhibitory self-control is executed, an immediate gratification is avoided for the benefit of a long-term goal, similar to gratification of delay as most famously researched by Mischel and colleagues (2014). This could be, for instance, resisting to check the smartphone that is located on the desk while a person is at work. A second type discussed is initiatory self-control. It is assumed that actions are directed towards a long-term goal through planning in a way that resisting a temptation is not necessary because it will most likely not occur (e.g., a person would not place the smartphone on the desk while at work, so resisting the urge to check for notifications is unnecessary in the first place).

However, the items that cluster under the two factors could neither be interpreted in the suggested way (since the items formerly differentiated as indicators of inhibitory vs. initiatory aspects of self-control clustered on either factor), nor could I interpret the items in a meaningful way as to how they would describe different types of self-control (see appendix, Table A 20 and Table A 21). Literature on the German version of the SCS (Bertrams & Dickhäuser, 2009) reported similar results as found in this study and suggested a unidimensional measure. Since the full 13-item scale showed good internal consistency ($\alpha = .85$, and the part-whole correction did not suggest exclusion of any item for an improvement of alpha) and the main intention was to measure trait self-control, as opposed to different types of self-control, the scale will be used as unidimensional measure in the following analyses as well.

8.5.5 **EFA ULS-8**

Explorative factor analysis suggested a two-factor structure of the ULS-8 based on scree plot and eigenvalue criterion, explaining 63% of variance (see appendix, Table A 22). However, one item loaded ambiguously on both factors ("I can find companionship when I want it"). Removing this item improved explanation of variance to 67%. The item clustering of this EFA is similar to the results by Döring and Bortz (1993) for the German 20-item-scale. Even though they found a three-factor structure (for a more than twice as long scale), the same items clustered on a factor in this study as they did in theirs (except for one item ("I lack companionship") which loaded on the first factor in this study but with the items of this study's second factor in theirs). The items that cluster on the same factor suggest that factor 1 represents a feeling of isolation and factor 2 represents sociability (see Table 23).

Table 23

Two-Factor Solution for ULS-8

	Component	
	Feeling of Isolation	Sociability
I feel isolated from others.	**.844**	
I am unhappy being so withdrawn.	**.790**	
I feel left out.	**.775**	
There is no one I can turn to	**.767**	
I lack companionship.	**.726**	.331
I am an outgoing person. (R)		**.902**
People are around me but not with me.	.336	**.683**
Eigenvalues	3.66	1.04
% of variance	52.26	14.81
α	.86	.55

Note. Factor solution based on rotated component matrix. Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Rotation converged in three iterations. Factor loadings over .5 that constitute one factor for reliability analysis (Cronbach's alpha) appear in bold, no factor loadings under .3 are shown. Variance explanation of 67.1%.

8.5.6 **Conclusion—EFA of all Scales**

The EFA showed that the factor structure for the scales used in this study is comparable to those demonstrated in previous research though not the same. The U&G is the only scale, aside from the negative experiences and justifications, for which an EFA was advisable as it contains very different dimensions of the need spectrum. EFA for all scales were conducted for

reasons of completeness as well as comparability to previous research, nonetheless. Still, only the factors of U&G as well as the negative experiences and the social justifications factor will be used in the following analyses. Even though it would be interesting to analyze the factors in-depth, for instance inquire which facets of a trait would have which predictive qualities, this would go beyond the scope of this thesis. For this reason, and because they have shown excellent qualities as unidimensional measurements, the scales measuring traits independently from media use (BMPN, SCS-K-D, and ULS-8) as well as the SRHI, used to capture smartphone-related habits in this study, will be used in their (post-EFA) entirety. This concludes the EFA of all scales in this study and in the following the model will further be analyzed as well as the hypotheses tested.

8.6 Some Justifications Explain Persistent Smartphone Use

EFA helped to find some answers about collinearity and possible underlying dimensions of the justifications and the other scales. Now, this section will come back to the main question of this study: Why would negative experiences with the smartphones be condoned persistently, and what part play justifications for its explanation? As analyses have shown before (see Section 8.3.4), negative experiences can explain part of the variance of persistent smartphone exposure. In fact, adaptation experiences alone (i.e., factor 1, consisting of IR, AU, LoT, MB) explained 29% of variance in frequent exposure. During the interviews, I asked why someone would persistently endure negative experiences even though no gratifications were the consequence—which resulted in different justifications. In the following, I will analyze whether and to what extent these justifications might offer valuable clues as to why this behavior is so persistent if negative experiences are also considered.

8.6.1 Adaptation Experiences, Justifications, & Persistent Use

Factor 1 consists of experiences that occur due to our habitualized smartphone use in everyday life. But when asked, people—in both the qualitative study I and the standardized study II—would justify their behavior, although habitual actions are often nonconsciously performed. In the following, the justifications will be entered into a model as mediator variables to see whether they can help to explain why a negative experience would still lead to frequent use. The six justifications will be entered into individual one-mediator-models to begin with, for two reasons: First, the same issues of collinearity as described earlier for regression analysis could occur when all justifications are entered simultaneously. Second, the power for tests of

indirect effects is reduced and sampling variance greater in models with more than one mediator variable (Hayes, 2018) so that effects are more likely *not* to be detected.

Not only were the justifications entered individually but also under consideration of the results of the EFA for the justifications: Responsibility and Pressure build one factor over all negative experiences and Pragmatism and Need-Balance intercorrelated strongly ($r > .7$). So, I also contrasted the social factor vs. the individual justifications and computed one variable for Pragmatism and Need-Balance as well. These justifications and newly computed variables, however, did not influence persistent use in the calculated models: Only FOMO and Need-Balance explained variance of persistent smartphone use significantly as can be seen in Figure 4 and Figure 5.

The adaptation experiences already explained 29.2% variance on their own, so FOMO only added .05% of variance explanation, Need-Balance added .1%. A model with FOMO and Need-Balance as mediators did not result in significant indirect effects. FOMO and Need-Balance individually explain a minimalistic amount of variance, but level each other out when considered together (all effects of M on Y ns).

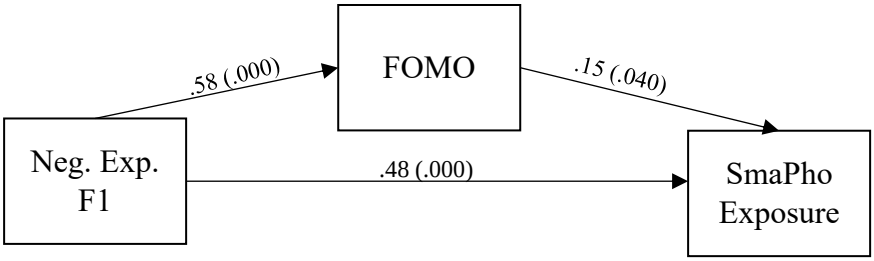

Figure 4

Model of Adaptation Experiences Predicting Frequent Smartphone Use Mediated by FOMO

Note. Unstandardized regression coefficients are reported. The *p*-values are in parentheses after *b*-coefficients. Non-significant effects are in gray font for better clarity. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 5000 samples.

The model explains 29.2% of variance of smartphone exposure. Total effect $b = .57$, $p < .000$. Indirect effect $b = .09$, Boot SE .04, 95% BCa CI [.003, 167]. Sample size $n = 259$.

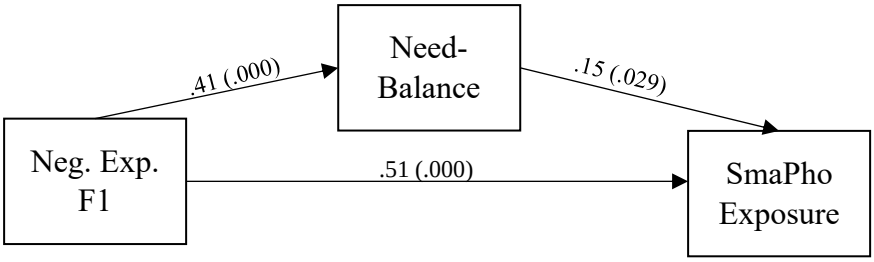

Figure 5

Model of Adaptation Experiences Predicting Frequent Smartphone Use Mediated by Need-Balance

Note. Unstandardized regression coefficients are reported. The *p*-values are in parentheses after *b*-coefficients. Non-significant effects are in gray font for better clarity. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 5000 samples.

The model explains 29.3% of variance of smartphone exposure. Total effect $b = .57$, $p < .000$. Indirect effect $b = .06$, Boot SE .03, 95% BCa CI [.008, 119]. Sample size $n = 259$.

Its test power notwithstanding, simple mediation analysis only holds the influence of X and possible other mediators constant without comparison of the unique effects of the justifications. But previous analyses showed that the justifications are presumably not distinct from each other, some of them even correlated to a relatively high degree. So, including these correlated mediators in a model would allow to "disentangle spurious and epiphenomenal association from potential causal association(s)" (Hayes, 2018, p. 184). When all justifications were considered in one model (see Figure 6), no justification accounted for explained variance anymore, suggesting that the adaptation experiences occur in a manner that may not need justifications because they have become a norm, presumably even integrated into a person's self-concept, automatic in everyday life; and that a person only thinks of a justification for this behavior if asked for—for instance by an interviewer or an online questionnaire.

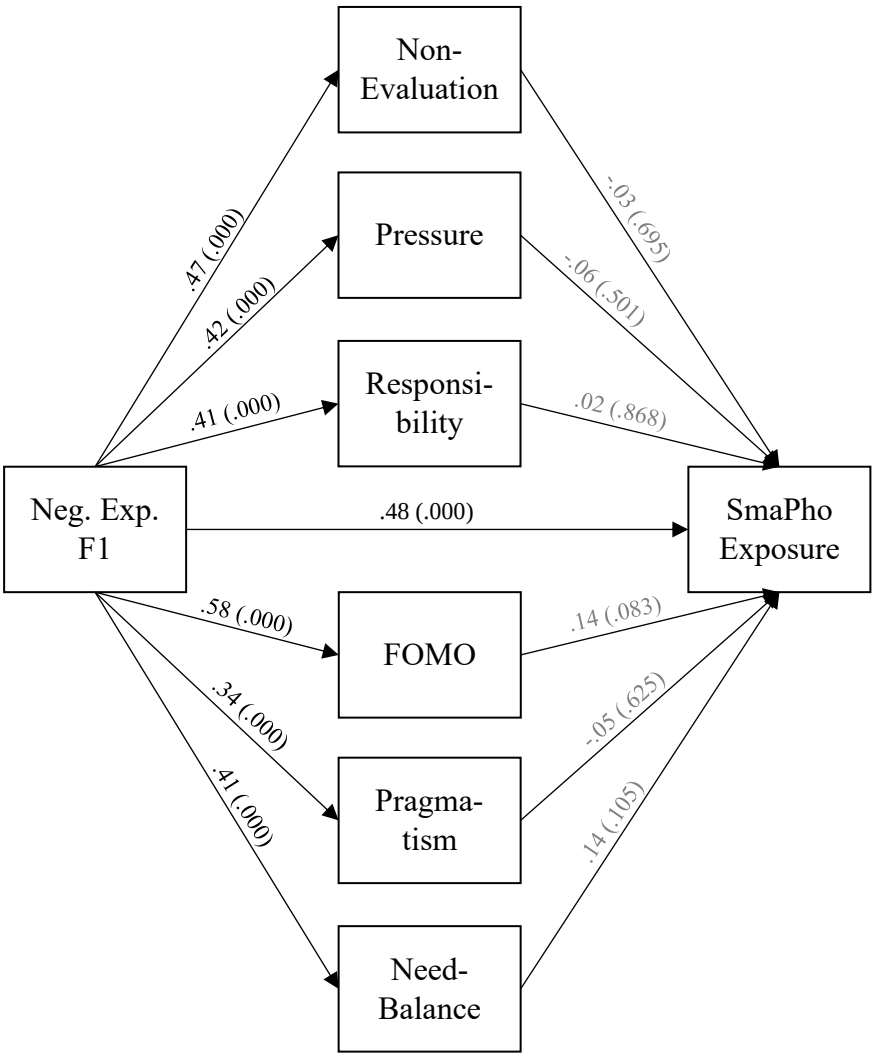

Figure 6

Parallel Mediation Model of Adaptation Experiences Predicting Smartphone Exposure via Justifications

Note. Unstandardized regression coefficients are reported. The *p*-values are in parentheses after *b*-coefficients. Non-significant effects are in gray font for better clarity. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 5000 samples.

R^2 of the depicted model is 30.3%. Total effect $b = .57$ ($p < .000$); all indirect effects are non-significant. Sample size $n = 259$.

8.6.2 **Acceleration Experiences, Justifications, & Persistent Use**

The course of analysis was the same for the acceleration experiences as already described for the adaptation experiences in the previous section. The analyses led to different results, though: Acceleration experiences alone explain only 1.2% in more frequent use, but the direct effect of X on Y does not remain significant when a justification is entered as a mediator variable. The indirect effect, however, was significant for Non-Evaluation (see Figure 7), the

social factor (i.e., Pressure and Responsibility[44]; see Figure 8) and for FOMO (see Figure 9), with FOMO explaining most of the variance. For the acceleration experiences, FOMO led to a full mediation. In the parallel model containing all justifications, the indirect effect via FOMO (that is, Factor 2 → FOMO → DV) as mediator variable was the only one remaining significant (see Figure 10). So, FOMO justified persistent exposure despite negatively evaluated outcomes.

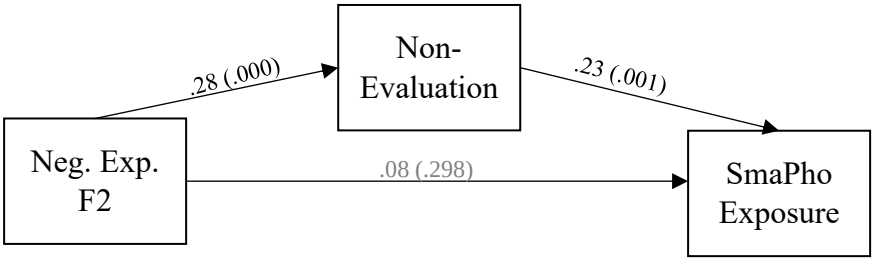

Figure 7

Model of Acceleration Experiences Predicting Frequent Smartphone Use Mediated by Non-Evaluation

Note. Unstandardized regression coefficients are reported. The *p*-values are in parentheses after *b*-coefficients. Non-significant effects are in gray font for better clarity. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 5000 samples.

The model explains 5.9% of variance of smartphone exposure. Total effect $b = .14$, $p = .045$. Indirect effect $b = .06$, Boot SE .03, 95% BCa CI [.019, .130].

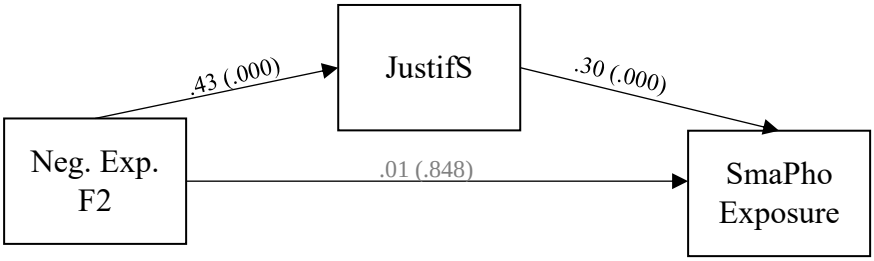

Figure 8

Model of Acceleration Experiences Predicting Frequent Smartphone Use Mediated by the Justifications' Social Factor

Note. Unstandardized regression coefficients are reported. The *p*-values are in parentheses after *b*-coefficients. Non-significant effects are in gray font for better clarity. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 5000 samples.

The model explains 7.9% of variance of smartphone exposure. Total effect $b = .14$, $p = .045$. Indirect effect $b = .06$, Boot SE .03, 95% BCa CI [.066, .201].

[44] The models are also individually significant, with Responsibility explaining a bit more variance (8%) than the combined model (7.9%) or Pressure alone (6.5%). However, the *b*-coefficient (M → Y) and the indirect effect are larger when using them as a factor instead of individually. Therefore, only the factor-model is shown.

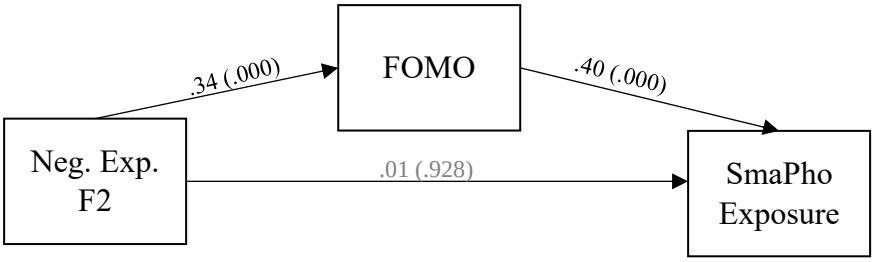

Figure 9

Model of Acceleration Experiences Predicting Frequent Smartphone Use Mediated by FOMO

Note. Unstandardized regression coefficients are reported. The *p*-values are in parentheses after *b*-coefficients. Non-significant effects are in gray font for better clarity. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 5000 samples.

The model explains 13.9% of variance of smartphone exposure. Total effect $b = .14$, $p = .045$. Indirect effect $b = .14$, Boot *SE* .03, 95% BCa CI [.076, .206].

The positive correlations and respective individual linear regression analyses (see Table 16) pointed to a clear support of the H3 ("The stronger the justifications, the more smartphone exposure") with small to moderate correlations of the justifications with smartphone exposure. However, justifications are unnecessary without respective negative experiences (that is, to justify use despite of them); and these in-depth analyses added new insights into the relationship of these variables under consideration of the experiences (individually and as post-EFA factors): The positive prediction of exposure due to justifications might not be true for all negative experiences as was shown before for the experiences individually (see Table 15) and later with the aggregated justification variables in mediation analyses. FOMO was the only variable explaining (very little) variance of the adaptation experiences but only in a simple regression model. There was no significant indirect effect in a model containing all justifications for this factor. Non-Evaluation, the social justifications factor as well as FOMO could explain more variance for the acceleration experiences, but in a model containing all justifications, only the indirect effect via FOMO remained significant. So, even though H3 could be supported for the bivariate relationship, in-depth analyses showed that justifications were not explaining persistence of all negative experiences equally and variance explanation was not high either.

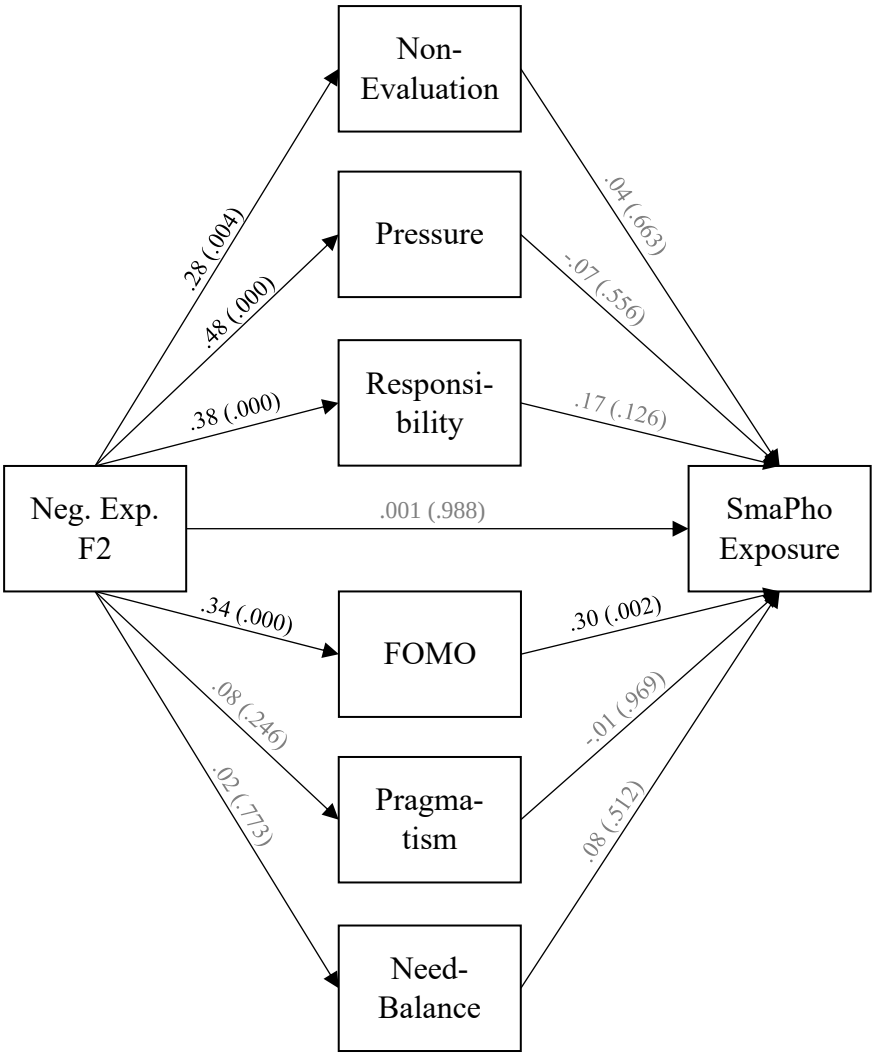

Figure 10

Parallel Mediation Model of Acceleration Experiences Predicting Smartphone Exposure via Justifications

Note. Unstandardized regression coefficients are reported. The *p*-values are in parentheses after *b*-coefficients. Non-significant effects are in gray font for better clarity. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 5000 samples.

R^2 of the depicted model is 15.6%. Total effect b = .14 (p = .045). Only the indirect effect via FOMO is significant (b = .10; Boot SE .04 [.034, .178]).

8.6.3 **Conclusion—Negative Experiences, Justifications, & Persistence**

The negative experiences factor 1 consists of experiences that might occur due to adaptation of the device into our daily lives. So, maybe people would only retrospectively justify their behavior, but without having to find a reason, it seems to be mostly taking place in a nonconscious way. For instance, people do not realize that they walked in their Media Bubble; let the smartphone interrupt other activities, leading them to lose time, too; or that they checked

it once more rather automatically—until these negative aspects have occurred. So, after it happened, people might say they still use it because they would not want to miss out on what acquaintances were doing but it might just not be conscious in the very moment when the behavior is taking place. This would help to clarify why some negative experiences explain 29% of variance of frequent use even though they were judged as negative experiences. In this case, FOMO or Need-Balance might be justifications but only in retrospect. The justifications are not "necessary" to check the phone persistently despite negative outcomes since these adaptation experiences are just not happening intentionally. A model containing all justifications supported this assumption. Of course, the data did not allow for causal conclusions but during the interviews justifications were thought about in retrospective only and the wording of the questionnaire was retrospective as well. Longitudinal data are necessary to draw conclusions that go beyond these primary inferences.

For the acceleration experiences, the picture is different as this factor consists of stressful experiences that barely explain by themselves why use would remain persistent. Combined in a model with the first factor, they even have a tendency—but get overrun by the daily habitualized behaviors subsumed under factor 1—to lead to less frequent use as would be expected using common sense. When a justification was entered as a mediator, more variance could be explained. Meaning, a person might decide to condone being constantly available, stressed by a plethora of insignificant messages, and possibly even a feeling of changed communication when computer-mediated because FOMO (explaining the most unique variance) is a sufficient justification to do so.

The negative experiences might not occur as separately in everyday life as they were measured in this study. Presumably, they rather take place as a chain of experiences. For instance, checking the phone might happen automatically and a person might be annoyed by the insignificance or plethora of (insignificant) messages as well as briefly reminded of the stress it causes. However, it will come to a nonconscious checking behavior again, and that time with a positive (i.e., need-fulfilling) outcome, maybe even positive and negative experiences during the same "checking session". So, the reported results are a first approximation towards finding an explanation of everyday negative experiences through possible justifications for them. The social aspects of smartphone use for condoning also its dark sides were stressed during the interviews. The results, especially for the second factor of negative experiences (not just FOMO, but also the social factor explaining variance of frequent use as well), was another indicator for the power of social commitment guiding behaviors, even if they are not always beneficial for a user.

The indirect effects were very small in all analyses, which poses a limitation of the reported results. However, the previously indicated influence of FOMO as a justification that might lead to more exposure, even though the experiences are not gratifying, became prevalent in comparison to the other justifications once more, especially for the acceleration experiences.

8.7 More Variables Influencing Persistent Negative Experiences

This project originated with the U&G and the extension of the model to help explaining its very shortcoming: non-gratifying or even negative experiences with the smartphone yet persistent use. Justifications explained some more of the variance of frequent use despite negative experiences, but other variables must be involved as well. Interviews and theory hinted towards some variables that might contribute to the explanation of frequent use of the smartphone: needs, habit, self-control, and loneliness. Their assumed influence will be examined in the following paragraphs.

The descriptive statistics for the remaining scales are shown at the beginning of this section (see Table 24): The U&G and SHRI scales were answered only a bit above average, indicating that neither U&G- nor SRHI-statements fully applied to the typical smartphone use in this sample. The mean of the respective factors of U&G suggested that social reasons (i.e., U&G F1) were more important than entertainment (i.e., U&G F2) or a feeling of companionship (i.e., U&G F3, safety and not feeling lonely) for use of the smartphone.[45] Similarly, the score for self-control suggested that the sample indicated to have relatively high trait self-control, although also not much above average. With the highest average score among the scales, the results of the BMPN indicate that the basic needs were more satisfied than dissatisfied, whereas most participants did not indicate to feel lonely with the lowest average score compared to the other scales.

The model (containing the bivariate correlations of the variables, see Figure 11) will be analyzed consecutively, followed by a concluding integrated analysis considering the previous findings. One part of the model has already been analyzed: the part down to the right which depicts the connection of negative experiences and smartphone exposure (see Section 8.3) as well the influence of justifications (see Section 8.6). In the following sections, the role of U&G and the needs' influence on frequent exposure to the smartphone will be examined as well as the relationship to the negative experiences and the influence of habitual use on persistency.

[45] It must be noted that this difference is purely descriptive and was not tested for statistically.

This will be followed by the addition of the influence of trait self-control, loneliness, and satisfaction of basic needs (SDT).

Table 24

Descriptive Statistics of the Remaining Scales

Scale	*n*	Min	Max	*M*	*SD*
U&G scale	264	1.00	5.73	3.46	.90
U&G factor 1	264	1.00	6.00	3.87	1.07
U&G factor 2	264	1.00	6.00	3.42	1.19
U&G factor 3	264	1.00	6.00	2.52	1.32
BMPN	264	2.06	5.88	4.43	.74
SRHI	264	1.00	6.00	3.63	1.19
SCS-K-D	264	1.85	5.92	3.89	.86
ULS-8	264	1.00	5.86	2.15	.91

Note. Factor 1 = social interaction – self-presentation; factor 2 = entertainment – relaxation; factor 3 = safety – loneliness. Statistics for the entire U&G scale depicted for reasons of completeness.

8.7.1 U&G and Persistent Smartphone Use

Expectations of need gratification via smartphone use depend on social and psychological origins which cause needs to be experienced in the first place—this is what the original model proposes (Katz, Blumler, et al., 1973). This section covers the basic needs and their assumed influence on the expectations towards need gratification via smartphone as well as the relationship with usage frequency. It also examines the influence of trait self-control on the expectations.

More satisfied basic needs predicted fewer expectations towards the smartphone to gratify needs—except for entertainment-needs (see the bivariate correlation analyses as shown in Figure 11). This supports H4: “The more satisfied the basic needs are, the less need gratification is sought via smartphone”. The same was true for self-control: If the trait was better developed, the expectations towards smartphone use for gratification of needs were fewer (this was the case for all U&G factors). The correlations are very small, so they should be interpreted with caution. However, they might indicate that someone with better satisfied basic needs, especially less dissatisfaction of relatedness and competence (for details see appendix, Figure A 4), has no need to depend on the smartphone for obtaining these gratifications.

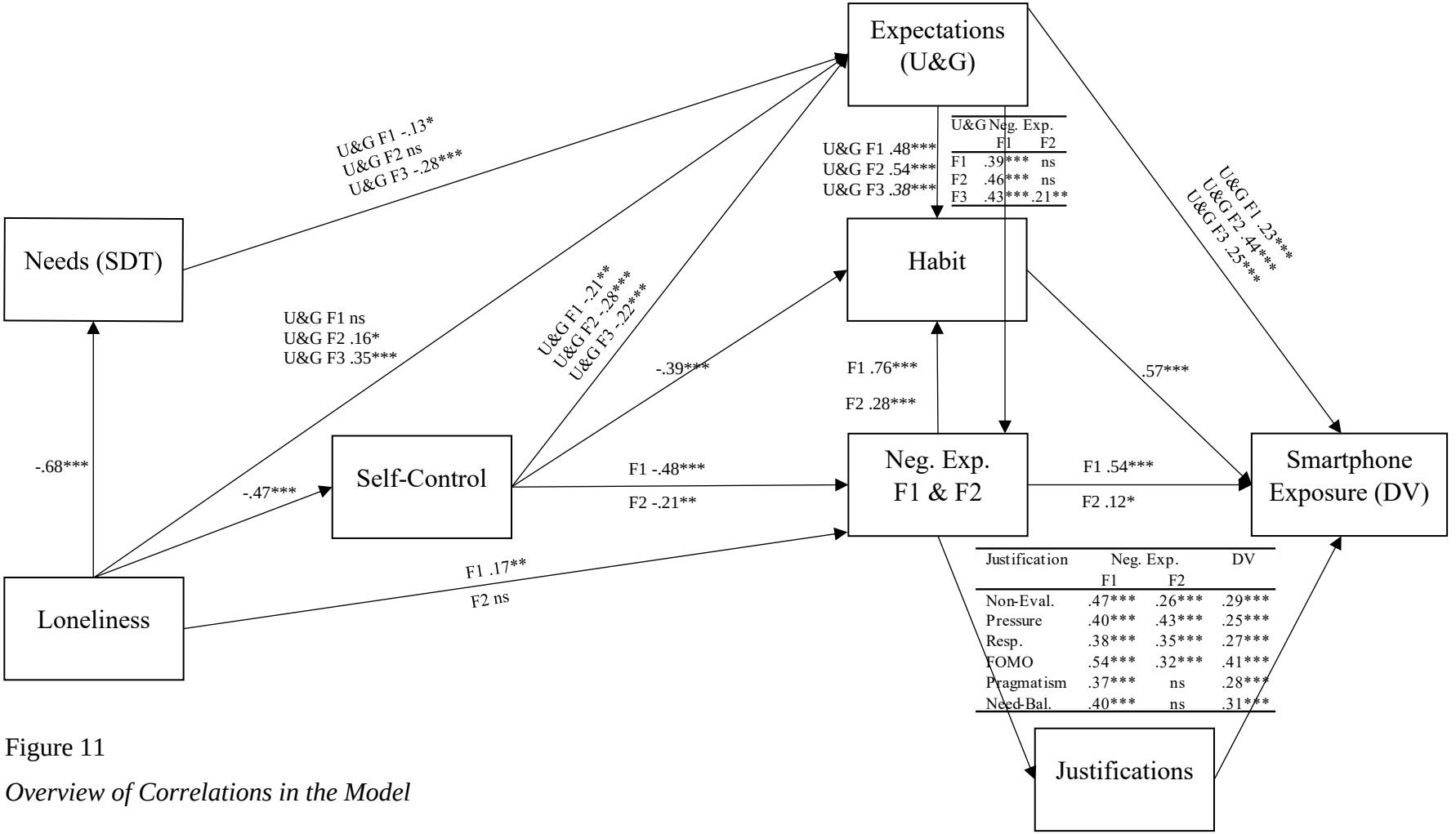

Figure 11

Overview of Correlations in the Model

Note. Pearson correlation coefficients (*r*) are shown. *F* stands for factor. Only factors of the U&G and the negative experiences are shown, otherwise the scale mean was used. Correlations of Neg. Exp. and Justifications based on those calculated per factor (*n* for justifications of factor 1 = 259). A model containing all correlation coefficients (incl. factors, according to the EFA, of SRHI, BMPN, and ULS-8) can be found in the appendix (Figure A 4).
* $p < .05$, ** $p < .01$, *** $p < .000$.

Self-control is keeping us from performing actions that are not beneficial for us in the long run and is, hence, associated with many beneficial outcomes. So, it is unsurprising, that this trait correlates negatively with the U&G needs, especially the entertainment factor (U&G F2), which is in accordance with findings of previous research (e.g., Panek, 2012). The coefficients are very small, but they might still point to the possibility that people with higher trait self-control are more consciously aware of their actions and, thus, also of alternatives to media use for need fulfillment (even though the smartphone is easily *and* always available). It could also indicate that people scoring high on the self-control scale do not indulge in this behavior because the hoped-for need gratification is not a guaranteed outcome. The correlations with negative experiences (r = -.48, p < .000 for adaptation and r = -.21, p < .01 for acceleration experiences) and frequent smartphone use (r = -.20; p < .01; not depicted in the model) point to this conclusion as well. Expectations of need gratification via smartphone are positively correlated to a more frequent use which is, again, particularly the case for the entertainment factor, explaining 19% of variance in smartphone exposure (as opposed to 4.9% through the U&G social factor (U&G F1) and 5.6% via the U&G safety factor (U&G F3)). This supports H5: "The more positive expectations someone has towards need gratifications through the smartphone, the more frequently they use it". This is also in accordance with the basic assumption of the U&G: With a gratification of needs via media comes a repetition of this behavior to get the same effect again—and this is where an actively chosen behavior might turn onto the road towards becoming a habit. As stated before, one basic for the development of a habit is repetition. Thus, we learn that a need will—more or less reliably—be gratified by using the smartphone, so we tend to it, but we no longer actively choose to do so every time.

8.7.2 **U&G and Negative Experiences**

According to the U&G, a non-gratification of needs should result in an abstinence from the respective behavior, but it is already known that is not the case when it comes to smartphone use. So, need gratification and negative experiences should not be at the opposite extremes of one continuum but two entirely different experiences—use is either followed by need-fulfillment or not. Conversely, a first analysis of data did not support this assumption. That is, negative experiences and (some) needs were even positively correlated (see Figure 11), which is contradictory to H6 ("The more the expected need gratifications occur, the fewer negative experiences are reported"). This might be surprising at first but, as illustrated in the model, an explanation of these positive correlations could lie in the influence of another variable: habit,

for instance. When exploring these relationships, mediation analyses could support this assumption: Habitual use mediated the effect of U&G F1 on negative experiences (both factors) fully while explaining almost 59% of variance in factor 1 and 8.4% in factor 2 (see Figure 12). However, the model for acceleration experiences turned out to be an inconsistent effect model with the total effect being non-significant. Since the total effect is the sum of indirect and direct effect, opposite signs can easily lead to a non-significant and/or small total effect because they cancel each other out. Significant indirect effects are, therefore, still useful to examine; they are the core of mediation analysis and they help to detect how the variables are related and if sequences are plausible and as derived from theory (cf. MacKinnon et al., 2002).

Habit also mediated the effect of U&G F2 on adaptation experiences fully and, for these U&G needs as well, explained almost 59% of variance. The mediation model for acceleration experiences (Figure 13) also proved to be an inconsistent effect model and would explain almost 11% of variance. Habit mediated the effect partially while the effect of these social U&G needs was small, but negative—as would be expected according to the approach and was, hence, proposed in H6. The total effect for U&G F3 was significant and habit explained almost 61% in variance of adaptation experiences while partially mediating the effect and 9% of variance, fully mediating the effect of needs on these negative experiences (see Figure 14). The positive effect of U&G F3 on the adaptation experiences is not surprising when considering the meaning of the two needs subsumed under this factor: The factor depicts a need for safety as well as well as the longing to not feel alone, sort of a feeling of companionship induced by the smartphone. So, habitually carrying the phone, possibly with this need in mind (at least, before it becomes a habit), might explain this small coefficient, predicting the negative experiences that are associated with learned and routinized behavior.

To conclude, even though the consideration of the influence of habitual use led to smaller or even non-existing direct effects for all U&G needs, the explained variance, especially of the acceleration experiences, clearly indicated that other variables are needed to explain the relationship of U&G needs and negative effects. However, it was a first step towards explaining their co-existence and their influence on smartphone exposure, respectively. The latter will be covered in the next section.

8.7.3 **U&G, Negative Experiences, & Persistent Use**

So, habit was one factor influencing the relationship of U&G and negative experiences, yet another possible explanation of this relationship could lie in smartphone exposure itself,

since need gratification and negative experiences take place all the time and do not exclude but presumably rather alternate each other. As smartphone use is frequent in everyday life, so are all kinds of experiences with it, beneficial and detrimental alike; and overall, as argued before, uses might outweigh the detriments so that smartphone use per se is not quit. To test this assumption, a hierarchical regression analysis was conducted. It provided statistical evidence for a co-existence of satisfying as well as non-satisfying experiences in daily use.

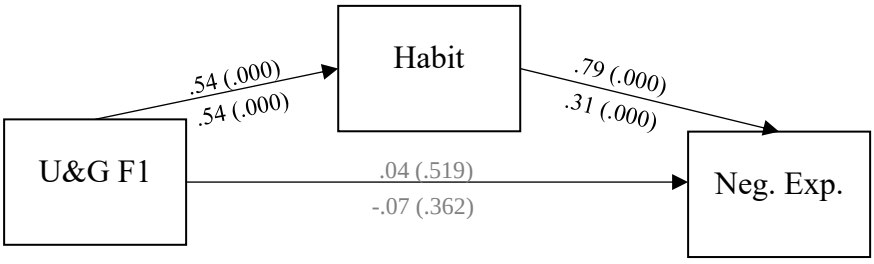

Figure 12

Exploring the Connection of Social Needs and Negative Experiences

Note. The *p*-values are in parentheses after *b*-coefficients. Non-significant effects are in gray font for better clarity. Coefficients for Neg. Exp. F1 above the arrows, for Neg. Exp. F2 underneath them.

The model for Neg. Exp. F1 explains 58.6% of variance. Total effect $b = .46$, $p < .000$. Indirect effect $b = .43$, Boot *SE* .06, 95% BCa CI [.314, .542].
The model for Neg. Exp. F2 explains 8.4% of variance. Total effect $b = .10$, $p = .167$. Indirect effect $b = .17$, Boot *SE* .04, 95% BCa CI [.092, .250].

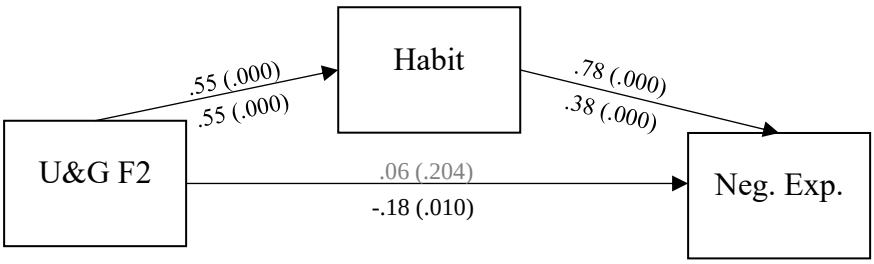

Figure 13

Exploring the Connection of Entertainment Needs and Negative Experiences

Note. The *p*-values are in parentheses after *b*-coefficients. Non-significant effects are in gray font for better clarity. Coefficients for Neg. Exp. F1 above the arrows, for Neg. Exp. F2 underneath them.

The model for Neg. Exp. F1 explains 58.8% of variance. Total effect $b = .49$, $p < .000$. Indirect effect $b = .42$, Boot *SE* .04, 95% BCa CI [.340, .507].
The model for Neg. Exp. F2 explains 10.5% of variance. Total effect $b = .03$, $p = .712$. Indirect effect $b = .21$, Boot *SE* .04, 95% BCa CI [.128, .280].

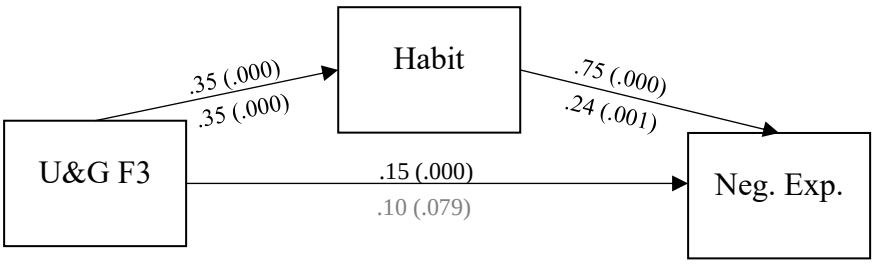

Figure 14

Exploring the Connection of Safety Needs and Negative Experiences

Note. The *p*-values are in parentheses after *b*-coefficients. Non-significant effects are in gray font for better clarity. Coefficients for Neg. Exp. F1 above the arrows, for Neg. Exp. F2 underneath them.

The model for Neg. Exp. F1 explains 60.6% of variance. Total effect $b = .41$, $p < .000$. Indirect effect $b = .26$, Boot *SE* .04, 95% BCa CI [.185, .334].
The model for Neg. Exp. F2 explains 9.2% of variance. Total effect $b = .18$, $p = .001$. Indirect effect $b = .08$, Boot *SE* .03, 95% BCa CI [.035, .131].

The negative experiences were entered in the first block because the previous analyses established that they predicted frequent use. Justifications contributed to the explanation of variance, so they were entered in the second block. Previous research and first correlation analyses in this study indicated that expectations towards need gratification also lead to frequent use of the smartphone (e.g., Karapanos et al., 2016; Quan-Haase & Young, 2010), so the U&G factors were entered in the third block. The results can be seen in the appendix, Table A 23: The negative experience factors explained 29.6% of variance of frequent use (first block). The justifications did not add significantly to R^2 with FOMO as only significant justification. The entertainment-factor (U&G F2) added significantly to the explanation of variance (but only 3.6%) resulting in 33.2% explained variance in the model (up to step 3). The predictors in the third model were adaptation experiences ($b = .48$, $SE = .08$, $p < .000$), FOMO ($b = .19$, $SE = .09$, $p < .05$), and U&G entertainment needs ($b = .27$, $SE = .07$, $p < .000$).

8.7.4 Habit as Link between U&G, Negative Experiences, & FOMO

Habits as measured with the SRHI already explained to some extent why we would indulge in persistent negative behaviors, although we recognize them as such. When habit was added to the model explaining frequent smartphone exposure, variance explanation improved significantly to 37.3% but also led to U&G F1 changing into a significant (negative) predictor (see also appendix, Table A 23). So, according to this model, more habitualized use ($b = .40$, $SE = .10$, $p < .000$), more adaptation experiences ($b = .27$, $SE = .09$, $p < .01$), greater FOMO

(b = .22, SE = .09, p < .05), and stronger entertainment needs (b = .19, SE = .07, p < .01) predicted more frequent use of the smartphone, and so did a lower need for social interaction (b = -.20, SE = .08, p < .01).

Since the correlation between U&G social needs and smartphone exposure was positive before entering the other variables (i.e., not just the U&G factors) into the model, this might have caused another (suppressor) effect to occur. Hayes (2018) urges researchers in case of effects like this to look for an explanation rather than just giving it a name. Considering his recommendation and what it means to look at a correlation between needs and smartphone use frequency (or a linear regression without consideration of other variables' influences) as opposed to the needs (factors in this case) not as isolated but always also affected by other variables (e.g., characteristics of the person, current environment,...), specific needs for social contact and self-presentation may under certain circumstances (i.e., in association with other variables) lead to less usage of the smartphone. It might, thus, be that when habits are entered to explain use, the part of the variance of the U&G scale that is *not* habitualized might explain further, and potentially more specific, situation-dependent social needs. That is, people who are more selective/conscious in their needs for interaction with others might use the smartphone less to fulfill these needs as opposed to those who have less specific, more habitualized, needs for contact. In fact, testing this with the data by entering either negative experiences factor 1 (b = -.06, ns) or Pressure (b = -.00, ns) or FOMO (b = -.09, ns) into a linear regression model (DV smartphone exposure, IV U&G factor 1) shows that this influence of other variables leads to the change in sign; and finally entering the SRHI to statistical significance.

Still, a great part of our daily lives is not consciously planned, as habits "take over" to lower cognitive load (e.g., Wood, 2019) and also our use of mobile devices often takes place out of habit (e.g., LaRose, 2010a; Schnauber-Stockmann & Naab, 2019). Accordingly, routinized everyday use can override other strategies of need-fulfillment if strategies have been habitualized. This is what might happen in everyday use of the smartphone and explain why use takes place even without a conscious decision or despite negative experiences (unless we consciously disrupt or avoid this behavior—this will be examined with the influence of self-control, starting in Section 8.7.6). Mediation analyses (see Figure 15 and Figure 16) supported this assumption and showed that, no matter if the coefficient was positive or negative, habit mediated use as did the strongly correlated (r = .77, p < .000) adaptation experiences. The direct negative effect of the U&G social factor (that is, U&G F1) was not significant anymore but the indirect effects via habit (b = .24, Boot SE .05, 95% BCa CI [.137, .350]) and adaptation experiences (b = .10, Boot SE .04, 95% BCa CI [.016, .189]) were (see Figure 15).

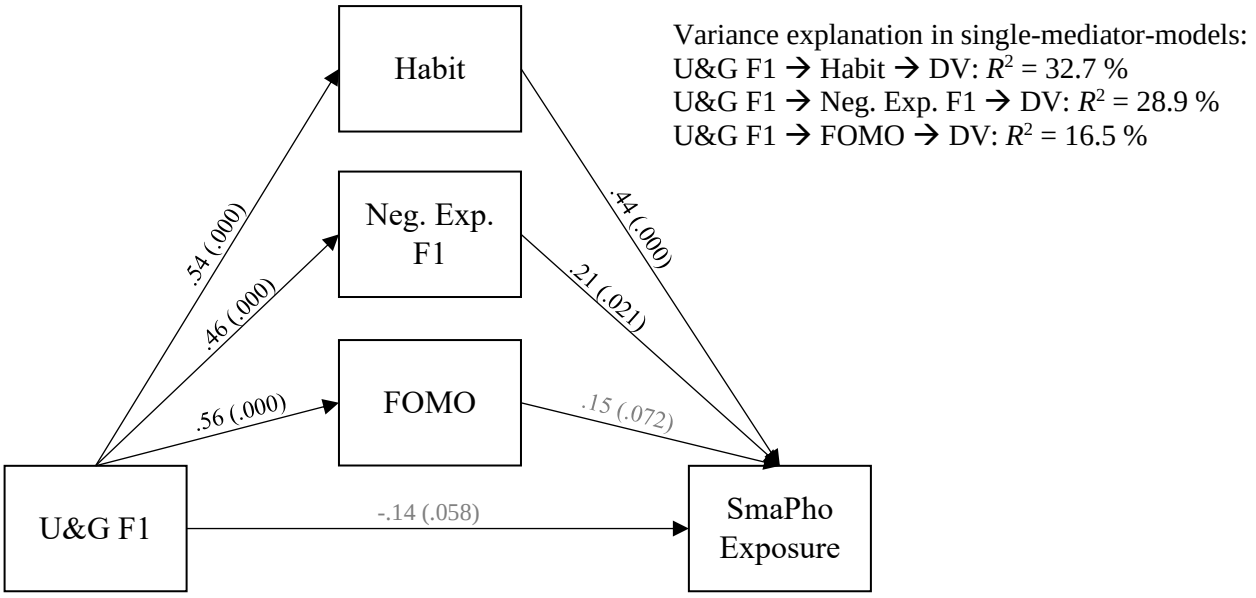

Figure 15

Model of Social Needs Predicting Frequent Smartphone Use Mediated by Habit, Adaptation Experiences, and FOMO

Note. Unstandardized regression coefficients are reported. The *p*-values are in parentheses after *b*-coefficients. Non-significant effects are in gray font for better clarity. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 5000 samples.

The model explains 36.4% of variance of smartphone exposure. Total effect $b = .28$, $p < .000$. Indirect effect for habit $b = .24$, Boot SE .05, 95% BCa CI [.137, .350]. Indirect effect for Neg. Exp. 1 $b = .10$, Boot SE .04, 95% BCa CI [.016, .189]. Indirect effect via FOMO ns.

The same was true for the U&G entertainment needs (i.e., U&G F2), even though the direct effect was positive ($b = .17$, $p = .01$). The indirect effects via habit ($b = .18$, Boot *SE* .05, 95% BCa CI [.072, .282]) and adaptation experiences ($b = .10$, Boot *SE* .05, 95% BCa CI [.019, .198]) showed a mediation effect via these variables (see Figure 16).

It is important to note that habit as only mediator explains the most variance in both models but also as individual mediator in a one-mediator model (with either U&G factor 1 or 2 as X and smartphone exposure as Y). Habitual use of the smartphone also mediates the negative experiences' association with smartphone exposure as depicted in Figure 17 and Figure 18. When FOMO is added, variance explanation rises only around 6% for the adaptation factor (Neg. Exp. F1), with the effect of FOMO *not* being statistically different from chance (see Figure 19).

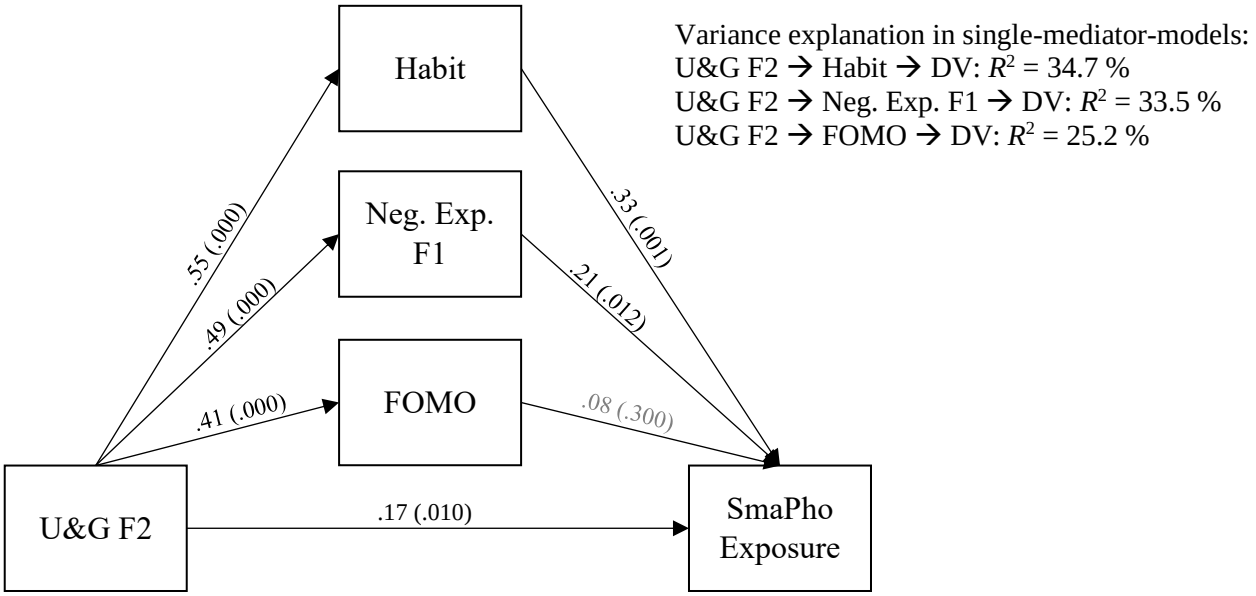

Figure 16

Model of Entertainment Needs Predicting Frequent Smartphone Use Mediated by Habit, Adaptation Experiences, and FOMO

Note. Unstandardized regression coefficients are reported. The *p*-values are in parentheses after *b*-coefficients. Non-significant effects are in gray font for better clarity. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 5000 samples.

The model explains 37.2% of variance of smartphone exposure. Total effect b = .48, p < .000. Indirect effect for habit b = .18, Boot SE .05, 95% BCa CI [.072, .282]. Indirect effect for Neg. Exp. 1 b = .10, Boot SE .05, 95% BCa CI [.019, .198]. Indirect effect via FOMO ns.

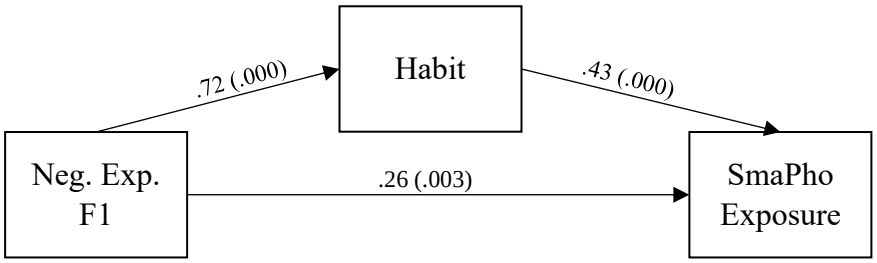

Figure 17

Model of Adaptation Experiences Predicting Frequent Smartphone Use Mediated by Habit

Note. Unstandardized regression coefficients are reported. The *p*-values are in parentheses after *b*-coefficients. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 5000 samples.

The model explains 34.9% of variance of smartphone exposure. Total effect b = .57, p < .000. Indirect effect b = .30, Boot *SE* .07, 95% BCa CI [.187, .438].

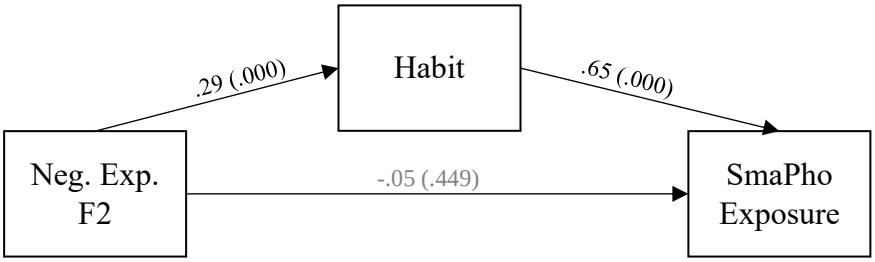

Figure 18

Model of Acceleration Experiences Predicting Frequent Smartphone Use Mediated by Habit

Note. Unstandardized regression coefficients are reported. The *p*-values are in parentheses after *b*-coefficients. Non-significant effects are in gray font for better clarity. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 5000 samples.

The model explains 32.6% of variance of smartphone exposure. Total effect $b = .14$, $p = .045$. Indirect effect $b = .19$, Boot *SE* .04, 95% BCa CI [.106, .278].

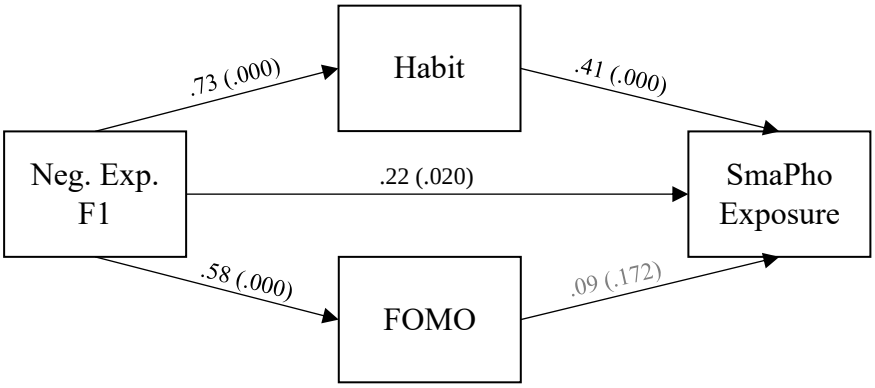

Figure 19

Model of Adaptation Experiences Predicting Frequent Smartphone Use Mediated by Habit and FOMO

Note. Unstandardized regression coefficients are reported. The *p*-values are in parentheses after *b*-coefficients. Non-significant effects are in gray font for better clarity. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 5000 samples.

The model explains 34.5% of variance of smartphone exposure. Total effect $b = .57$, $p < .000$. Indirect effect for habit $b = .30$, Boot *SE* .07, 95% BCa CI [.024, .485]. Indirect effect via FOMO ns. Sample size $n = 259$.

In contrast, the addition of habit made a difference in explaining negative experiences associated with acceleration in daily life (Neg. Exp. F2, Figure 20): FOMO as individual mediator explained 13.9% of daily use (see Section 8.6.2), but the model explained 33.9% when habit was included. Additionally, both indirect effects differ significantly from each other with habit being the larger one ($b = .12$, Boot *SE* .05, 95% BCa CI [.022, .226]). The analyses of the other justifications that were only significant when analyzed for individually (see Sections 8.6.1 and 8.6.2) were similar and just as impressive with regards to the explanation of variance (of Neg. Exp. F2) via habit; they can be found in the appendix (Figure A 5 and Figure A 6).

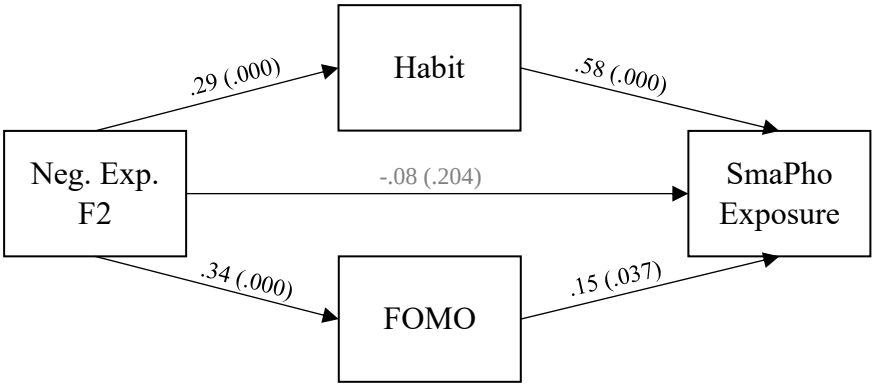

Figure 20

Model of Acceleration Experiences Predicting Frequent Smartphone Use Mediated by Habit and FOMO

Note. Unstandardized regression coefficients are reported. The *p*-values are in parentheses after *b*-coefficients. Non-significant effects are in gray font for better clarity. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 5000 samples.

The model explains 33.9% of variance of smartphone exposure. Total effect $b = .14$, $p = .045$. Indirect effect for habit $b = .17$, Boot *SE* .04, 95% BCa CI [.092, .256]. Indirect effect for FOMO $b = .05$, Boot *SE* .03, 95% BCa CI [.005, .105].

8.7.5 Habitual and Conscious Use are NOT Mutually Exclusive

As can be derived from the previous mediation analyses (e.g., Figure 15, Figure 16) and the associations depicted in the model (see Figure 11), U&G and habit are moderately correlated. But how can an active choice to tend to the smartphone to fulfil needs and habitual use, which supposedly takes place without prior conscious intentions for need-fulfillment, be related?

Previous research suggested that smartphone use can be divided into instrumental (that is, for need-fulfillment) and ritualistic use (that is, out of habit; Hiniker et al., 2016). Accordingly, active use to fulfil needs and habitual everyday usage are not mutually exclusive (see also Rubin, 1984), just as need-fulfilling and need-thwarting experiences are not. Even in a longitudinal study would it hardly be possible to disentangle these two as habits form via regular use (amongst other factors that are facilitating habit-formation, see Section 2.4). The smartphone is used permanently, not to mention its vast penetration; so, it would nearly be impossible for a study to capture the onset of use and habit formation, respectively. It is probable, though, that an important factor connecting these two is the frequent exposure to the smartphone. Mediation analyses (one for each factor of the U&G scale) confirmed this assumption (see appendix, Figure A 7, Figure A 8, and Figure A 9). Of course, with the variance explanation ranging from 39% to 46%, it is probable that other variables influence this connection

as well, others involved in habit formation of smartphone use, for instance. Still, this helps to explain the correlations of needs (or, need factors) and habitual use a bit more. The resulting correlations were contradictory to H7 ("The more habitualized the use of the smartphone is, the less it is actively used for need-gratification."), whereas H8 ("The more habitualized the use of the smartphone, the more frequent the use") and H9 ("The more habitualized the use of the smartphone, the more negative experiences are reported") were supported by the results reported in this section as well as those depicted in Figure 11.

To recap, habitual use might define our everyday smartphone use significantly. But, as LaRose put it so aptly "media habits are not entirely 'ballistic' (…) once started. Media habits are subject to conscious override, or may be incorporated in complex scripts that include both habitual and volitional media consumption behaviors" (2010a, p. 217). Self-control is one important variable which has been shown to influence habits and behavior to a great extent, especially by leading to the formation of "good habits" (for an overview see Wood, 2019). The following section is dedicated to look at the association of self-control and habits in this sample, guided by the question: Does self-control influence habits and, thus, the frequency of smartphone use—and its positive as well as negative outcomes, respectively?

8.7.6 Self-Control Influences Habitual Use and Negative Experiences

The correlation analyses (see model, Figure 11) allowed for a first confirmation of the theoretically derived influence of self-control as this trait correlates negatively with expectations of need-gratification, habitual use of the smartphone, and with negative experiences, correspondingly. Mediation analyses showed that self-control predicted a less habitualized usage of the smartphone in everyday life and fewer negative experiences consequently. The strong correlation of habitual use and the adaptation experiences became apparent again as the model explained almost 63% of variance of frequency of the respective negative experiences (see Figure 21). Whereas the direct effect of self-control was still significantly different from chance, this was not the case for the experiences subsumed under factor 2, with habit fully mediating the influence of self-control. However, the model (Figure 22) explained only 9% of variance, suggesting that variables other than self-control and habit are important to determine a less frequent occurrence of these experiences.

Smartphone use was only marginally correlated with self-control (r = -.20, p < .01) and mediation analysis showed that frequent use was not directly affected by self-control. However, mediated by habit, higher trait self-control led to a less frequent exposure to one's mobile device

(Figure 23). Considering the explanation of variance with 32.5%, it is obvious that habit explains almost all of it on its own. What is important here, however, is the influence of self-control turning the otherwise positive effect of habit into a negative one, leading to less exposure (and less negative experiences as well).

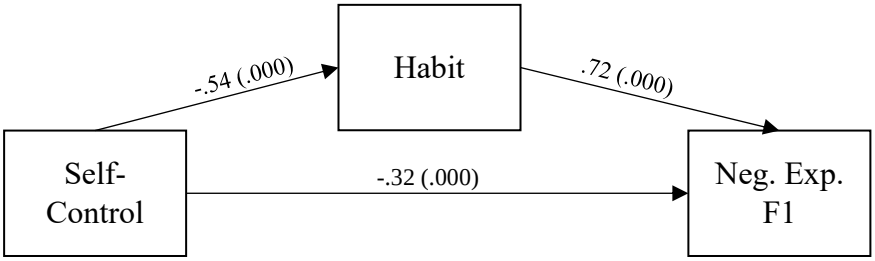

Figure 21

Model of Self-Control Predicting Frequent Adaptation Experiences Mediated by Habit

Note. Unstandardized regression coefficients are reported. The *p*-values are in parentheses after *b*-coefficients. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 5000 samples.

The model explains 62.6% of variance of frequency of the respective negative experiences as subsumed under Factor 1. Total effect b = -.70, p = .000. Indirect effect for habit b = -.39, Boot *SE* .06, 95% BCa CI [-.505, -.273].

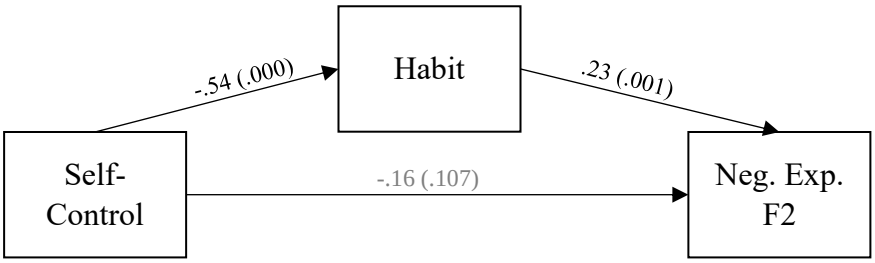

Figure 22

Model of Self-Control Predicting Frequent Acceleration Experiences Mediated by Habit

Note. Unstandardized regression coefficients are reported. The *p*-values are in parentheses after *b*-coefficients. Non-significant effects are in gray font for better clarity. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 5000 samples.

The model explains 9.1% of variance of frequency of the respective negative experiences as subsumed under Factor 1. Total effect b = -.28, p = .001. Indirect effect for habit b = -.13, Boot *SE* .04, 95% BCa CI [-.213, -.052].

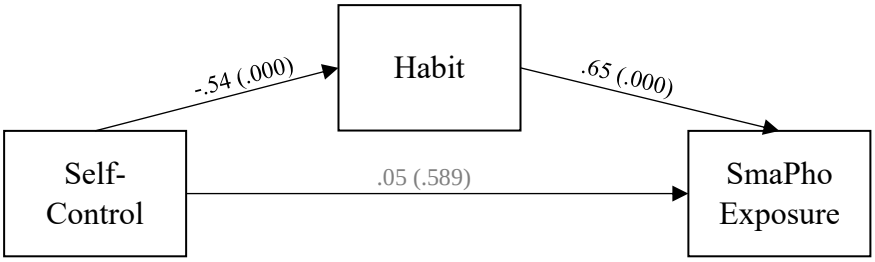

Figure 23

Model of Self-Control Predicting Smartphone Exposure Mediated by Habit

Note. Unstandardized regression coefficients are reported. The *p*-values are in parentheses after *b*-coefficients. Non-significant effects are in gray font for better clarity. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 5000 samples.

The model explains 32.5% of variance of frequency of smartphone exposure. Total effect b = -.30, p = .002. Indirect effect for habit b = -.35, Boot *SE* .06, 95% BCa CI [-.468, -.243].

The same explanation was applicable for the second factor when negative experiences were added to the model predicting smartphone exposure (see Figure 24 and Figure 25): it led to only a small improvement of variance explanation for the first and almost none for the second factor of negative experiences. This, again, stresses the crucial role of habit in everyday smartphone use. To demonstrate this furthermore, two serial models were calculated additionally (they can be found in the appendix, Figure A 10 and Figure A 11). These models depict how the effect of habit on the negative experiences leads to a decrease of the *b*-coefficients (shown in Figure 24 and Figure 25) between self-control and the respective negative experience factor.

To summarize, self-control influences habits in a way that more trait self-control leads to better habits (or less habitual smartphone use, as it was surveyed in this study) and, thus, fewer negative experiences. Accordingly, H10 (“The higher someone indicates their trait self-control to be, the fewer habitual use of the smartphone they report.”) was supported and the presented findings are in line with previous research (e.g., Bayer, Dal Cin, et al., 2016; Oulasvirta et al., 2012). Considering only the correlation analyses plotted in Figure 11 would result in the assumption that habit always leads to more (positive correlation) use of the smartphone. With self-control included, however, it can be assumed that habitual use does not automatically mean that use is more frequent and, with regards to negative experiences, would always lead to “more”. This depends on the level of trait self-control. The hypothesized bivariate effect on negative experiences of H11 (“The higher someone indicates their trait self-control to be, the fewer negative experiences they report”) could be supported for the bivariate correlations shown in the model. However, taking into consideration that the direct effect of self-

control on negative experiences disappeared in the mediation analysis reported in this section for the second factor, would limit the (full) acceptance of H11.

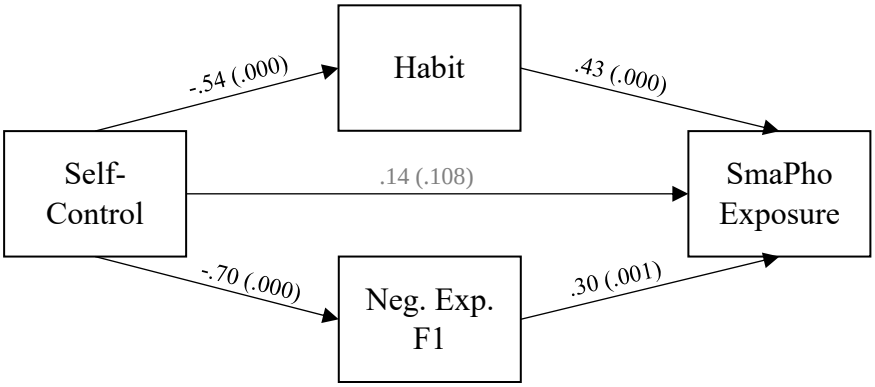

Figure 24

Parallel Model of Self-Control Predicting Smartphone Exposure Mediated by Habit and Adaptation Experiences

Note. Unstandardized regression coefficients are reported. The *p*-values are in parentheses after *b*-coefficients. Non-significant effects are in gray font for clarity. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 5000 samples.

The model explains 36.6% of variance of frequency of smartphone exposure. Total effect b = -.30, p = .002. Indirect effect for habit b = -.23, Boot *SE* .06, 95% BCa CI [-.358, -.128]. Indirect effect for Neg. Exp. F1 b = -.21, Boot *SE* .07, 95% BCa CI [-.262, -.069].

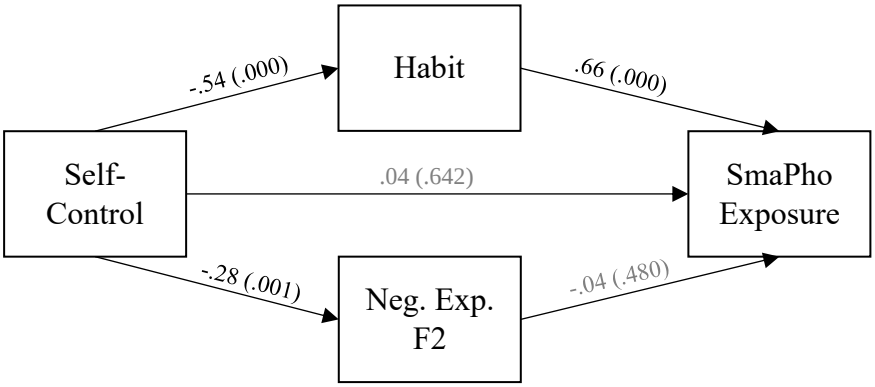

Figure 25

Parallel Model of Self-Control Predicting Smartphone Exposure Mediated by Habit and Acceleration Experiences

Note. Unstandardized regression coefficients are reported. The *p*-values are in parentheses after *b*-coefficients. Non-significant effects are in gray font for clarity. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 5000 samples.

The model explains 32.6% of variance of frequency of smartphone exposure. Total effect b = -.30, p = .002. Indirect effect for habit b = -.36, Boot *SE* .06, 95% BCa CI [-.460, -.235]. Indirect effect for Neg. Exp. F2 *ns.*

So, what about the found negative influence of self-control on the U&G needs and the respective exposure to the smartphone? As shown before (see Section 8.7.1), self-control also correlates negatively with the U&G needs (with all factors, but only small), supporting H12 ("The higher someone indicates their trait self-control to be, the less they intend to fulfill their needs via smartphone use"). However, with habit included, a mediation-effect for these positive experiences became apparent just as in the previous section for the negative experiences and smartphone exposure (see Figure 26, Figure 27, and Figure 28). Accordingly, habitual use explains how higher self-control could have a negative effect on smartphone use for need-fulfillment. The direct effect(s) on need-fulfillment, as proposed in H12, ceased to exist when other variables were controlled for and, as a result, the insights of the multivariate analyses would lead to a rejection of the hypothesis.

To conclude, self-control influences smartphone exposure negatively via three mediating variables: habitual use, adaptation experiences, and U&G entertainment needs. All other indirect effects were not statistically significant when the variables analyzed in this section were controlled for in a parallel mediation model (see Figure 29).

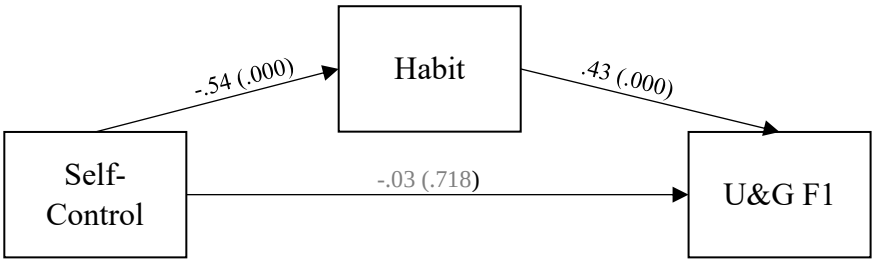

Figure 26

Model of Self-Control Predicting Social Needs Mediated by Habit

Note. Unstandardized regression coefficients are reported. The *p*-values are in parentheses after *b*-coefficients. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 5000 samples.

The model explains 23.3% of variance of U&G Factor 1. Total effect $b = -.26$, $p = .001$. Indirect effect for habit $b = -.23$, Boot *SE* .05, 95% BCa CI [-.332, -.144].

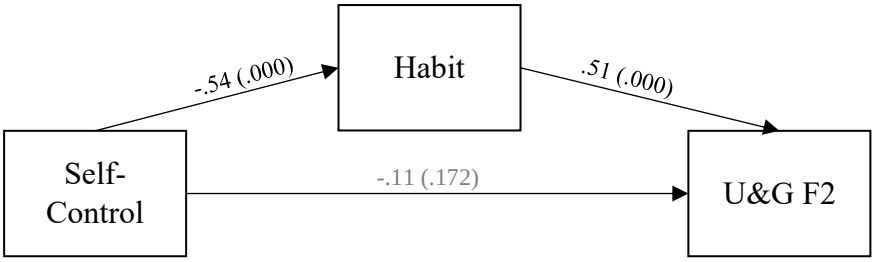

Figure 27

Model of Self-Control Predicting Entertainment Needs Mediated by Habit

Note. Unstandardized regression coefficients are reported. The *p*-values are in parentheses after *b*-coefficients. Non-significant effects are in gray font for better clarity. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 5000 samples.

The model explains 30.1% of variance of U&G Factor 2. Total effect b = -.38, p = .001. Indirect effect for habit b = -.28, Boot *SE* .05, 95% BCa CI [-.387, -.181].

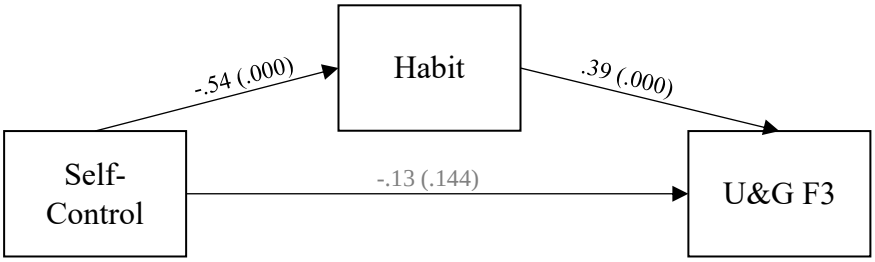

Figure 28

Model of Self-Control Predicting Safety Needs Mediated by Habit

Note. Unstandardized regression coefficients are reported. The *p*-values are in parentheses after *b*-coefficients. Non-significant effects are in gray font for better clarity. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 5000 samples.

The model explains 15.4% of variance of the U&G Factor 3. Total effect b = -.34, p = .001. Indirect effect for habit b = -.21, Boot *SE* .05, 95% BCa CI [-.302, -.125].

8.7.7 The Influence of Loneliness on Negative Experiences

At first glance, loneliness did not seem to play a crucial role in this sample as the averaged response rate on the ULS-8 was the lowest in comparison to the other scales (see Table 24). Additionally, this study's sample perfectly fits the age group that was found to rarely experience loneliness (Cacioppo & Patrick, 2008; Nowland et al., 2018). Nonetheless, correlations were moderate to strong and signaled that people who felt lonelier had less satisfied basic needs—loneliness explained 46% of variance, in fact (see Figure 11), supporting H13: "The more loneliness someone experiences, the less well satisfied are their basic needs.

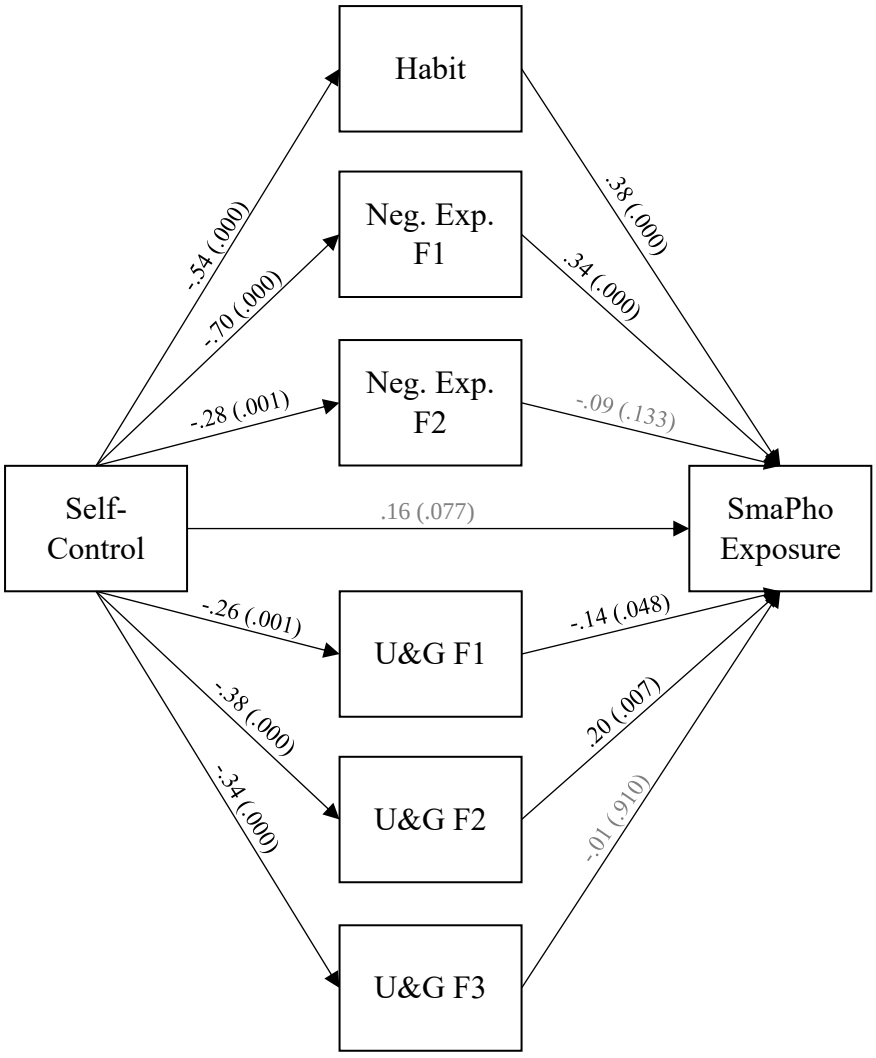

Figure 29

Parallel Model of Self-Control Predicting Smartphone Use Mediated by Habit, Negative Experiences, and U&G Needs

Note. Unstandardized regression coefficients are reported. The *p*-values are in parentheses after *b*-coefficients. Non-significant effects are in gray font for clarity. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 5000 samples.

The model explains 39% of variance of frequency smartphone exposure. Total effect b = -.30, p = .002. Indirect effect 1 (S-C → Habit → DV) b = -.46, Boot *SE* .06, 95% BCa CI [-.322, -.097]. Indirect effect 2 (S-C → Neg. Exp. F1 → DV) b = -.21, Boot *SE* .07, 95% BCa CI [-.383, -.115]. Indirect effect 3 (S-C → Neg. Exp. F2 → DV) *ns.* Indirect effect 4 (S-C → U&G F1 → DV) *ns.* Indirect effect 5 (S-C → U&G F2 → DV) b = -.08, Boot *SE* .03, 95% BCa CI [-.154, -.021]. Indirect effect 6 (S-C → U&G F3 → DV) ns.

More specifically, the need for relatedness satisfaction (r = -.55, p < .000;) and competence dissatisfaction (r = .50, p < .000; appendix, Figure A 4) showed the strongest correlations of the BMPN factors, as could be expected from previous studies (e.g., Cacioppo & Patrick, 2008). These results were in support of H13a: "The more loneliness someone experiences, the less well satisfied is their need for relatedness". The level of loneliness was also moderately related to self-control (r = -.47, p < .000), with an R^2 of 22%, supporting H14 ("The more loneliness

someone experiences, the less trait self-control they indicate to have"). So, the correlations suggest that a greater feeling of loneliness might lead to less self-control as well as thwarted basic needs. This could result in a stronger wish for contact to others and in turn also more negative experiences while trying.

A full mediation effect was found for the effect of loneliness on frequency of negative experiences for the first factor (see Figure 30). Although the indirect effect of loneliness on negative experiences through self-control was significant for all negative experiences, this effect was just small for the acceleration experiences (i.e., factor 2; see Figure 31). The model for factor 2 turned out to be an inconsistent effect model with the total effect being non-significant. In conclusion, more loneliness leads to less self-control and, in turn, more negative effects.

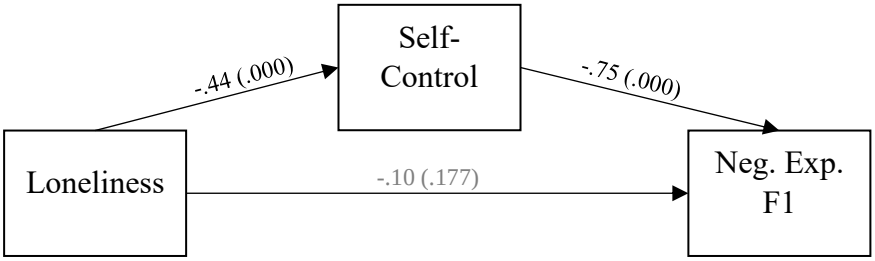

Figure 30

Model of Loneliness Predicting Adaptation Experiences Mediated by Self-Control

Note. Unstandardized regression coefficients are reported. The *p*-values are in parentheses after *b*-coefficients. Non-significant effects are in gray font for clarity. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 5000 samples.

The model explains 23.8% of variance of frequency of negative experiences (factor 1). Total effect $b = .23$, $p = .004$. Indirect effect $b = .33$, Boot *SE* .05, 95% BCa CI [.233, .440].

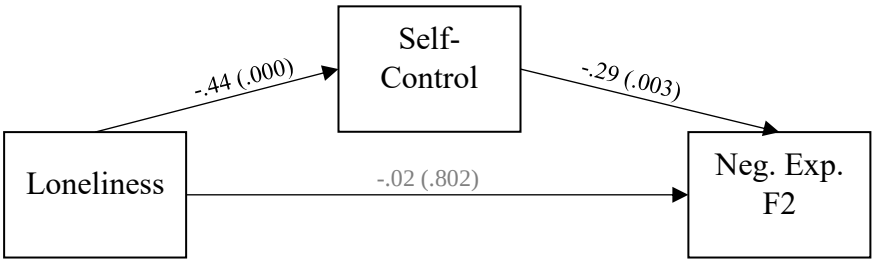

Figure 31

Model of Loneliness Predicting Acceleration Experiences Mediated by Self-Control

Note. Unstandardized regression coefficients are reported. The *p*-values are in parentheses after *b*-coefficients. Non-significant effects are in gray font for clarity. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 5000 samples.

The model explains 4% of variance of frequency of negative experiences (factor 2). Total effect *ns* ($b = .11$, $p = .220$). Indirect effect $b = .13$, Boot *SE* .05, 95% BCa CI [.041, .221].

As shown before, higher trait self-control led to less negative experiences mediated through habit. Consequently, adding habit as a predictor to a serial model (due to the before established path) led to a variance explanation of almost 63% for the adaptation experiences (see Figure 32) and a somewhat better explanation than without habit (R^2 = 9% vs. 4% before) for the acceleration experiences (see Figure 33). Also, self-control no longer significantly predicted the acceleration experiences once habit was controlled for. H15 ("The more loneliness someone experiences, the more negative experiences they report") was supported by the correlation analyses. Conversely, this direct affect disappeared when other variables were entered into a mediation model, and this would lead to a rejection of the hypothesis—if the hypothesis regarded the influence of other variables the way the derived model does.

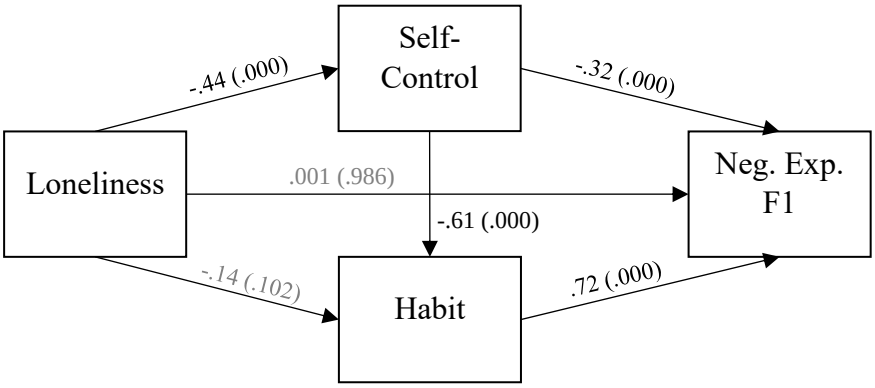

Figure 32

Serial Model of Loneliness Predicting Adaptation Experiences Mediated by Self-Control via Habit

Note. Unstandardized regression coefficients are reported. The *p*-values are in parentheses after *b*-coefficients. Non-significant effects are in gray font for clarity. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 5000 samples.

The model explains 62.6% of variance of frequency of negative experiences (factor 1). Total effect *b* = .23, *p* = .004. Indirect effect 1 (Loneliness → S-C → Neg. Exp. F1) *b* = -.14, Boot *SE* .04, 95% BCa CI [.067, .213]. Indirect effect 2 (Loneliness → Habit → Neg. Exp. F1) ns. Indirect effect 3 (Loneliness → S-C → Habit → Neg. Exp. F1) *b* = .19, Boot *SE* .04, 95% BCa CI [.124, .278].

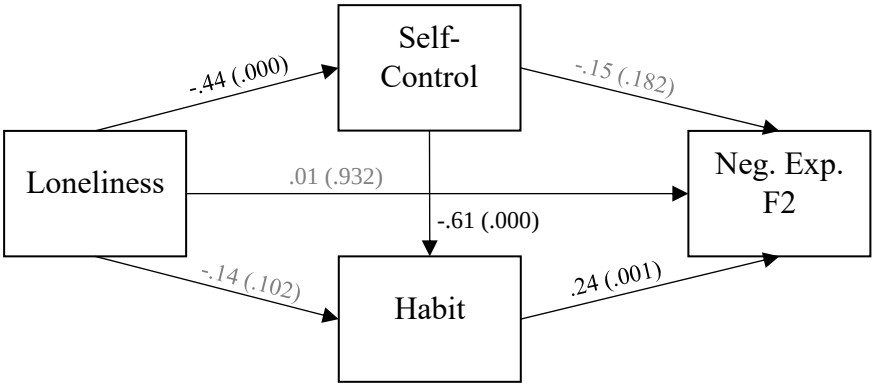

Figure 33

Serial Model of Loneliness Predicting Acceleration Experiences Mediated by Self-Control via Habit

Note. Unstandardized regression coefficients are reported. The *p*-values are in parentheses after *b*-coefficients. Non-significant effects are in gray font for clarity. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 5000 samples.

The model explains 9.2% of variance of frequency of negative experiences (factor 1). Total effect $b = .11$, $p = .220$. Indirect effect 1 (Loneliness → S-C → Neg. Exp. F2) ns. Indirect effect 2 (Loneliness → Habit → Neg. Exp. F2) ns. Indirect effect 3 (Loneliness → S-C → Habit → Neg. Exp. F2) $b = .06$, Boot *SE* .03, 95% BCa CI [.025, .114].

8.7.8 **The Influence of Loneliness on Need-Fulfillment**

The model (Figure 11) depicts not only the paths between loneliness and self-control to habit and negative experiences but also to needs according to SDT and U&G. The former connection was already briefly described before (see Section 8.7.1) and just as loneliness was considered to be connected to negative experiences, it was to predict positive ones as well (direct path between loneliness and expectations as depicted in Figure 11). Correlations for loneliness and the U&G factors showed a small significant correlation for U&G F2 and a moderate relationship for U&G F3. Mediation analyses with SDT needs as mediating variable and U&G factors as Y-variables revealed no significant indirect effects for the U&G factors via BMPN. However, all total effects were significant: For U&G F1, the direct effect was not significant ($b = .07$, $p = .492$) but the total effect was ($b = .23$, $p = .044$, $t(262) = 2.023$, 95% BCa CI [.004, .278]) with the model explaining 5.7% of variance. For U&G F2, the direct effect was also not significant ($b = .18$, $p = .110$) yet the total effect was ($b = .20$, $p = .015$ $t(262) = 2.452$, 95% BCa CI [.040, .363]) with the model explaining 2.4% of variance. In contrast, the direct effect for U&G F3 was significant ($b = .43$, $p < .000$) and the total effect was as well ($b = .50$, $p < .000$, $t(262) = 6.036$, 95% BCa CI [.338, .666]) with the model explaining 12.4% of variance. The latter factor's significant direct effect is not surprising, though, considering that one of the two items asks for the need not to feel lonely and, accordingly, more felt loneliness is

related to a stronger need not to feel lonely.

So, basic need satisfaction was influenced by the degree of loneliness a person experiences but did not mediate the relationship between loneliness and needs as stated by the U&G, according to which a person expects and experiences needs also to be also gratified by use of the smartphone. Found effects were small and other variables that were not considered in this study might influence the connection, respectively. The H16 ("The more loneliness someone experiences, the more they expect the smartphone to be a remedy by gratifying thwarted needs") was partially supported based on the correlation analyses (not for U&G F1, since the correlation was non-significant). In similar fashion, it would also be partially accepted for some needs (U&G F3), as the direct effect remained significant throughout the multivariate analyses reported in this section and no mediation effect was found.

To complete the analysis, the model's path via self-control was entered into the mediation analysis as well. Neither the indirect nor direct effects via the SDT needs did change significantly, nor did the total effects, of course. However, self-control significantly mediated the relationship of loneliness and the U&G needs subsumed under factors 1 and 2 (see Figure 34, Figure 35, and Figure 36), whereas self-control did neither really improve explanation of variance nor indirectly have an effect of the relationship the third U&G factor (see Figure 36).

To conclude, the level of loneliness a person feels influences their basic need-fulfillment as well as their desire to use the smartphone to feel less lonely and to relax and/or be entertained. However, basic need-fulfillment did not mediate these bivariate relationships. Loneliness also negatively influences the level of self-control and self-control, in turn, the degree as to which someone uses the smartphone for fulfillment of the needs subsumed under factors 1 and 2, but not U&G F3. For the third factor, the direct path was the only significant connection.

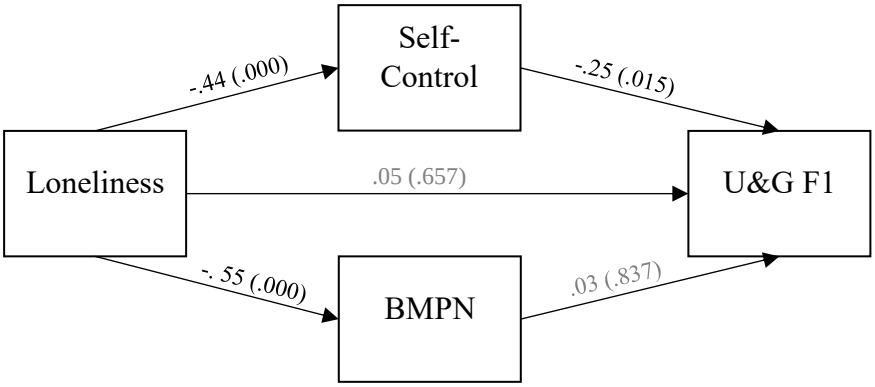

Figure 34

Model of Loneliness Predicting Social Needs Mediated by Self-Control and Basic Need-Fulfillment

Note. Unstandardized regression coefficients are reported. The *p*-values are in parentheses after *b*-coefficients. Non-significant effects are in gray font for clarity. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 5000 samples.

The model explains 4.4% of variance of frequency of need-fulfillment via smartphone (U&G F1). Total effect $b = .14$, $p = .044$. Indirect effect for Self-Control $b = .11$, Boot *SE* .05, 95% BCa CI [.022, .205]. Indirect effect for BMPN ns.

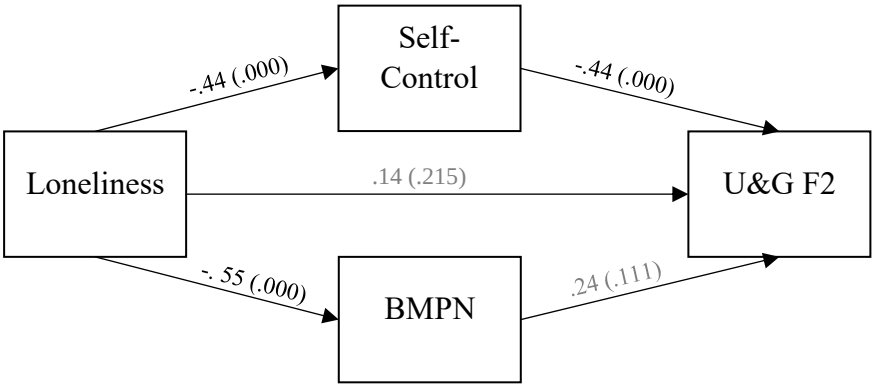

Figure 35

Model of Loneliness Predicting Entertainment Needs Mediated by Self-Control and Basic Need-Fulfillment

Note. Unstandardized regression coefficients are reported. The *p*-values are in parentheses after *b*-coefficients. Non-significant effects are in gray font for clarity. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 5000 samples.

The model explains 4.4% of variance of frequency of need-fulfillment via smartphone (U&G F2). Total effect $b = .20$, $p = .015$. Indirect effect for Self-Control $b = .19$, Boot *SE* .05, 95% BCa CI [.101, .295]. Indirect effect for BMPN ns.

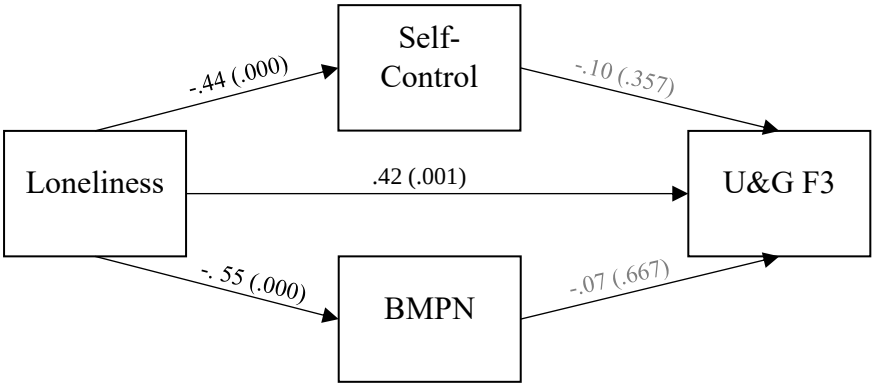

Figure 36

Model of Loneliness Predicting Safety Needs Mediated by Self-Control and Basic Need-Fulfillment

Note. Unstandardized regression coefficients are reported. The *p*-values are in parentheses after *b*-coefficients. Non-significant effects are in gray font for clarity. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 5000 samples.

The model explains 12.6% of variance of frequency of need-fulfillment via smartphone (U&G F3). Total effect $b = .50$, $p = .000$. Both indirect effects ns.

8.7.9 **Testing the Model**

So, which variables influence the persistence of negative effects in everyday use of mobile devices? The in-depth analyses in the previous sections revealed some interesting dynamics by deducting a chain of connections (correlations, regressions, mediations) explaining the possibly causal pathways of the main model. To conclude this analysis, three more models were calculated to examine the influence of all deduced variables at once, first on negative experiences and then on smartphone exposure. It has been shown that multiple variables might lead to negative as well as positive experiences—but is this still the case when all variables are entered into one model or will other dynamics develop that did not emerge in the analysis of the individual model parts?

For negative experiences factor 1 & 2 (as DVs this time), all variables depicted in the model (Figure 11) were entered in three steps: Firstly, the smartphone-independent measures were entered (i.e., basic needs (BMPN), self-control (SCS-K-D), and loneliness (ULS-8)), secondly, the smartphone-dependent measures added (i.e., U&G F1, F2, and F3 as well as habit

(SRHI)), and thirdly, the six justifications[46] as well. Habit, FOMO, and the U&G safety needs explained why the adaptation experiences would occur frequently, whereas a higher trait self-control would lead to fewer of those experiences, and with that almost 66% of variance (see Figure 37 and for the entire regression see appendix, Table A 24).

The roles of habit, self-control, and FOMO were explored in-depth before and the positive influence of U&G F3 was found and elaborated on as well. However, without knowing about the significant influence of loneliness on this factor (which was analyzed later in this study, see Section 8.7.8), this could not be interpreted to a greater extent before (see Section 8.7.2). But now, with the regression model depicting its influence, it can be derived that habit influenced the relationship; and so does the level of loneliness of a person, since more loneliness also predicted a greater need for companionship (U&G F3) and, consequently, this need predicted more negative experiences. In other words, U&G F3 predicts adaptation experiences and these, in turn and along with U&G social and entertainment needs, smartphone exposure.

For acceleration experiences, the social justifications factor (consisting of Pressure and Responsibility; for an explanation as to why this factor and not the individual justifications, see Section 8.6.2), FOMO, and habit predicted more of these negative experiences, whereas the coefficient of Need-Balance (meaning, it also has its good sides) was negative and could possibly (variables uncontrolled for in this study notwithstanding) lead to fewer of these experiences—or, maybe to a different evaluation of them and, thus, not classifying them as negative (see appendix, Table A 25). However, the coefficients were small and the model (Figure 38) explained only 24.9% of variance. So, the missing influence of other variables and need for further research are self-evident.

[46] The model depicts the justifications after the negative experiences, but people are not linear; and just as the expectations (U&G) measure (which asks for expectations of need-fulfillment and at the same time implies that the sought gratifications were obtained before, thus learned and sought again in expectation of gratifications), justifications might not simply be a sequel of negative experiences. They are presumably integrated into our self (as outlined in cognitive dissonance theory, e.g. Adriaanse & Prinsen, 2017; Festinger, 1954) and, thus, also a precursor of indulging in some possibly non-beneficial behaviors. For instance, interviewees evaluated experiences as negative and justified why they would condone them repeatedly anyway.—When taking up the smartphone, knowing of possible outcomes and after having justified the behavior in the past, the justification is not just a consequence anymore.

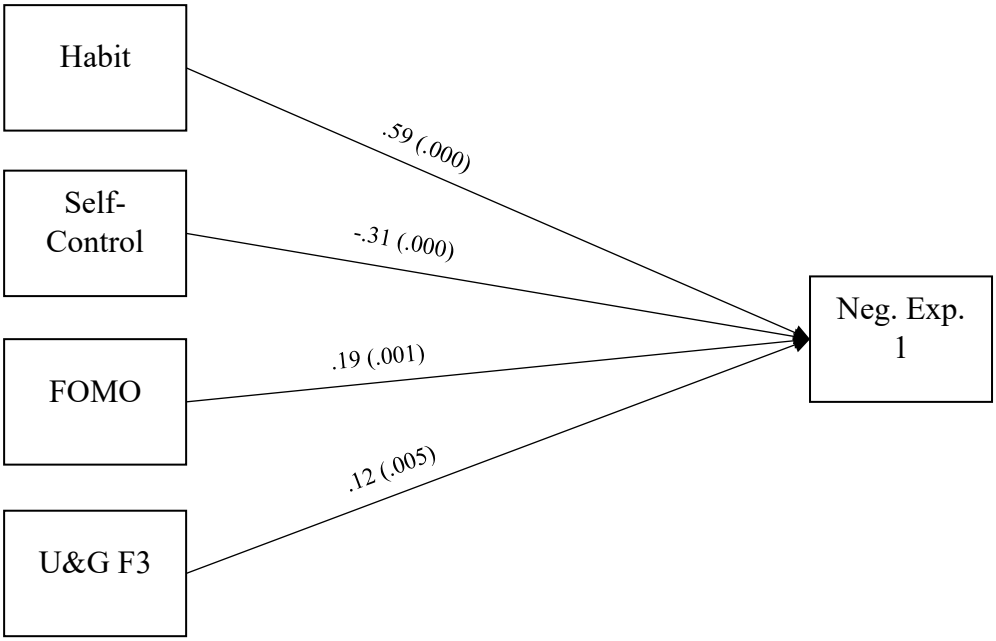

Figure 37

Regression Model Containing the Significant Predictors of Adaptation Experiences

Note. Unstandardized regression coefficients are reported. The *p*-values are in parentheses after *b*-coefficients. The model explains 65.6% of variance of frequency of occurrence of the adaptation experiences.

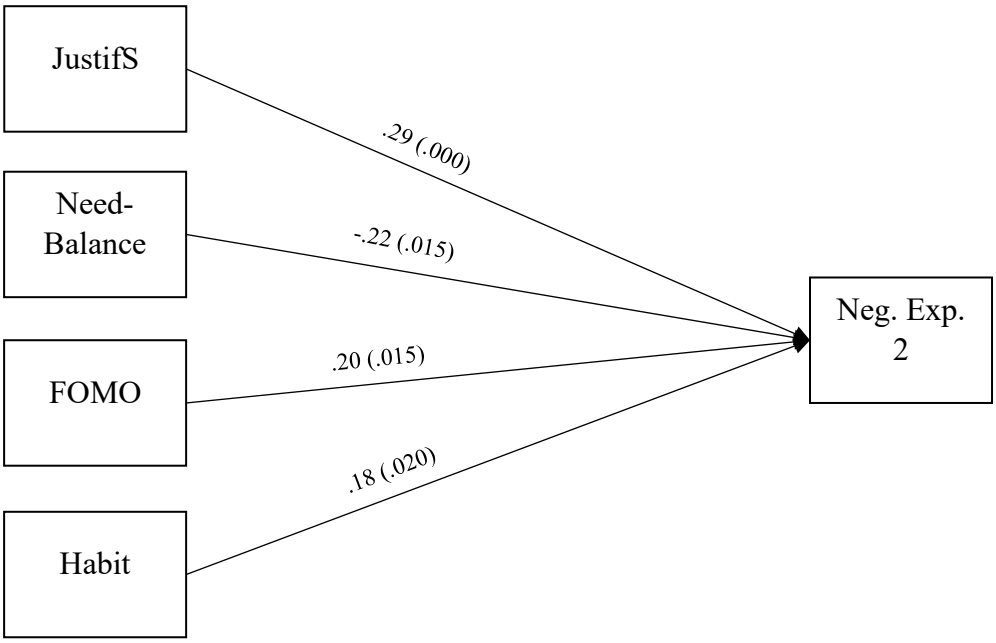

Figure 38

Regression Model Containing the Significant Predictors of Acceleration Experiences

Note. Unstandardized regression coefficients are reported. The *p*-values are in parentheses after *b*-coefficients. The model explains 24.9% of variance of frequency of occurrence of the acceleration experiences.

Most interesting about the results of hierarchical models was to explore the influence of the variables before subsequent variables were entered and the respective change in variance explanation. So, for adaptation experiences, self-control was the only predicting media-unrelated variable in the first regression model (b = -.78, t(260) = -7.878, p < .000), and was also significantly predicting the experiences in the second model, but less strongly (b = -.32, t(256) = -4.341 p < .000), and accompanied by habit (b = .65, t(256) = 12.076, p < .000) as well as U&G F3 (b = .14, t(256) = 3.429, p < .001).

The changes are a bit more interesting for the acceleration experiences, though not surprising when thinking of the previous mediation analyses (see Section 8.7.6). That is, self-control predicted these experiences negatively in the first model (b = -.21, t(260) = -2.051, p < .041), but *not* once habit was entered (model 2). Habit took over the explanatory role (b = .32, t(256) = 4.145, p < .000) as did basic needs according to the SDT (BMPN, b = -.28, t(256) = -1.990, p < .048), U&G F2 (b = -.20, t(256) = -2.777, p < .006), and U&G F3 (b = .13, t(256) = 2.118, p < .035).

The changes in significance of R^2 were significant for both negative experience factors in each model, and for the acceleration experiences most variance was, in fact, explained by adding the justifications. So, the influence of the smartphone-independent variables could be observed before other variables were also accounted for—which then took over explanation of more variance than the others while the smartphone-independent variables are possibly predetermining them as proposed in the model and suggested by the findings of this study. This might explain, at least to a certain degree, which variables influence everyday negative effects. So, which variables contribute to using the phone persistently, nonetheless? After in-depth analyses of the prerequisites of frequent smartphone exposure, especially with regard to persistent use despite negative experiences, one final and all-integrating, hierarchical multiple regression model was analyzed to get to the bottom of this project's main question (see appendix, Table A 26). Variables were, again, entered according to the model. That is, firstly the smartphone-independent measures were entered (i.e., basic needs (BMPN), self-control (SCS-K-D), and loneliness (ULS-8)); then, the smartphone-related measures (i.e., U&G F1, F2, and F3, the negative experiences factors as well as habit (SRHI)) added; and thirdly, the six justifications entered as well.

The final model showed that if only regarding the smartphone-independent measures in step one, just self-control was predicting smartphone exposure significantly (b = -.41, t(260) = -3.554, p < .000) but missed significance in the second model (b = -.14,

$t(254) = 1.261$, $p = .209$). However, habit ($b = .38$, $t(254) = 4.032$, $p < .000$), adaptation experiences ($b = .34$, $t(254) = 3.695$, $p < .000$), and U&G entertainment needs ($b = .20$, $t(254) = 2.947$, $p = .004$) predicted smartphone exposure significantly. The final model depicts that habit, adaptation experiences, FOMO, U&G social needs, and U&G entertainment needs would predict frequent exposure to the smartphone when all other variables considered in this study were controlled for (see Figure 39).

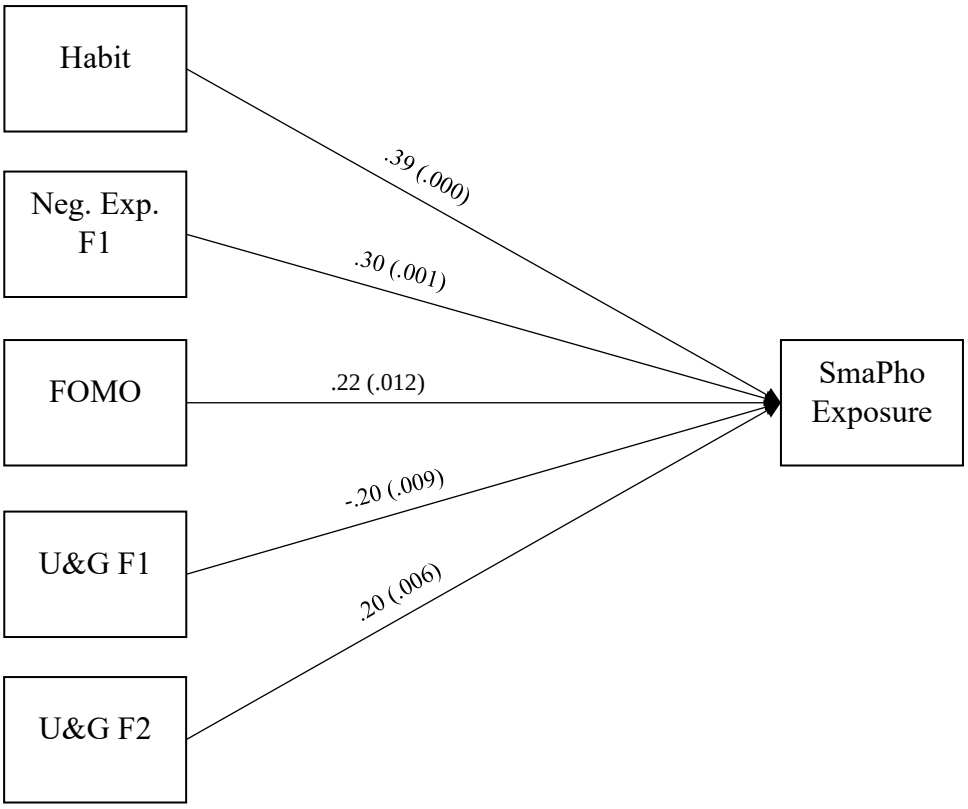

Figure 39

Final Regression Model Containing the Significant Predictors of Persistent Smartphone Use

Note. Unstandardized regression coefficients are reported. The *p*-values are in parentheses after *b*-coefficients. The model explains 37.4% of variance of frequency of smartphone exposure.

8.7.10 **Conclusion—Final Model**

The connection of self-control and smartphone exposure had not been analyzed individually beyond the positive bivariate correlations shown in Figure 11 previous to the analysis of these final models. The hierarchical regressions led to the deduction that self-control would predict acceleration experiences until habit was entered. It also showed the influence of basic needs according to SDT on acceleration experiences before the justifications were added, suggesting that need-fulfillment also influences negative experiences, maybe via its depicted

path to U&G needs. Though just significant, it does portray an interesting finding that could be examined in more detail in the future. For now, these findings confirm that the regression models still added information to the detailed analyses conducted in the previous sections. Also, the variables explaining negative experiences in these comprehensive models did not contradict but rather consolidate the previous in-depth-findings.

However, the previous analyses provided much more information than this final model could—they gave valuable insight as on how the variables might be connected and tested these paths statistically. For instance, they showed that the media-independent measures influenced the media-dependent measures and, thus, might have led to more or less (depending on degree of self-control, need-satisfaction, and loneliness) expectations towards need-fulfillment via the smartphone as well as a more or less habitualized use, which in turn predicted the frequency of smartphone exposure in general and the frequency of positive as well as negative experiences subsequently. The analysis of justifications for negative experiences pointed to FOMO as particularly important, especially for the acceleration experiences (i.e., OK, ES, IS, WoC). Adaptation experiences shared a lot of variance with the habit measure, pointing to a possible automatic character inherent in the respective experiences; whereas acceleration experiences, considering that they never occur as separately as measured in a study like this, would lead to less exposure if it were not for the influence of justifications and habit (as depicted in Figure 38). Derived from the *b*-coefficient of the final regression model, habitual everyday use could only be suspected as the largest effect compared to the others (not tested for statistically, though). However, it was shown in detail during previous analyses that habit, in fact, explained the most variance and mediated the effects of the individual variables on frequent exposure in all tested models at least partially. Moreover, habit not only mediated the negative but also the positive expectations/experiences (U&G) of smartphone use.

8.8 (Discussion of the) Significance and Limitations of Study II

The negative experiences and justifications explored in study I were confirmed in study II. Exploratory factor analyses were conducted to test the underlying factor structure of the negative experiences since those were based upon the interview study, thus, presumably not all of them constitute distinct experiences. Two negative experience factors were extracted: an adaptation and an acceleration factor. The first consists of Interruption, Auto Use, Loss of Time, and Media Bubble; the second of Overkill, Emotional Stress, Insignificance, and Way of Communication, while Endangerment was excluded due to ambiguous loadings on both factors. Furthermore, six justifications were extracted from study I and tested in study II. An EFA led

to two factors: a functional and a social factor. The social factor was the same (that is, consisting of Pressure and Responsibility) across all nine persistent negative experiences, whereas justifications subsumed under the functional factor were somewhat varying, possibly also due to the different methods employed in both studies.

Interestingly, the assumed third-person effect for two persistent negative experiences, namely Media Bubble and Endangerment, was confirmed. These were the only experiences analyzed from this perspective, although it would be worthwhile to examine this for the remaining ones as well. That is, because it is not only in line with theory that others are perceived to be more prone to negative effects of mass media and the respective behavior (Davison, 1983; Perloff, 1993; Tsay-Vogel, 2015; Zhong, 2009) but to date has not been analyzed for the mentioned persistent negative experiences with the smartphone. Additionally, the respective behaviors could be detrimental for people's safety since using the smartphone while walking or driving is very common (Bayer & Campbell, 2012; Panek et al., 2015) and causes even more accidents than DUI (Spitzer, 2018). Further research is needed to elaborate on the question as to whether this applies to Media Bubble and Endangerment only or other negative effects as well, thereby adding even more to the scope of research on the third-person effect in smartphone use. Possibly, implications could be used to work differently on interventions for detrimental behavior like texting while driving. For instance, a concept different from using just billboards to raise awareness of the effects of smartphone use while walking/driving could be developed since people might just not think that it applies to them. In other words, they might believe that their own behavior is different from, and their abilities to multitask better than, those of others. So, if people perceive others to be more prone to walking or driving while using the smartphone (i.e., while being in their Media Bubble) and, thus, endangering themselves without realizing it, they might very well underestimate their own risk for this behavior and unconsciously act just like "the others". Billboards or other messages would, accordingly, be read or noticed but most likely would not change own behavior because of this biased self-perception. Related to this deduction of the present results, a study was recently published that analyzed the third-person effect of education messages to prevent smartphone use while driving (Gauld et al., 2020). That study, however, did not examine the effect from the perspective of the present project. That is, it was derived that young males thought that educational messages would reach others better than themselves, but the study did not ask for underlying reasons as to why this might be the case. The present study might contribute insofar as that a possible angle for intervention could be to raise awareness that not just others show the respective behaviors when behind the wheel. Limiting should be kept in mind that Media Bubble and Endangerment were

only measured using one item each and that they might not represent two distinct experiences (as was already discussed in the results section). Nonetheless, these findings of third-person effects in smartphone use for communication purposes validate not only the interview data and add to the body of research on third-person effects, but with respect to possible implications in everyday life also indicate a weightily endeavor for future research.

Study II also examined a model to extend the seminal U&G. It thereby addressed the explanatory gap between its assumptions and the persistence of smartphone use despite frequent negative experiences. Analysis of the model started with the negative experiences at its core and then tended towards the relations to and among the model's other variables and their influence on the DV, respectively. The hypotheses were tested accordingly and most paths of the model (all but H6 and H7) were confirmed bivariately. Consequently, the H1 ("The more negative experiences someone reports, the more frequent they use the smartphone") was supported. What appears counterintuitive from the perspective of the U&G (see Section 2.2) has been found to be common in everyday life. Smartphone use intensity is often associated with problematic or even addictive use, whereas excessive use is often related to simply more frequent use. Hence, results could be different when the strain measure had been applicable in this study (e.g., Elhai, Levine, et al., 2018; Lu et al., 2014). However, the strain measure did not have much extra exploratory power and the experiences were found to take place in everyday life, nonetheless. It might be that the found experiences are simply not evaluated as extremely negative or burdensome at all. This is plausible since these experiences were measured as "everyday experiences" and, thus, do not (yet) represent mental disorders, though they could turn into those eventually (e.g., Montag et al., 2018; Rosen et al., 2012). Negative experiences could also be this persistent, because habitual behavior is often not accompanied by a conscious experience of emotional responses, or at least no strong emotional reactions (e.g., Wood et al., 2002). This, including the possibility of a third-person effect valid for *all* experiences, could add to the explanation as to why most coefficients were small, too.

H2 ("The more negative experiences someone reports, the stronger their justifications for persistent exposure") was partially confirmed for the first but not for the second factor of the negative experiences, respectively. The H2a ("The more negative experiences someone reports, the more they justify this by interpersonal commitment") was supported for both factors, as was H2c ("The more negative experiences someone reports, the more they justify this by a non-evaluation of needs"). H2b ("The more negative experiences someone reports, the more they justify this by uses that outweigh the detriments.") and H2d ("The more negative experi-

ences someone reports, the more they justify this with uses and detriments being counterbalanced.") were, again, only supported for the negative experiences subsumed under the first factor. H3 ("The stronger the justifications, the more smartphone exposure") could be supported for the bivariate relationship but the in-depth analyses showed that justifications were not explaining persistence of all negative experiences equally, with Non-Evaluation, the social factor (i.e., Pressure and Responsibility), and particularly FOMO being relevant, especially when all justifications were computed together. Then, the fear to miss out on what friends could be experiencing turned out to be the only significant justification—as could also be expected from literature which suggested FOMO to be a considerable driving force behind use (e.g., Chotpitayasunondh & Douglas, 2016; Dossey, 2014; Elhai, Yang, et al., 2020; Rosen et al., 2016).

If someone "admits" to experience negative effects persistently, justifications are one way to keep a feeling of coherence (Aronson, 1997; Cooper, 2007; Festinger, 1957). That is, despite this ambiguous behavior, people need to be in coherence with their selves in order not to feel an unpleasant dissonance. So, if behavior is inconsistent, people can either change it, or reduce the importance of their attitudes to lower dissonance, or gather information outweighing the downsides (which would assumedly lead to a re-evaluation). When asked for the persistence of negative experiences, as I did during the interviews, justifying them could ease this unpleasant recognition of one's own dissonant behavior. It would add reason to it and, thus, outweigh its downsides. Furthermore, research found that people often do not admit when they are uncertain about the reasons for their behavior (Nisbett & Wilson, 1977; Sheeran et al., 2013) but rather confabulate reasons (Adriaanse, Weijers, et al., 2014)—which could be the case in more habitualized behaviors that people often are not aware of (Bar-Anan et al., 2010). Furthermore, higher mental processes (such as internal goal processes, evaluations, judgements, or social interactions) often take place automatically and outside of conscious awareness (Bar-Anan et al., 2010; Bargh & Ferguson, 2000); and the smartphone behavior falls into the category as it is most often used for social interactions (Vorderer et al., 2016; We Are Social & Hootsuite, 2020b). Moreover, these confabulations could possibly turn into self-fulfilling prophecies and thereby lead to even more negative experiences. That is, many social interactions take place online these days and people are presumably not aware of the initial reasons for checking the phone, but in case of provoked confabulations, such as justifying the behavior through FOMO or social pressure, they might actually become integrated into a person's self-concept and affect subsequent behaviors, respectively (Adriaanse & Prinsen, 2017; Bar-Anan et al., 2010); potentially leading to even more checking of the phone. This hypothesized cycle

would have to be part of future studies, but the present study indicates especially FOMO to be important for persistent use as well as social reasons and Need-Balance in general for the occurrence of negative experiences (at least, acceleration experiences).

Satisfaction of basic needs (SDT) was analyzed and the expected negative correlation was found, supporting H4 ("The more satisfied the basic needs are, the less need gratification is sought via smartphone"). Accordingly, more gratifications sought were positively correlated with more exposure, supporting H5 ("The more positive expectations someone has towards need gratifications through the smartphone, the more frequently they use it"). Basic need satisfaction was only found to influence two U&G factors (*not* factor 2, namely entertainment-relaxation needs) and only with small effect sizes. A study that was conducted across 123 countries to research well-being and fulfillment of needs as proposed by Maslow (1943), concluded that these needs were universal but also that the order was not as essential as initially proposed. To be more precise, higher-level needs, like the need for autonomy or social support, were important even when lower-level needs were not fulfilled (Tay & Diener, 2011). So, one might conclude that even though the needs for autonomy, competence, or relatedness were not fulfilled, U&G needs towards smartphone use could still be relevant for a person. This would also be an argument supporting the thesis that needs can be fulfilled just partially (instead of completely) before another need already becomes relevant.

Both negative experiences as well as U&G needs positively predicted persistent use. Surprisingly, however, also U&G needs and negative experiences were positively correlated, as opposed to the reviewed U&G research and H6 ("The more the expected need gratifications occur, the fewer negative experiences are reported"). A possible explanation was provided through habitual use, which mediation analyses confirmed. That is, assumingly the more frequent someone uses the smartphone, the more it becomes a habit and, in turn, the less important becomes the initial need gratification. However, habit mediated only the first (social) U&G factor's association with negative experiences fully while it explained an average of 60% of variance of adaptation experiences and only about 10% of the acceleration experiences (averaged for the three U&G factors). So, there was still variance unaccounted for, but both positive and negative experiences co-influenced smartphone exposure (partially yet positively) due to habit. Individually, as had been found in the previous analyses, negative experiences as well as U&G needs positively predicted persistent use. With the extension of the U&G at the core of this study, the influence of U&G predicting exposure was analyzed in a hierarchical regression, but including the negative experiences, FOMO, and habit in a subsequent step as

well. Results suggest that habit alone explained most variance on its own, though U&G entertainment needs and adaptation experiences also influenced exposure. Furthermore, FOMO still predicted the acceleration experiences even when controlled for habit. This and the positive bivariate correlation led to rejection of H7 ("The more habitualized the use of the smartphone is, the less it is used for need-gratification"). More habitualized use was positively related to more frequent exposure (supporting H8: "The more habitualized the use of the smartphone, the more frequent the use"), seemingly disregarding the consequences (and supporting H9: "The more habitualized the use of the smartphone, the more negative experiences are reported"). These results align with the introduced literature on habits, assuming that goal-directedness and rewards initially were important for the performance of the behavior but are less so once it has become habitual (e.g., Wood, 2019). Though habits cannot pose needs, because U&G assumes conscious use whereas habitual use takes place without deliberation (cf. e.g., LaRose, 2010a; LaRose et al., 2001), the results support the assumption of habits and U&G needs to possibly be positioned at the opposed ends of a need-satisfaction-continuum (see Section 2.4.1).

Habitualized behavior can supposedly be disrupted—for which self-control is necessary (e.g., Lally et al., 2010). Self-control was, in fact, negatively associated to smartphone exposure, negative experiences, and habit. The results were in support of H10 ("The higher someone indicates their trait self-control to be, the fewer habitual use of the smartphone they report"), H11 ("The higher someone indicates their trait self-control to be, the fewer negative experiences they report"), and H12 ("The higher someone indicates their trait self-control to be, the less they intend to fulfill their needs via smartphone use"); thereby also limiting the informative value of H8 and H9. That is, habit only led to more exposure and more frequent negative experiences when self-control was not regarded—or more precisely, when self-control was lower. The results were also in line with previously introduced literature on self-control's effects on habit and goal-directed behavior (see Section 2.5.2). Further analyses showed that habit mediated the effects of self-control: Higher trait self-control led to less habitual use and, in turn, to less exposure. Whereas habit fully mediated the effect on smartphone exposure for need fulfillment and for the acceleration experiences, the effect on adaptation experiences remained significant when statistically controlled for habit, explaining H11 & H12 to an even greater extent. The results, once more, highlight the relevance of habit, and particularly in association with self-control (e.g., De Ridder et al., 2012; Hofmann, Baumeister, et al., 2012). The present study focused upon negative experiences and factors directly influencing them, so the model did not include the path from basic needs to self-control—though the satisfaction of basic needs is assumed to positively influence self-control (e.g., Mills & Allen, 2020). To include these and

other antecedents of self-control could, therefore, be an endeavor of future studies, expanding this extended model's scope, too.

Aside from self-control, also loneliness and basic needs were measured independently from smartphone use, as was analyzed next: The correlation coefficient of loneliness and need-fulfillment was large and negative, supporting H13 ("The more loneliness someone experiences, the less well satisfied are their basic needs"). More specifically, lonelier people would especially lack fulfillment of the need for relatedness, supporting H13a ("The more loneliness someone experiences, the less well satisfied is their need for relatedness") and being in accordance with literature about the association of these two (Gallardo et al., 2018; Lin, 2016; Russell, 1996). In line with the literature introduced in Section 2.6, loneliness and self-control were negatively connected, supporting H14 ("The more loneliness someone experiences, the less trait self-control they indicate to have"). The bivariate analysis also supported H15 ("The more loneliness someone experiences, the more negative experiences they report"), but the multivariate analysis showed the direct effect to turn insignificant when self-control was entered as mediating variable (cf. e.g., Hofmann et al., 2013; Johnson et al., 2020)—until habit was entered, too: then, only habit would explain the association of the degree of loneliness and the experience of more negative encounters, with all other paths turning non-significant. Though explanation of variance for acceleration experiences was low, it improved with the addition of habit—although particularly for adaptation experiences, possibly due to their more automatic nature. Analyses further revealed that loneliness and habit are statistically independent from one another. This is not too surprising: More loneliness has been associated with lower self-control and lower self-control with less structured everyday routines, yet would less structure be disadvantageous for habit formation (cf. also e.g., De Ridder et al., 2012; Wood, 2017). The direct positive influence of loneliness on need-fulfillment via smartphone (i.e., U&G needs) supported H16 ("The more loneliness someone experiences, the more they expect the smartphone to be a remedy by gratifying thwarted needs") partially—that is, only for U&G F2 and U&G F3. The effect remained only positive for U&G F3 (which constitutes longing for less loneliness and more safety) when controlled for self-control and basic need satisfaction, while both indirect effects were not statistically significant. The results highlight the stronger wish for need satisfaction and possibly insufficient means to obtain it when loneliness is experienced to a greater degree, potentially contributing to the argument of a vicious cycle being at work as was introduced in Section 2.6 (e.g., Cacioppo & Hawkley, 2005). It was assumed that lonelier people would have less satisfied basic needs, but this was only true for the bivariate relationship. In the path model, basic needs did not mediate the effect on negative experiences.

So, the assumed direction might not apply, pointing to the necessity to include the potential reciprocal relationship in future studies. Also, this sample scored low on the ULS-8, potentially due to its average age of 33 years that falls right into the reported age range (25 to 55 years) for which the experience of loneliness is rare. This might have added to less explanatory contribution of the potential influence of loneliness.

Moreover, the survey was not constructed deductively but with the most important questions for this study in the beginning. That is, SES was surveyed first, followed by negative experiences, justifications, smartphone-related needs (U&G), and habits, and the smartphone-independent measures at last. This could have led to response order effects (such as priming) that influenced especially the independent measures, since participants could have already guessed the study's goal to collect data on effects of smartphone use. This as well as further known response tendencies of participants (e.g., acquiescence; social desirability; moderate and extreme response bias) or simply fatigue due to length of the survey, possibly in turn also influencing consistency, could have led to biased results.[47]

Further, the negative experiences identified during the interviews were confirmed in the second study. However, no additional ones were discovered since the standardized design of the questionnaire did not provide an option for this (as in an open question, for instance). Only one item per experience might be insufficient to capture the full scope of them and could particularly be problematic when it comes to analyses such as EFA, since the assumptions for a reliable factor structure depend on sample size and/or number of items loading onto a factor as well as on the respective communalities (see also 8.3.3.1). With the sample size of $n = 264$ in this study and the small number of items per scale, the suggested guidelines were not always met but exploratory factor analyses were conducted for the reasons already discussed when reporting the results. The same applies for the measure of the justifications. That is, more items would possibly lead to a better scope, more participants recognizing them from own experience, and presumably a more reliable factor structure. In particular, FOMO was considered to belong to the social factor since it was shown to be intercorrelated with social pressure before (Reinecke et al., 2017), but EFA did suggest for FOMO to load on either factor, depending on the respective negative experiences. Also, this study's justification measures emphasized social reasons by measuring the facets of interpersonal connectedness using three items, and the other justifications (Need-Balance, Non-Evaluation, and Pragmatism) only by using one. The reason

[47] Further research on these and other possible biases can be found in Bogner and Landrock (2016), Moosbrugger and Kelava (2008), and particularly Podsakoff et al. (2003).

for this decision was the length and complexity of the questionnaire, which made it necessary to reduce the number of questions in order to not overburden the respondents. This led to not using an existing FOMO scale like the well-established one by Przybylski and colleagues (2013) or measuring social pressure using Reinecke et al.'s scale (2017). Possible effects due to similarity of items cannot be ruled out either (i.e., the U&G scale included needs as well, such as boredom or social needs). The need for relatedness, for instance, was of great importance for most interviewees in study I. The one item measuring Need-Balance, which included relatedness as just one aspect of needs (i.e., "contact to others"), was maybe not sensitive enough to capture this, whereas when calculated also with just single items, FOMO stood out as being relevant, as did Pressure and Responsibility. So, especially for the yet to fully explore negative experiences and the justifications, interpretation of the factor analyses should happen carefully and with these limitations in mind. Additionally, in social sciences factors are often *not* unrelated to each other yet orthogonal rotation frequently used due to its better interpretability of the factors. Oblique rotation incorporates the intercorrelations and is said to be closer to reality, show better explanatory value and, thus, better replicability of results (Costello & Osborne, 2005). The former was chosen because I did not want to investigate the relationship among the factors, knowing that data in social sciences are rarely discrete, therefore went for better interpretability. Results could be different using another method (though presumably only slightly, as some pre-tests during analysis indicated), but "[EFA] is (…) an error-prone procedure even with very large samples and optimal data" (Costello & Osborne, 2005) and it was used to get an idea of underlying variables that make sense regarding their content, while keeping these limitations in mind.

The justification patterns as they had been derived from study I could not be replicated in study II. It is likely that this was due to the chosen operationalization, meaning that boredom or recreation as justifications were not surveyed individually. Instead, for reasons of brevity and because they were not as prioritized during the interviews, they were subsumed within the one need-item (Need-Balance). Since they are often surveyed as needs in the U&G tradition (e.g., Krupp & Breunig, 2015; Naab & Schnauber, 2014; Schnauber, 2017), they were included individually as U&G items in the questionnaire, yet the item measuring boredom excluded after EFA. Correlations had shown that these need items were linked to the negative experiences as well but including them to the analyses of reasons would have led to a comparison of two different aspects. That is, different sample size for the justifications is one reason, the other is the question explicitly for justifications of persistent use as opposed to the question for motives of

use in general (U&G). So, future studies should measure all justifications (and possibly additional ones) more detailed and test their factor structure, respectively. The mostly adapted U&G scale consisted of an uneven number of items for measuring different needs as well. For instance, social needs were measured using four items whereas boredom was measured using only one. This certainly influenced the found factor structure and could be improved by a more balanced scale.

More generally, even though most bivariate hypotheses were confirmed, the in-depth analyses conducted to test the model's paths did not always comply with them. This not only limits the generalizability of the hypotheses but shows that the reality of smartphone use despite negative experiences is much more intricate. The paths of the model were confirmed as statistically different from chance during analyses and the conclusions drawn were based upon theoretically derived relations and directions between the variables and considering effect sizes, but the data are cross-sectional, so no causal direction can be derived. A long-term study could be more insightful as it would allow to reveal the directions of the presumed pathways or even different cause-and-effect chains. Also, no Bonferroni correction was used. That is, scientists argue that repeated use of the same data or test of the same hypothesis leads to an accumulated alpha error—which is an increase in Type I error, namely rejection of the null hypothesis although it is correct. However, using a correction might also lead to an inflated Type II error (i.e., accepting the false null hypothesis) and thereby less power (that is, less likely being able to detect an effect/statistical relation in the data). Scientific literature is very inconsistent about whether and how to use which adjustment[48] and only a small number of published articles regard this issue—namely, use an adjustment—at all (Cabin & Mitchell, 2000; Perneger, 1998). Since the present work is exploratory and a first means to discover possible underlying variables of persistent negative experiences and their interplay in everyday life, I decided not to adjust the *p*-values. Therefore, *p*-values close to the five percent threshold should be interpreted with this possible limitation in mind. However, it must also be regarded that *p* depends on *n*, so any effect will reach statistical significance once the sample size is sufficient, a possible inflated alpha error considered or not. For a more informed interpretation of a study's results, effect sizes should be regarded and findings interpreted more comprehensively, if possible (Sullivan & Feinn, 2012)—as was done in this project.

[48] Bonferroni adjustment is a very conservative method, quickly leading to a very small *p*-value as the limit for rejection of the null hypothesis; so less conservative approaches are suggested, too (e.g., Chen et al., 2017; Field, 2018).

Additionally, the sample is a non-representative convenience sample, consisting of mostly female (i.e., 68.9%) and (formally) well-educated (i.e., 79.5%) participants. Moreover, the study was conducted online, which could have led to some biases in behavior (e.g., self-selection of people who usually like to participate in studies; or reaching only people who use the Internet). Research, however, has at least found the previously mentioned biases (for instance, social desirability) to be valid in the same fashion online *and* offline (e.g., Dodou & de Winter, 2014). This is an important notion since this study intended to only research the uses and potential effects of messenger and social networking applications via smartphone and, accordingly, the Internet was the best venue for conducting the research. This research took place with a German speaking sample. Many studies regarding smartphone use for communication purposes have their origin in the USA and Asia. So, comparisons can be limited since functions of messengers differ (see Section 2.1.1). Furthermore, WhatsApp is only ranked number one in Germany and some parts of Asia but not in the US where the Facebook messenger dominates the market (Mehner & Bucher, 2020). A study with a more international focus would, thus, be an interesting endeavor for future research as well. This is also the case since cultural differences, such as privacy concerns (e.g., Dienlin & Metzger, 2016; Krasnova & Veltri, 2010; Schomakers et al., 2019), norms of social support (Kim et al., 2008), or CMC (Wang et al., 2009) influence the use of these platforms and possibly also the evaluation of experiences as being negative (Kyriakoullis & Zaphiris, 2016). Furthermore, the model in this study only included variables that interviewees pointed to initially (i.e., in study I). Many more variables can be derived from past research that might influence our media consumption, directly or indirectly; and given the amount of variance explained, there is still much unaccounted for—although the 37% that were explained in smartphone exposure in the final model already constitute a large effect according to Cohen (1988; see also MacKinnon et al., 2002).

Future studies could focus on the influence of self-efficacy for instance, since previous learning effects and setbacks in restraining from unwanted behavior might influence future self-control attempts (Bandura, 2009; Bandura et al., 1999; Wenzel et al., 2020) and, consequently, also habits and smartphone use. Aside from trait self-control, trait mindfulness is assumed to be negatively related to habitual texting behaviors, thus could be another variable worth adding for explanation of variance; and, because also malleable, in practice potentially a trait worth fostering (Moore & Brown, 2019). A study with a larger sample and more differentiated scales, and a narrowed focus on only some of this study's aspects (e.g., just the experiences, only the justifications or the role of FOMO in particular, third-person effects, etc.) could find stronger

effects or discover those that stayed hidden in this project. Analyzing for effects of age or gender could also provide more information about the observed experiences and their persistence.

Subsequent studies could employ another design, too: Instead of a questionnaire, ESM could be used to measure experiences in the moment and across the situations in which they take place, thus limiting possible memory effects. The smartphone plays an important role in everyday life and is used persistently anyway (e.g., Ling, 2012; Vorderer et al., 2017b). It would, therefore, be practical to use the device to measure live data. Despite the methodological disagreements and reporting standards yet to overcome when making use of these measures (van Berkel et al., 2017; Csikszentmihalyi & Larson, 2014), it would at least provide a precise framing of a situation of an experience and, more importantly, the evaluation of the experience, since the context might have a decisive impact on it—as some interviewees had implied (but the employed methodology in study I was not suited for detecting a pattern; see Section 5.3). Confabulations of justifications could be less problematic when using ESM as well since the exact situation might facilitate easier access to the reasons for a behavior when it took just place; or might at least prevent from a generalization across "all" situations and thus also from integration into self-knowledge if the reason really is not accessible. Lastly, even though U&G proposes an actively choosing and their needs knowing as well as accordingly acting individual, this method, because prompted closer to actual usage situations, would most likely provide much more reliable data even though it, too, relies on self-reports (Csikszentmihalyi & Larson, 2014).

Limitations notwithstanding, this study's contributions should not be neglected: Everyday persistent negative experiences and justifications for them were discovered and validated, whereas most research so far only looked at the "bright side" (e.g., at well-being) *or* went too "dark" too soon (e.g., analyzing possible clinical disorders associated with smartphone exposure). Moreover, this study extends a model that has been referred to for over 45 years and thereby provides an initial explanation as to why most people would condone the detriments of everyday smartphone use persistently. A behavior, the classic model alone cannot account for. The study also connects different disciplines and contributes to their body of research, respectively (e.g., to research on the third-person effect, habitual smartphone use, self-control, loneliness, basic needs, and negative effects of smartphone use). These contributions are not only valuable for advancing theoretical arguments but first suggestions for possible practical implications could be derived as well.

8.9 Summary Study II

The nine negative experiences with the smartphone found in study I were confirmed in a sample of $n = 264$ in study II. Moreover, Media Bubble and Endangerment were found to be distinguishable third-person experiences. Interruption, Loss of Time, and Auto Use were the most frequent; and Loss of Time, Interruption, and Overkill reported to be the most stressful persistent negative experiences. The nine experiences might not be as distinct as study I suggested. So, exploratory factor analyses were conducted, and two negative experience factors were extracted: an adaptation and an acceleration factor. The first subsumes Interruption, Auto Use, Loss of Time, and Media Bubble; and the second Overkill, Emotional Stress, Insignificance, and Way of Communication, while Endangerment was excluded due to ambiguous loadings on both factors. Analyses showed that the adaptation factor led to more smartphone exposure, whereas the acceleration factor's positive correlation turned negative once the adaptation experiences were controlled for in a regression model. This effect could be explained by the nature of the factor as well as smartphone use in everyday life. The adaptation experiences were closely associated with habitual use, they were learned and represent the "norm" in today's society: Most people are constantly available and often do not realize automatic use that disrupts other activities, costs them time that they could have spent otherwise, or that led them to walk/drive/sit around with the smartphone in their hands as if in their very own "bubble". This adapted behavior, thus, possibly leads to the respective negative experiences. In everyday life, the experiences presumably do not take place as separately as was measured in this study, too. It is more probable that needs get gratified (by getting an entertaining text, for instance) as well as dissatisfied (by not getting the message we were waiting for but many unimportant messages, for instance) in the same session of checking the phone. This assumption could be confirmed by analyses of factors influencing the persistence of this behavior despite negative experiences.

People justify behavior that is not in accordance with their goals or norms; and six justifications were extracted from the interviews (i.e., study I) and tested for in study II. Exploratory factor analyses led to two factors: a functional and a social factor. Analyses further revealed that FOMO and Need-Balance individually explained variance in the first factor, though only marginally. In a model containing all justifications, none mediated the effect of the adaptation factor on smartphone exposure. This led to the assumption that a justification might only be thought of when asked for (in a study, for instance) and only tangible in retrospective since the nature of these experiences suggests that they occur as result of rather nonconscious use most of the time. FOMO mediated the effect and explained a lot more variance in frequent use despite the experiences subsumed under the second factor—the most, in fact. Non-Evaluation and the

social factor (i.e., Pressure and Responsibility) also explained variance as mediating variables. However, only FOMO remained significant in a model containing all justifications. So, not wanting to miss out on what friends and acquaintances were doing weighed heavier in the prediction of frequent use than the other justifications did. Factor analyses were conducted for the remaining scales as well and the U&G factors were employed separately with the remaining scales used as unidimensional measures.

Analysis followed the structure of the model and tested the hypotheses, respectively. That is, they started with the negative experiences, their respective justifications, and the effects on smartphone exposure; and continued with the analysis of the U&G and its connections to persistent use as well as to negative experiences and FOMO. They revealed that U&G and negative experiences were positively correlated (as opposed to what could be derived from literature on the U&G, see Section 2.2) and a possible explanation could lie in habit, as mediation analyses confirmed. However, habit explained an average of 60% of variance of negative experiences factor 1 and only about 10% of the second factor; and FOMO still predicted negative experiences factor 2 even when controlled for habit. Active choice to use the smartphone for need fulfillment and habit co-exist in daily usage, as mediator analysis confirmed: The frequency of exposure mediated this relationship and explained 42% of variance on average. This is plausible since frequent usage intended to gratify needs becomes habitualized. However, even habitualized behavior can be influenced, for instance by self-control. Self-control negatively influenced smartphone exposure for need fulfillment as well as negative experiences and habit. These effects were mediated through habit: Higher trait self-control led to less habitual use, and less habitual use to less exposure.

Subsequently, the influence of the other two smartphone-independent measures were analyzed. Results showed that the degree of loneliness would influence self-control negatively and, only in turn, have a positive influence on negative experiences. Though, again, explanation of variance was low for the acceleration experiences. However, it did increase with the addition of habit, although especially for the adaptation experiences. The analyses also showed that loneliness and habit were independent from one another. The influence of loneliness on need-fulfillment was strong, and negative. So, someone experiencing more loneliness would rather lack a fulfillment of basic needs. This influence, however, would influence expectations towards need-fulfillment via smartphone (i.e., U&G needs) only via self-control—with one exception: The direct effect of loneliness on U&G F3 (which depicts longing for less loneliness and more safety) was positive even when controlled for self-control and basic need satisfaction, while both indirect effects were not statistically significant.

Lastly, the model was tested holistically—once with the focus on the prediction of the frequency of negative experiences and then with the main question in mind: *Which variables influence using the smartphone persistently despite possible negative effects*? Results suggest that adaptation experiences were mainly explained by habit, but since they also shared a lot of variance with the habit measure, it might point to a possible automatic character inherent in the respective experiences. Additionally, adaptation experiences were also positively predicted by FOMO and U&G safety needs, as well as negatively by self-control. Social reasons (i.e., Pressure, Responsibility, and FOMO) were particularly predicting acceleration experiences as was habit, whereas weighing the pros and cons of exposure if this justification stood alone (i.e., Need-Balance) would lead to less exposure to these experiences. These analyses shed some light on the prerequisites for negative experiences to occur frequently.

In the final model, predicting persistent exposure despite these experiences, it could be shown that a combination of habit, adaptation experiences, FOMO as well as entertainment needs would lead to more exposure, while the negative influence of social needs was significant as well. The entire regression model explained 37% of variance in smartphone exposure, still leaving much variance unaccounted for. However, the influences of smartphone-independent variables on those related to usage were detected and the connections depicted in the model as well, and assumed directions of the respective paths confirmed. Interesting insights came to light during the different analyses, such as the third-person effect for Media Bubble and Endangerment that could also be valid for other experiences; or the positively correlated positive (i.e., U&G) and negative experiences; just as the basic needs were found to be a pre-cursor of the acceleration experiences; or the pre-eminent role of traits such as self-control. Most importantly, the salient role of habitual smartphone usage in everyday life became evident, but also that this does not automatically exclude actively chosen usage for reasons of need-fulfillment.

9 Contribution & Conclusion of the Project

> Statistical models are tools we use to help us understand our data, and they can give us insights that are only approximations of reality.
>
> —Andrew F. Hayes

The significance and limitations of both studies presented were discussed in detail as well as summarized comprehensively in previous sections (see Sections 5.5 and 8.8 and Sections 5.6 and 8.9 respectively). Therefore, I will concisely reflect on the essence of the project as well as its contributions to the different fields of research in this final chapter. I will also briefly revisit the methodology applied and the significance of the project's findings. Three main results to build on scientifically and a possible course of action to counteract unwelcome persistent negative experiences will be proposed and conclude this thesis.

Data of n = 26 interviews (study I) and n = 264 surveys (study II) were analyzed to identify and validate negative experiences with the smartphone. These experiences are suggested to be persistent in everyday life but do not constitute mental disorders (yet). Nine negative experiences and six justifications for their persistence were derived from both studies. Although various limitations were discussed, particularly in the referenced sections above, three aspects are central for the classification and generalizability of the results. These are: sample, study design, and effect sizes. Firstly, the sampling method is imperative for the results to be statistically representative. Whereas study I used a quota plan to at least ensure a balanced sample regarding age, gender, and formal education; the sample of study II was a self-selected online sample and thus not well-balanced as it consisted of mostly female and formally well-educated participants. Both samples were German speaking, so cultural and usage characteristics might not be internationally comparable. Moreover, though a large sample size is not a necessity for the results to be representative, the sample size can be relevant for the inferential statistics employed—which was the case for the analysis of study II because several assumptions must be met before employing the respective methods (see Chapter 8 and in particular Sections 8.3.1 and 8.3.3.1). With a sample of n = 264, these assumptions were not always met, particularly in the case of the exploratory factor analyses. Power of a test (that is, the power to detect an effect) also depends on sample size. So, based on sampling and sample size inferences are only possible to a limited extent. Secondly, the design of both studies was cross-sectional yet tested a linear model that proposes directional pathways. Both qualitative interviews and quantitative surveys are accompanied by biases, such as interviewer effects, response-biases,

or social desirability. Moreover, potential shortcomings of the survey design (study II) were identified, particularly with regards to the questionnaire's length and order of questions. These factors could have influenced the data of the present project; thus, alternative designs for future studies were recommended and these limitations discussed with the results (see Section 8) and particularly in Section 8.8 regarding the significance of study II. Thirdly, effect sizes are important for evaluation of a statistical association between variables and for their informative value. Effect sizes in the quantitative study (i.e., study II) were mostly small to moderate, with only some variables' connections and their explanatory power observed to be large (as can be seen in Chapter 8 and the extended model, Figure 11). Accordingly, these limitations must be kept in mind when interpreting the results, derived implications, and thus, the potential scope of the present project's findings; and future studies, as always, are necessary to validate and extend this project's conclusions.

The project offers promising results, nonetheless: it contributes to the body of literature in that it extends the U&G and thereby addresses its shortcomings. In doing so, the project also demonstrated interdisciplinary connections as introduced in the literature review as well as depicted and analyzed in the model (Figure 11). In short, the studies contribute to literature on U&G, SDT, the third-person effect, FOMO, habit, loneliness, and self-control as well as the body of research on negative outcomes of smartphone use. Furthermore, connections to social comparison, the concept of flow, and cognitive dissonance were established throughout the project. The potential to combine these concepts and theories demonstrated that it is beneficial and important to work in an interdisciplinary manner. This is especially relevant considering the number of studies within the field of psychology alone which focus on mental disorders associated with smartphone use yet often disregard how these develop in the first place. As these behaviors are first and foremost (at least in a normal rather than clinical sample) everyday behaviors, it is necessary to consider "everyday explanations" for them. In this way, negative experiences could be counteracted before they become mentally harmful to a clinical extent.

Moreover, digitalization has led to an acceleration not only of our everyday lives—it has also entered science with an enormous pace and has accelerated the number of publications created (see also Montag, 2018). Even though the "half-life" of knowledge across various subdisciplines of psychology was once assumed to be 8.7 years, it was expected to steadily decrease over time (cf. Neimeyer et al., 2014) and is thus likely much shorter now—especially in research concerning fast-developing technologies which are used daily. New studies on this current topic notwithstanding, the contribution of this project is still valuable: Most studies outlined previously (e.g., Section 2.1) presumed mental disorders or some specific negative

effects, thus they did not explore other possible negative outcomes or consider everyday effects to constitute an issue since these disrupt daily life "at best" and constitute pre-clinical indices at worst. This project addressed the implicit request for basic research by focusing on prerequisites of the suggested mental illnesses in two consecutive studies: The first study was open to the user's experiences, meaning that the user could decide what kind of experiences were deemed negative and what medium they were mostly associated with. By using this approach, person-centered data was collected which was close to users' everyday experiences. The results were used for the second study to extend a classic yet influential framework of communication studies and to validate these first findings by testing the assumed connections between variables. This methodological approach is similar to initial U&G research where researchers ask about motives for media consumption and then validate this catalogue of motives. This was done during the emergence of U&G and then again when the Internet became a mass medium (Katz et al., 1974; Papacharissi & Rubin, 2000; Rubin, 1981). However, studies on negative experiences neither asked empirical and user-centered questions about these experiences (Gowthami & Kumar, 2016; Nath & Mukherjee, 2015), nor asked these as comprehensively as the present project has. To the best of my knowledge, this is the first project that studies not only persistent negative outcomes of everyday media use experienced by people frequently, but also employs both a qualitative and a quantitative approach to do so.

Combining methods has largely been found to be worthwhile as it "can offer a better understanding of the links between theory and empirical findings, challenge theoretical assumptions and develop new theory" (Östlund et al., 2011, p. 369). Moreover, a qualitative as well as quantitative methodology find beneficial application in all parts of a study—for instance, "in [the] type of questions, research methods, data collection and analysis procedures, or in inferences" (Tashakorri & Teddlie, 2003, as cited in Kuckartz, 2014, p. 33). This research design was employed in several stages of the project—with a qualitative interview study, analyzed utilizing a combination of quantitative and qualitative methodology to answer the research questions as well as for the development of the second study to further validate findings of the first study (for information on mixed methods see for instance Tashakkori & Teddlie, 2010). Moreover, results were interpreted and implications as well as the project's limitations and outlook were derived using an interdisciplinary view while considering the results of both studies.

Additionally, practical contributions could be derived from the insights of this study: For one, it implies that awareness is important—that is, some interviewees had not reflected upon their smartphone use so that they justified it just after they had realized that usage might be disadvantageous at times. Previous research has shown that unrealistic expectations of

smartphone use lead to more habitual use (Hunt et al., 2018) and changes of attitudes or even (habitualized) behavior are much more likely when a person feels that there are inconsistencies between their self-concept and their cognition or behavior (Aronson, 2019; Dickerson et al., 1992). The first step, however, needs to be the noticing of the respective behavior. Therefore, future endeavors to raise this awareness in users entail the potential for them to reflect so as to form more realistic expectations of use and its outcomes as well as the modification of "bad" habits as a next step. Secondly, looking at real-life issues of people who report negative experiences more often than others (as the model illustrates and at least the cross-sectional data supported) might also be an important prerequisite to intervene in the development of maladaptive practices (Wang et al., 2015). For instance, strengthening self-control or working on the issue of loneliness, and thus facilitating future need-gratification, might lead to less unwanted experiences. In short, the model is not exhaustive yet suggests some promising starting points for intervention in everyday negative experiences and for future research endeavors, too.

To conclude, I want to take a final look at the initial questions which led to this project:

- *Have you ever had a negative experience with the smartphone?*
- *Do you keep using it, nonetheless?*
- Finally, and most importantly: *Why would you use it again if use is most likely accompanied by negative outcomes?*

What can be derived from the present research project is the following: Firstly, negative experiences seem to play a regular role in everyday communication via the smartphone. Whether these are nine distinct negative experiences or two factors summarizing the negative experiences is less important for now—these nine aspects of negative encounters with the smartphone were identified in both studies and despite the limitations discussed provided insight into the maladaptive practices and their potential consequences in everyday life. They are important since they are a bridge crossing the gap between everyday use and its "darkest" side (i.e., mental disorders resulting from use).

Secondly, in everyday communication via mobile devices, habits are very important, as the largest effects of this variable illustrated (as opposed to the effect sizes observed for the other variables employed in the model), but—just as with needs—they *cannot* explain all the variance in the persistence of negative experiences on their own. Together, habit, adaptation experiences, FOMO, and U&G needs (i.e., social and entertainment needs) explained 37% of variance in smartphone exposure for communication purposes and though the effect is not small, it is still far from being exhaustive. Therefore, additional variables need to be

considered—the interplay of individual characteristics is complex, and it seems plausible that persistence depends on social context, too.

Thirdly, the third-person perspective was only analyzed in more depth for two experiences (Media Bubble and Endangerment), but to the best of my knowledge it has not been analyzed for persistent negative experiences with the smartphone to date. It was surprising that this effect was not present for all experiences during the interviews, and since it might explain much more of our ambiguous behavior (that is, use despite negative experiences) it could potentially support the deduction of implications for practice.

What can we do?

I argue that awareness of the behaviors which we (and not only "third-persons") demonstrate in everyday life is a first step towards counteracting these. This is especially the case where certain behaviors have become habitual because we are not consciously aware of them. In other words, we cannot develop a more beneficial relationship with the smartphone until we are fully aware of how we are utilizing it. Its mere presence might distract us from more important things or lead us to act in ways we do not consciously want to. For instance, using the phone while in the presence of friends is possibly driven by a fear of missing out in the first place (as it is suggested to be a very important driving force behind smartphone use). This behavior, however, is contradictory as the smartphone is used for establishing contact with others while at the same time distracting us from the friends who are present physically. Moreover, these friends might feel neglected, phubbed, or even ostracized by this behavior. In this way, smartphone use because of FOMO might lead to even more negative consequences than what a person was afraid of to begin with. It might even have the opposite effect, that is, less satisfaction in terms of the need for relatedness. This would, in turn, lead to heightened FOMO and increased smartphone use, including in the presence of others.

So being explicitly aware of our actions and reflecting upon them might help us to realize that we are possibly caught up in a vicious cycle. We can then implement strategies to interrupt this behavior, such as making a conscious effort to check the smartphone less frequently. Once aware, we could possibly use a smartphone application to help with unwanted checking behavior or use of certain applications. This may sound contradictory, but applications exist that are designed to help us with this digital detox. In fact, recent studies have shown that using applications which switch off, decrease the frequency of notifications, or lock the phone for a pre-determined amount of time can help with using it less frequently and, thus, prevent unwanted experiences and even improve well-being (see e.g., Fitz et al., 2019; Schmuck, 2020).

Habits are not easy to change and multiple factors contribute to our everyday behaviors, as has been outlined elsewhere in this project. Awareness is possibly only the first, though necessary, step that needs to be taken to change unwanted behaviors and their respective experiences. Using one of these apps could be part of this tangible plan. The development of healthier habits might help even in cases of low or weakened self-control. Our needs would benefit from this, and with the improved satisfaction of needs, our tendency towards using the phone and the gratifications obtained thereby become more satisfying, too. At least, this is what the findings of this project, including the reviewed literature, imply. Let us try this out in our everyday lives now, shall we?

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Appendix

Additional supplementing material not included in the appendix can be requested from the author.

Study I

Table A 1

Questionnaire Study I

CODE: _____ **Datum:** _____

Alter: _____

Geschlecht:
□ weiblich
□ männlich
□ sonstiges_____

Höchster Bildungsabschluss:
□ Hochschulabschluss
□ Fachhochschulabschluss
□ Abitur
□ FH-Reife
□ Realschule
□ Hauptschule
□ keiner
□ anderer _____

Beruf:
□ _____
□ Student
□ Schüler
□ Rentner
□ arbeitslos

Häufigkeit Mediennutzung:

<u>Fernsehen linear</u> (d. h. man guckt etwas, wenn es gesendet wird):
□ mehrmals täglich
□ täglich
□ mehrmals/Woche
□ 1x/Woche
□ mehrmals/Monat
□ 1x/Monat
□ Seltener
□ nie

<u>Fernsehen</u> – Streaming (d. h. man wählt, was man wann guckt; z. B. Netflix oder Mediatheken):

□ mehrmals täglich
□ täglich
□ mehrmals/Woche
□ 1x/Woche
□ mehrmals/Monat
□ 1x/Monat
□ seltener
□ nie

Radio:

□ mehrmals täglich
□ täglich
□ mehrmals/Woche
□ 1x/Woche
□ mehrmals/Monat
□ 1x/Monat
□ seltener
□ nie

Tageszeitung:

□ mehrmals täglich
□ täglich
□ mehrmals/Woche
□ 1x/Woche
□ mehrmals/Monat
□ 1x/Monat
□ seltener
□ nie

Internet:

□ mehrmals täglich
□ täglich
□ mehrmals/Woche
□ 1x/Woche
□ mehrmals/Monat
□ 1x/Monat
□ seltener
□ nie

Smartphone:

□ mehrmals täglich
□ täglich
□ mehrmals/Woche
□ 1x/Woche
□ mehrmals/Monat
□ 1x/Monat
□ seltener
□ nie

anderes Medium (sofern zutreffend): _____

□ mehrmals täglich
□ täglich
□ mehrmals/Woche
□ 1x/Woche
□ mehrmals/Monat
□ 1x/Monat
□ seltener
□ nie

Table A 2

Interview Guideline

STEP	**QUESTION/*NOTE***
Begrüßung	Hallo, vielen Dank dass Sie sich bereit erklärt haben, mir ein bisschen was zu Ihrer Mediennutzung zu erzählen! Ich bin Doktorandin am Institut für Medien und Kommunikation der Universität Hamburg und dieses Gespräch stellt den ersten Schritt einer Untersuchung für meine Dissertation dar, in der ich die Wahrnehmung von Medien genauer untersuchen möchte. So viel vorab, mehr möchte ich eigentlich nicht vorwegnehmen. Ich kann aber gerne später, sofern es Sie interessiert, etwas genauer auf meine Untersuchungsziele eingehen?! Dieses Gespräch dauert vermutlich nicht länger als 20 Minuten und ich würde es gerne aufzeichnen, um nichts zu überhören oder zu vergessen und damit v. a. wissenschaftlich korrekt arbeiten (es verschriftlichen und auswerten) zu können. Dabei behandle ich die Inhalte dieses Gespräches vertraulich, so dass Personendaten und Interviewdaten nicht in Verbindung gebracht oder Rückschlüsse auf Ihre Person gezogen werden können. Sind Sie einverstanden? Wenn alles klar ist und keine Fragen mehr im Raum stehen, können wir starten – in Ordnung? Dann komme ich direkt zu der Frage, die hier und jetzt Mittelpunkt stehen soll:

Interviewfragen	1.) Wenn Sie an Ihre Mediennutzung denken – ist es Ihnen auch schon mal passiert, dass Sie während dieser oder auch danach negative Erfahrungen gemacht haben und trotzdem wiederholen Sie diese Mediennutzung? 2.) In welchem sozialen Kontext findet diese Mediennutzung (mit negativen Erlebnissen) für gewöhnlich oder meistens statt? 3.) Was glauben Sie, woran liegt es, dass Sie trotz der negativen Erfahrungen immer wieder Medium XY nutzen? *Evtl. nachhaken, wenn alle Medien genannt, die einfallen:* Ist Ihnen noch etwas Negatives bzw. ähnliches mit anderen Medien, z. B. Fernsehen, Internet, Radio, Zeitung, etc. passiert?
Abschluss	Das waren bereits meine Fragen. Wie ging es Ihnen während des Gespräches und wie geht es Ihnen jetzt – sind noch Fragen für Sie offen? Gibt es noch Ungesagtes? *Fragen klären, evtl. zur Diss. etwas erzählen und abschließend auf Verwertung der Daten hinweisen:* Wie schon gesagt, stellt dieses Gespräch den ersten Schritt einer Untersuchung für meine Dissertation dar, weswegen ich die Ergebnisse dieses Gesprächs in meiner Doktorarbeit verarbeiten werde sowie in wissenschaftlichen Publikationen oder Vorträgen. Auch schon eingangs erwähnt habe ich, dass ich dabei auf die Pseudonymisierung der hier gemachten Antworten die größte Sorgfalt lege, also keine Rückschlüsse gezogen werden können. Das nur noch mal zum Abschluss – vielen herzlichen Dank!

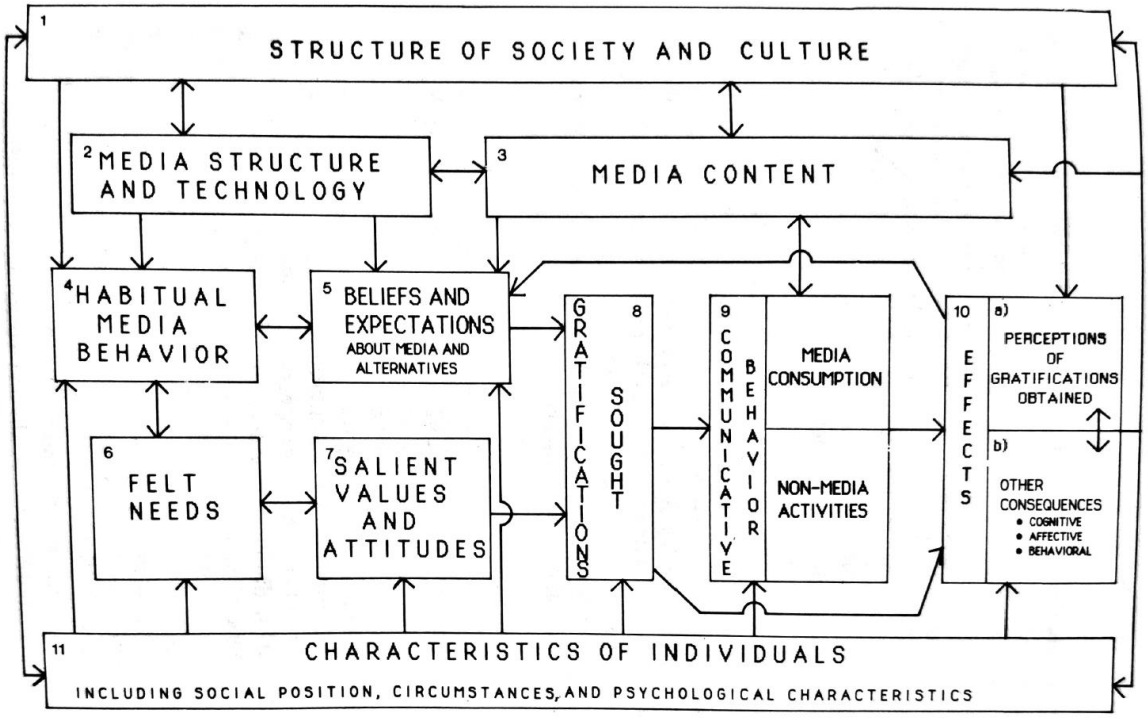

Figure A 1

A General Media Gratifications Model

Note. Illustration of the model kindly borrowed from Palmgreen, Wenner, and Rosengren (1985, p. 16). Copyright lies with the authors of the cited publication.

Study II

Table A 3

Questionnaire Study II

SKALA/VARIABLE (SCALE/VARIABLE)	**ITEMS (ITEMS)**	**AUSFÜLLAN-WEISUNG (INSTRUC-TIONS)**	**ANTWORTOPTIONEN (RESPONSE OPTIONS)**
SOZIODEMOGRAFIE [a] **(DEMOGRAPHIC INFORMATION)** 4 Items	Wie alt bist du? (How old are you?)	Bitte gib dein Alter in Jahren an. (Please indicate your age in years.)	
	Bitte gib das Geschlecht an, mit dem du dich am ehesten identifizierst. (Please indicate the gender you identify with.)		weiblich (female) männlich (male) divers (divers)
	Bitte gib deinen aktuell höchsten Bildungsabschluss an. (Please indicate your highest academic qualification.)		Hochschulabschluss (graduate degree) Fachhochschulabschluss (polytechnic degree) Abitur (university-entrance diploma) FH-Reife (advanced technical college entrance qualification) Realschule (intermediate secondary education certificate) Hauptschule (general secondary education certificate) Kein Schulabschluss (without school certificate) Anderer, nämlich (other)
	Bitte gib an, welcher Berufsstand am ehesten auf dich zutrifft.		Schüler (student—school) Student (student—uni/college)

SKALA/VARIABLE (SCALE/VARIABLE)	**ITEMS (ITEMS)**	**AUSFÜLLANWEISUNG (INSTRUCTIONS)**	**ANTWORTOPTIONEN (RESPONSE OPTIONS)**
	(Please indicate your working status.)		Berufstätig Vollzeit (employed full time) Berufstätig Teilzeit (employed part-time) Nicht beschäftigt (unemployed)
	Im Folgenden geht es um die Nutzung deines Smartphones zu Kommunikationszwecken - damit ist deine Nutzung von Messenger Apps (z.B. WhatsApp, Facebook Messenger) und/oder deine Nutzung von Social Networking Apps bzw. Sites (z.B. Facebook, Instagram) gemeint. (The questions below concern your smartphone use for communication purposes—more precisely, your use of messenger apps (e.g., WhatsApp, Facebook Messenger) and/or social networking apps/sites (e.g., Facebook, Instagram).)		
NUTZUNG SOCIAL MEDIA [a] **(USE OF SOCIAL MEDIA)** 2 Items	Wie häufig schaust du auf deiner Messenger App (z.B. WhatsApp, Facebook Messenger) nach, ob es neue Nachrichten gibt? (How often do you check your messenger apps for new messages?)	Bitte gib die Häufigkeit an, die am ehesten zutrifft. Falls dein Smartphone die Information bereithält oder du eine entsprechende App zum Tracking deiner Nutzung verwendest, kannst du dort auch nachsehen und evtl. noch genauere Angaben machen. (Please indicate the frequency which applies. If this information is captured by your smartphone or a usage	7 = mehrmals pro Stunde (multiple times per hour) 6 = durchschnittlich 1x/Std (on average hourly) 5 = durchschnittlich 5-10x/Tag (on average 5 to 10 times per day) 4 = durchschnittlich 2-4 x/Tag (on average 2 to 4 times per day) 3 = täglich (daily) 2 = seltener (less than daily) 1 = nie (never)

SKALA/VARIABLE (SCALE/VARIABLE)	**ITEMS (ITEMS)**	**AUSFÜLLAN-WEISUNG (INSTRUC-TIONS)**	**ANTWORTOPTIONEN (RESPONSE OPTIONS)**
		/tracking app, please feel free to check this data and use it to provide more detailed information.)	
	Wie häufig schaust du via Social Networking Apps (z.B. Facebook, Instagram) nach, ob es Neuigkeiten gibt? (How often do you check social networking apps (sites) for new information?)		7 = mehrmals pro Stunde 6 = durchschnittlich 1x/Std 5 = durchschnittlich 5-10x/Tag 4 = durchschnittlich 2-4 x/Tag 3 = täglich 2 = seltener 1 = nie
FILTER	Bei Nichtnutzung: Ausschluss (Antwort „nie“ bei Messengern und Social Networking Apps) (The respondent was excluded from further questioning, if they used neither messengers nor social networking via their smartphone.)		
NEGATIVE ERFAHRUNGEN [a] **(NEGATIVE EXPERIENCES)** 11 Items	Im Folgenden werden Erfahrungen aufgelistet, die viele Menschen wiederholt mit ihrem Smartphone machen, während sie Messenger und/oder Social Networking Apps nutzen. Bitte gib an, **wie häufig** du die genannten Erfahrungen selbst machst. Wähle „nie“ aus, wenn du diese Erfahrung noch nie gemacht hast. (People experience different phenomena repeatedly with their smartphones while using messengers and/or social networking apps. These experiences are listed below. Please indicate, **how often** you experience the described phenomena. Choose “never” if you have never experienced a particular phenomenon.)	Ich mache diese Erfahrung... (I experience this…)	Bitte nimm die Bewertung anhand einer Skala von 1 bis 6 vor, wobei die 1 bedeutet, dass du diese Erfahrung nie machst und die 6, dass du sie sehr oft machst. 6 = *ich mache diese Erfahrung **sehr oft*** bis 1 = *ich mache diese Erfahrung **nie*** (Please indicate on a scale from 1 to 6, if and how often you experience the phenomenon with your smartphone. 1 means you never experience this and 6 means that you experience this phenomenon very often.

SKALA/VARIABLE (SCALE/VARIABLE)	**ITEMS (ITEMS)**	**AUSFÜLLAN-WEISUNG (INSTRUC-TIONS)**	**ANTWORTOPTIONEN (RESPONSE OPTIONS)**
			6 = *I experience …* ***very often***; 1 = *I* ***never*** *experience this with my smartphone*)
Medienblase, 1st person (Media Bubble 1st person)	Durch die Nutzung von Messengern und/oder Social Networking Apps nehme ich die Welt um mich herum gar nicht mehr wahr. (Due to the use of messengers and/or social networking apps, I don't take notice of the world around me.)		
Medienblase, 3rd person (Media Bubble 3rd person)	**Andere** Menschen sind so vertieft in ihr Smartphone, dass sie die Welt um sich herum nicht mehr wahrnehmen. (Due to the use of messengers and/or social networking apps, **others** no longer take notice of the world around them.)	Wie oft fällt dir das auf? (How often do you notice this?)	6 = *sehr oft* bis 1 = *nie* (6 = *very often* to 1 = *never*)
Overkill (Schnelllebigkeit; Nachrichtenwelle - zu viele WA-/FB-Messages; Überangebot) (Overkill)	Ich bin genervt von der Masse und Geschwindigkeit neuer Mitteilungen auf Messengern oder Social Networking Sites. (I'm annoyed by the rate of new messages on messengers or social networking sites.)		
Belastung (emotional) (Emotional Stress)	Es stresst mich, über Messenger oder Social Networking Apps immer und überall erreichbar zu sein. (I find it stressful to always be contactable via messengers and social media.)		
Automatische Nutzung (Auto Use)	In meinem Alltag nutze ich Messenger oder Social Networking Apps ganz automatisch ohne es zu beabsichtigen.		

SKALA/VARIABLE (SCALE/VARIABLE)	**ITEMS (ITEMS)**	**AUSFÜLLANWEISUNG (INSTRUCTIONS)**	**ANTWORTOPTIONEN (RESPONSE OPTIONS)**
	(In my everyday life, I use messengers or social networking apps automatically without intending to do so.)		
Negative Auswirkungen auf die eigene Gesundheit (Endangerment 1st person)	Durch die Nutzung von Messengern oder Social Networking Apps setze ich meine Gesundheit aufs Spiel—zum Beispiel, wenn ich völlig darauf vertieft damit herumlaufe oder es während des Autofahrens nutze. (I put my health at risk when I use messengers or social networking apps - for example, when I am completely absorbed by it while walking around or use it while driving.)		
Negative Auswirkungen auf die Gesundheit anderer (Endangerment 3rd person)	Ich sehe gesundheitlich riskante Smartphonenutzung bei **anderen**—zum Beispiel, wenn jemand darauf fixiert im Straßenverkehr herumläuft oder es sogar während des Autofahrens nutzt, oder aber bei Kindern, die noch viel zu jung für die Nutzung von Smartphones sind. (I see smartphone use that might endanger the health of **others**—for example, if someone is using it while walking or even driving, or in children, who are too young for the use of smartphones.)	Wie oft fällt dir das auf? (How often do you notice this?)	6= *sehr oft* bis 1 = *nie* (6 = *very often* to 1 = *never*)
Priorisierung, Inhaltslosigkeit, Unwichtigkeit von Inhalten (Insignificance)	Es nervt mich, dass die meisten Inhalte auf Messengern und/oder Social Networking Sites für mich und mein Leben eigentlich völlig unwichtig sind. (It annoys me that most of the content on messengers and/or social networking sites is completely unimportant for me and my life.)		
Unterbrechung, Ablenkung (Interruption, Distraction)	Messenger und/oder Social Networking Apps unterbrechen mich bei oder halten mich von wichtigeren Tätigkeiten ab (z.B. von meiner Arbeit, vom Lernen, von Arbeit im Haushalt,…).		

SKALA/VARIABLE (SCALE/VARIABLE)	**ITEMS (ITEMS)**	**AUSFÜLLAN-WEISUNG (INSTRUC-TIONS)**	**ANTWORTOPTIONEN (RESPONSE OPTIONS)**
	(Messenger and/or social networking apps interrupt me during or keep me from more important activities (such as work, learning, chores,...)		
Zeitverlust (Loss of Time)	Messenger Apps und/oder Social Networking Sites kosten mich viel Zeit, die ich viel sinnvoller nutzen könnte. (Messenger apps and/or social networking sites waste a lot of time, which I could use much more meaningfully.)		
Art der Kommunikation (Way of Communication)	Die Kommunikation via Messenger/Social Networking Apps ist unpersönlich und/oder anfällig für Missverständnisse. (Communication via messenger/social networking apps is impersonal and/or prone to misunderstandings.)		
filter	Je negativer Erfahrung direkt nach Beantwortung der Häufigkeit die Begründungen abfragen! Filter, so dass nur die Erfahrungen abgefragt werden, die auch gemacht werden. Wenn nicht „nie“ angegeben wurde, wird wie folgt gefragt (erst Belastung, dann Begründung). (Directly following the inquiry of frequency for an experience, the negative appraisal and justifications will be collected, but only if applicable. This means, only if the respondent chose an answer other than "never" for frequency, they will be asked further about it.)		
BELASTUNGS-EMPFINDEN [a]	Ich wüsste nun gerne, inwiefern du die genannte **Erfahrung** in deinem Alltag als **belastend empfindest**.	Ich empfinde diese Erfahrung in meinem Alltag als belastend.	Es gibt keine richtigen oder falschen Antworten - bitte antworte so, wie es für dich persönlich zutrifft. Bitte nimm deine Einschätzung anhand

SKALA/VARIABLE (SCALE/VARIABLE)	**ITEMS (ITEMS)**	**AUSFÜLLAN-WEISUNG (INSTRUC-TIONS)**	**ANTWORTOPTIONEN (RESPONSE OPTIONS)**
(APPRAISAL OF EMOTIONAL QUALITY (NEGATIVITY) OF EXPERIENCES) 11 Items	(To what extent do you appraise the experience as emotionally stressful?)	(I perceive this experience as being emotionally stressful.)	einer Skala von 1 bis 6 vor, wobei die 1 bedeutet, dass du die Erfahrung gar nicht als belastend wahrnimmst und die 6, dass du sie als sehr belastend erlebst. (There are no right or wrong answers - please answer to what extent you personally agree or disagree. Please indicate your assessment on a scale from 1 to 6, whereby 1 means that you don't perceive the experience as emotionally stressful and 6 that that you appraise the experience as very stressful.)
Medienblase, 1st person (Media Bubble 1st person)	Durch die Nutzung von Messengern/Social Networking Apps nehme ich die Welt um mich herum gar nicht mehr wahr. (Due to the use of messengers and/or social networking apps, I don't take notice of the world around me.)		6 = *trifft voll und ganz zu*, 1 = *trifft gar nicht zu* (6 = *fully applies*, 1 = *does not apply at all)*
Medienblase, 3rd person (Media Bubble 3rd person)	**Andere** Menschen sind so vertieft in ihr Smartphone, dass sie die Welt um sich herum nicht mehr wahrnehmen. (Due to the use of messengers and/or social networking apps, **others** no longer take notice of the world around them.)	*Note: Respondents not surveyed for justifications of third-person experiences.*	
Overkill (Schnelllebigkeit; Nachrichtenwelle - zu viele WA-/FB-Messages; Überangebot)	Ich bin genervt von der Masse und Geschwindigkeit neuer Mitteilungen auf Messengern oder Social Networking Sites.		

SKALA/VARIABLE (SCALE/VARIABLE)	**ITEMS (ITEMS)**	**AUSFÜLLANWEISUNG (INSTRUCTIONS)**	**ANTWORTOPTIONEN (RESPONSE OPTIONS)**
(Overkill)	(I'm annoyed by the rate of new messages on messengers or social networking sites.)		
Belastung (emotional) (Emotional Stress)	Es stresst mich, über Messenger oder Social Networking Apps immer und überall erreichbar zu sein. (I find it stressful to always be contactable via messengers and social media.)		
Automatische Nutzung (Auto Use)	In meinem Alltag nutze ich Messenger oder Social Networking Apps ganz automatisch, ohne es zu beabsichtigen. (In my everyday life, I use messengers or social networking apps automatically without intending to do so.)		
Negative Auswirkungen auf die eigene Gesundheit (Endangerment 1st person)	Durch die Nutzung von Messengern oder Social Networking Apps setze ich meine Gesundheit aufs Spiel—zum Beispiel, wenn ich völlig darauf vertieft damit herumlaufe oder es während des Autofahrens nutze. (I put my health at risk when I use messengers or social networking apps - for example, when I am completely absorbed by it while walking around or use it while driving.)		
Negative Auswirkungen auf die Gesundheit anderer (Endangerment 3rd person)	Ich sehe gesundheitlich riskante Smartphonenutzung bei **anderen**—zum Beispiel, wenn jemand darauf fixiert im Straßenverkehr herumläuft oder es sogar während des Autofahrens nutzt, oder aber bei Kindern, die noch viel zu jung für die Nutzung von Smartphones sind. (I see smartphone use that might endanger the health of **others**—for example, if someone is using it while walking or even driving, or in children, who are too young for the use of smartphones.)	*Note: Respondents not surveyed for justifications of third-person experiences.*	

SKALA/VARIABLE (SCALE/VARIABLE)	**ITEMS (ITEMS)**	**AUSFÜLLAN-WEISUNG (INSTRUC-TIONS)**	**ANTWORTOPTIONEN (RESPONSE OPTIONS)**
Priorisierung, Inhaltslosigkeit, Unwichtigkeit von Inhalten (Insignificance)	Es nervt mich, dass die meisten Inhalte auf Messengern und/oder Social Networking Sites für mich und mein Leben eigentlich völlig unwichtig sind. (It annoys me that most of the content on messengers and/or social networking sites is completely unimportant for me and my life.)		
Unterbrechung, Ablenkung (Interruption, Distraction)	Messenger und/oder Social Networking Apps unterbrechen mich bei oder halten mich von wichtigeren Tätigkeiten ab (z.B. von meiner Arbeit, vom Lernen, von Arbeit im Haushalt,…). (Messenger and/or social networking apps interrupt me during or keep me from more important activities (such as work, learning, chores,...)		
Zeitverlust (Loss of Time)	Messenger und/oder Social Networking Apps kosten mich viel Zeit, die ich viel sinnvoller nutzen könnte. (Messenger apps and/or social networking sites waste a lot of time, which I could use much more meaningfully.)		
Art der Kommunikation (Way of Communication)	Die Kommunikation via Messenger/Social Networking Apps ist unpersönlich und/oder anfällig für Missverständnisse. (Communication via messenger/social networking apps is impersonal and/or prone to misunderstandings.)		
JUSTIFICATIONS [a] 9 Items		Bitte gib nun an, inwiefern die unten genannten Gründe für dich zutreffen. Du kannst deine Einschätzung hierbei erneut auf einer Skala von 1 = *trifft gar nicht zu* bis	

SKALA/VARIABLE (SCALE/VARIABLE)	**ITEMS (ITEMS)**	**AUSFÜLLAN-WEISUNG (INSTRUC-TIONS)**	**ANTWORTOPTIONEN (RESPONSE OPTIONS)**
		6 = *trifft voll und ganz zu* vornehmen. (Please indicate to which degree each justification applies to you. You can choose from 1 = *does not apply at all* to 6 = *fully applies*.)	
Medienblase, 1st person (Media Bubble 1st person)	Wenn ich durch die Nutzung von Messengern und/oder Social Networking Apps die Welt um mich herum gar nicht mehr wahrnehme, tendiere ich normalerweise dazu, die Nutzung trotzdem fortzusetzen,... (When I don't take notice of the world around me due to the use of messengers and/or social networking apps, I still tend to continue this usage behavior,…)		…, weil **andere** in meinem privaten Umfeld **es von mir erwarten**, stets erreichbar zu sein**.** (+<-) (…because **others** in my private environment **expect from me** to be always reachable.) …,weil ich es für meine **soziale Verantwortung** halte, stets erreichbar zu sein. (+<-) (…because it is my **social responsibility** to be always reachable.) …,weil ich dann **nichts verpasse,** was Freunde und Bekannte erleben. (+<-) (…because this way, I **will not miss out** on what my friends and acquaintances do.) …,weil es einfach **praktisch** ist und sich **Vorteile und Nachteile** quasi die **Balance** halten. (+=-)

SKALA/VARIABLE (SCALE/VARIABLE)	**ITEMS (ITEMS)**	**AUSFÜLLAN-WEISUNG (INSTRUC-TIONS)**	**ANTWORTOPTIONEN (RESPONSE OPTIONS)**
			(…because it is **practical** and **uses and detriments** keep in **balance**.) …,weil ich mir über **negative Folgen keine bewussten Gedanken** mache. (+?-) (…because I **don't think about** possible **negative consequences**.) …, weil die **Vorteile** (z.B. weniger Langeweile, Erholung, Kontakt zu anderen, sich selbst mitteilen können, sich sicher fühlen,…) **doch etwas gegenüber den negativen Folgen überwiegen**. (+>-) (…because the **uses** (e.g., recreation, less boredom, contact to others, self-expression, feeling safe) **outweigh the detriments at least to some extent**.)
Overkill (Schnelllebigkeit; Nachrichtenwelle - zu viele WA-/FB-Messages; Überangebot) (Overkill)	Wenn ich von der Masse und Geschwindigkeit neuer Mitteilungen auf Messengern/Social Networking Sites genervt bin, tendiere ich normalerweise dazu, die Nutzung trotzdem fortzusetzen,… (Even though I annoyed by the rate of new messages on messengers or social networking sites, I still tend to continue this usage behavior,…)		Antwortalternativen wie zum ersten Item! (same as above)
Belastung (emotional)	Wenn es mich stresst, über Messenger und/oder Social Networking Apps immer und überall erreichbar zu sein,		Antwortalternativen wie zum ersten Item!

SKALA/VARIABLE (SCALE/VARIABLE)	**ITEMS (ITEMS)**	**AUSFÜLLAN-WEISUNG (INSTRUC-TIONS)**	**ANTWORTOPTIONEN (RESPONSE OPTIONS)**
(Emotional Stress)	tendiere ich normalerweise dazu, die Nutzung trotzdem fortzusetzen,… (Even though I am stressed out because I am always reachable via messengers or social networking apps, I still tend to continue this usage behavior,…)		(same as above)
Automatische Nutzung (Auto Use)	Wenn ich merke, dass ich Messenger/Social Networking Apps ganz automatisch nutze, tendiere ich normalerweise dazu, die Nutzung trotzdem fortzusetzen,… (When I realize that I use messengers and/or social networking apps automatically without intending to do so, I still tend to continue this usage behavior,…)		Antwortalternativen wie zum ersten Item! (same as above)
Negative Auswirkungen auf die eigene Gesundheit (Endangerment 1st person)	Wenn ich bei mir eine gesundheitlich riskante Nutzung von Messengern/Social Networking Apps bemerke (z.B. Nachrichten schreiben während ich herumlaufe oder Auto fahre), tendiere ich normalerweise dazu, die Nutzung trotzdem fortzusetzen,… (Even though I put my health at risk when I use messengers or social networking apps—for example, when I am completely absorbed by it while walking around or use it while driving—I still tend to continue this usage behavior,…)		Antwortalternativen wie zum ersten Item! (same as above)
Priorisierung, Inhaltslosigkeit, Unwichtigkeit von Inhalten (Insignificance)	Wenn ich genervt bin von unwichtigen Inhalten auf Messengern/Social Networking Apps, tendiere ich normalerweise dazu, die Nutzung trotzdem fortzusetzen,… (Even though it annoys me that most of the content on messengers and/or social networking sites is completely unimportant for me and my life, I still tend to continue this usage behavior,…)		Antwortalternativen wie zum ersten Item! (same as above)

SKALA/VARIABLE (SCALE/VARIABLE)	**ITEMS (ITEMS)**	**AUSFÜLLAN-WEISUNG (INSTRUC-TIONS)**	**ANTWORTOPTIONEN (RESPONSE OPTIONS)**
Unterbrechung, Ablenkung (Interruption, Distraction)	Wenn Messenger/Social Networking Apps mich ständig von anderen wichtigen Dingen abhalten oder mich bei diesen unterbrechen, tendiere ich normalerweise dazu, die Nutzung trotzdem fortzusetzen,… (When messengers and/or social networking apps interrupt me during or keep me from more important activities (such as work, learning, chores,...), I still tend to continue this usage behavior,…)		Antwortalternativen wie zum ersten Item! (same as above)
Zeitverlust (Loss of Time)	Wenn ich bemerke, dass ich viel zu viel Zeit mit Messengern/Social Networking Apps verbringe, tendiere ich normalerweise dazu, die Nutzung trotzdem fortzusetzen,… (Even though I realize that messenger apps and/or social networking sites waste a lot of time that I could use much more meaningfully, I still tend to continue this usage behavior,…)		Antwortalternativen wie zum ersten Item! (same as above)
Art der Kommunikation (Way of Communication)	Wenn ich bemerke, dass die Kommunikation via Smartphone sich unpersönlich anfühlt oder zu Missverständnissen führt, tendiere ich normalerweise dazu, die Nutzung trotzdem fortzusetzen,… (Even though communication via messenger/social networking apps is impersonal and/or prone to misunderstandings, I still tend to continue this usage behavior,…)		Antwortalternativen wie zum ersten Item! (same as above)
BEDÜRFNISSE (U&G) (Needs according to the Uses-and-Gratifications Approach, in short U&G)	Normalerweise nutze ich Messenger und/oder Social Networking Apps auf meinem Smartphone,... (I usually use messenger and/or social networking apps on my smartphone,…)	Im Folgenden geht es um die Gründe deiner Nutzung von Messengern und/oder Social Networking Apps auf deinem Smartphone. Bitte ant-	6= *trifft voll und ganz zu* bis 1 = *trifft gar nicht zu* (6 = *fully applies,* 1 = *does not apply at all)*

SKALA/VARIABLE (SCALE/VARIABLE)	**ITEMS (ITEMS)**	**AUSFÜLLAN-WEISUNG (INSTRUC-TIONS)**	**ANTWORTOPTIONEN (RESPONSE OPTIONS)**
Self-constructed scale based on Schnauber (2017), Krupp and Breunig (2015), Dhir, Chen, and Nieminen (2017), as well as on the results of the interviews (first part of this project). 17 Items		worte so, wie es normalerweise am besten auf deine Nutzung zutrifft. (The next part concerns your usage of messengers and/or social networking apps via your smartphone. Please choose the answer that applies best to your typical use.)	
Soziale Interaktion (Social interaction; (items adopted from Schnauber, 2017)	…um danach im Freundes-/Bekanntenkreis mitreden zu können. (…to be able to join in on a conversation in my circle of friends/acquaintances. [a/c]) ...um mit anderen Leuten kommunizieren zu können. (…to communicate with other people. [a]) …um in Bezug auf Freunde und Bekannte auf dem Laufenden zu bleiben. (…to stay informed with regards to (developments in) my circle of friends/acquaintances. [a]) …um bestimmte Dinge über Freunde und Bekannte erfahren zu können. (…to get to know certain things about friends/acquaintances. [a])		
Langeweile (Boredom) (one of originally two items (*boredom/pass time* and *escapism*) adopted from Schnauber, 2017)	…um freie Zeit zu überbrücken/Langeweile vertreiben zu können. (…to pass time.[c])		
Ablenkung	…um mich abzulenken. (…to escape my daily routine.[c])		

SKALA/VARIABLE (SCALE/VARIABLE)	**ITEMS (ITEMS)**	**AUSFÜLLAN-WEISUNG (INSTRUC-TIONS)**	**ANTWORTOPTIONEN (RESPONSE OPTIONS)**
(Escapism; based on Schnauber (2017) and (Krupp & Breunig, 2015)			
Entspannung (Relaxation; based on Schnauber (2017) and (Krupp & Breunig, 2015)	…um entspannen zu können. (…to relax.[a])		
Selbstdarstellung (Self-presentation; item generated according to results of interviews)	…um mich mitteilen zu können. (…to express myself.[a]) …um anderen Personen Dinge über mich zu zeigen (zum Beispiel Dinge, die ich erlebe oder Orte, an denen ich bin). (…to show others things about me (e.g. things I do or places I am visiting.[a])		
Einsamkeit (Loneliness; based on (Krupp & Breunig, 2015)	…um mich nicht allein zu fühlen. (...to not feel lonely.[a])		
Sicherheit (Safety; item generated according to results of interviews)	…um mich sicher zu fühlen, wenn ich unterwegs bin. (…to feel safe when I am out.[a])		
Unterhaltung (hedonistisch) (Entertainment, hedonistic; based on Schnauber (2017; Items 1&3), Krupp and Breunig (2015), and Dhir, Chen, and Nieminen (2017)	…um spannende Inhalte nutzen zu können. (…to use exciting content.[a]) …weil es mir Spaß macht. (…because it‘s fun.[a]) …um gut unterhalten zu werden. (…for entertainment.[a])		

SKALA/VARIABLE (SCALE/VARIABLE)	**ITEMS (ITEMS)**	**AUSFÜLLAN-WEISUNG (INSTRUC-TIONS)**	**ANTWORTOPTIONEN (RESPONSE OPTIONS)**
GEWOHNHEIT (Habit; SRHI) 13 Items	Im Folgenden möchte ich noch etwas mehr dazu erfahren, wie die Nutzung deines Smartphones in deinem Alltag aussieht. Bitte wähle auch hier die Aussage aus, die auf dein Verhalten normalerweise am ehesten zutrifft. (Using my smartphone for messenger and/or social networking apps is something…)	Bitte gib an, wie sehr diese Aussage auf deine alltägliche Nutzung zutrifft. (Please choose the answer that fits/applies best to your everyday use.)	6= *trifft voll und ganz zu* bis 1 = *trifft gar nicht zu* (6 = *fully applies*, 1 = *does not apply at all)*
	Oft nehme ich mein Smartphone ganz automatisch zur Hand, um Messenger und/oder Social Networking Apps zu nutzen.[d] (I do automatically.[e])		
	Oft nehme ich mein Smartphone ganz unbewusst zur Hand, um Messenger/Social Networking Apps zu nutzen.[d] (I do without having to consciously remember.[e])		
	Ich denke kaum darüber nach, wenn ich Messenger und/oder Social Networking Apps nutze.[d] (I do without thinking.[e])		
	Meist realisiere ich überhaupt nicht, dass ich Messenger und/oder Social Networking Apps nutze. [b/d] (I start doing before I realize I am doing it.[e])		
	Oft merke ich kaum, wie ich mein Smartphone zur Hand nehme, um Messenger und/oder Social Networking Apps zu nutzen.[b] (I have no need to think about doing.[e])		
	Ich nutze Messenger und/oder Social Networking Apps oft ohne es beabsichtigt zu haben.[b] (I do without meaning to do it.[g])		
	Es würde mir schwerfallen, meine Nutzung von Messengern und/oder Social Networking Apps einzuschränken.[d] (That would require effort not to do it.[e])		
	Es würde mir schwerfallen, Messenger und/oder Social Networking Apps gar nicht zu nutzen.[d] (That I would find hard not to do.[e])		
	Messenger und/oder Social Networking Apps zu nutzen, ist typisch für mich.[b] (That is typically ‘‘me’’.[e])		

SKALA/VARIABLE (SCALE/VARIABLE)	**ITEMS (ITEMS)**	**AUSFÜLLAN-WEISUNG (INSTRUC-TIONS)**	**ANTWORTOPTIONEN (RESPONSE OPTIONS)**
	Messenger und/oder Social Networking Apps sind Teil meiner täglichen Routine.[d] (That belongs to my daily routine.[e])		
	Ich nutze Messenger und/oder Social Networking Apps regelmäßig.[d] (I do frequently.[f])		
	Messenger und/oder Social Networking Apps gehören schon seit langer Zeit zu meinem Alltag.[d] (I have been doing for a long time.[f])		
	Es fühlt sich komisch an, wenn ich Messenger und/oder Social Networking Apps nicht nutze.[b] (That makes me feel weird if I do not do it.[f])		
SELBSTKONTROLLE [h] (Self-Control; SCS-K-D) 13 Items	Nun folgen noch ein paar generelle Aussagen zu einigen deiner Charaktereigenschaften. Bitte gib auf der sechsstufigen Skala an, inwieweit diese auf dich zutreffen. ("Using the scale provided, please indicate how much each of the following statements reflects how you typically are."(Tangney et al., 2004, appendix)		6= *trifft voll und ganz zu* bis 1 = *trifft gar nicht zu* (6 = *fully applies,* 1 = *does not apply at all)*
	Ich bin gut darin, Versuchungen zu widerstehen. (I am good at resisting temptation.)		
	*Es fällt mir schwer, schlechte Gewohnheiten abzulegen. (I have a hard time breaking bad habits.)		
	*Ich bin faul. (I am lazy.)		
	*Ich sage unangemessene Dinge. (I say inappropriate things.)		
	*Ich tue manchmal Dinge, die schlecht für mich sind, wenn sie mir Spaß machen. (I do certain things that are bad for me, if they are fun.)		
	*Ich wünschte, ich hätte mehr Selbstdisziplin. (I wish I had more self-discipline.)		

SKALA/VARIABLE (SCALE/VARIABLE)	**ITEMS (ITEMS)**	**AUSFÜLLAN-WEISUNG (INSTRUC-TIONS)**	**ANTWORTOPTIONEN (RESPONSE OPTIONS)**
	*Angenehme Aktivitäten und Vergnügen hindern mich manchmal daran, meine Arbeit zu machen. (Pleasure and fun sometimes keep me from getting work done.)		
	*Es fällt mir schwer, mich zu konzentrieren. (I have trouble concentrating.)		
	Ich kann effektiv auf langfristige Ziele hinarbeiten. (I am able to work effectively toward long-term goals.)		
	*Manchmal kann ich mich selbst nicht daran hindern, etwas zu tun, obwohl ich weiß, dass es falsch ist. (Sometimes I can't stop myself from doing something, even if I know it is wrong.)		
	*Ich handle oft ohne alle Alternativen durchdacht zu haben. (I often act without thinking through all the alternatives.)		
	Ich lehne Dinge ab, die schlecht für mich sind. (I refuse things that are bad for me.)		
	Andere würden sagen, dass ich eine eiserne Selbstdisziplin habe. (People would say that I have iron self-discipline.)		
EINSAMKEIT [i] (Loneliness; ULS-8) 8 Items	Es folgen nun noch ein paar generelle Fragen zu dir und deiner Befindlichkeit. Denke bei der Beantwortung der Fragen an die vergangenen zwei bis vier Wochen. Auch hier gibt es weder Richtig noch Falsch, antworte einfach spontan und aus dem Bauch heraus, wie es am ehesten auf dich zutrifft. (The following questions concern how you feel in general. Think about the past two to four weeks for your answer. There is neither right nor wrong, just answer spontaneously how it best fits for you.)	Bitte gib an, inwieweit du dieser Aussage bezogen auf die letzten zwei bis vier Wochen zustimmst. (Keeping the past two to four weeks in mind, please indicate to what extent you agree/disagree with the following statements.)	6 = *stimme voll und ganz zu*, 1 = *stimme überhaupt nicht zu* (6 = *fully agree*, 1 = *do not agree at all*)
	*Ich habe genug Gesellschaft. (I lack companionship.)		

SKALA/VARIABLE (SCALE/VARIABLE)	**ITEMS (ITEMS)**	**AUSFÜLLANWEISUNG (INSTRUCTIONS)**	**ANTWORTOPTIONEN (RESPONSE OPTIONS)**
	Ich habe niemanden an den ich mich wenden kann. (There is no one I can turn to.)		
	*Ich bin ein geselliger Mensch. (I am an outgoing person.)		
	Ich fühle mich ausgeschlossen. (I feel left out.)		
	Ich fühle mich von den anderen isoliert. (I feel isolated from others.)		
	*Ich kann mit anderen zusammensein, wenn ich das will. (I can find companionship when I want it.)		
	Ich bin zu viel allein. (I am unhappy being so withdrawn.)		
	Die anderen Menschen haben es schwer, an mich heranzukommen. (People are around me but not with me.)		
BEDÜRFNISSE NACH SDT [j] (Basic Psychological Needs Scale; BMPN. Needs according to Self-Determination Theory, in short SDT) 18 Items	Bitte gib an, wie sehr die folgenden Aussagen, bezogen auf die vergangenen zwei bis vier Wochen, auf dich zutreffen. 6 bedeutet, sie trifft vollständig zu, 1 bedeutet, die Aussage trifft gar nicht zu. (Keeping the past two to four weeks in mind, please indicate to what extent the following statements apply to you, whereas 1 means *does not apply at all* and 6 means *fully applies*.)		
Relatedness (+)	Ich hatte das Gefühl in Kontakt mit Menschen zu sein, die mir nahe stehen. (I felt a sense of contact with people who care for me, and whom I care for.)		
Relatedness (-)	*Andere Menschen haben mich zurückgewiesen oder ausgegrenzt. (I was excluded or ostracized.)		
Relatedness (+)	Ich habe mich anderen Menschen, die mir wichtig sind, nahe und verbunden gefühlt. (I felt close and connected with other people who are important to me.)		

SKALA/VARIABLE (SCALE/VARIABLE)	**ITEMS (ITEMS)**	**AUSFÜLLAN-WEISUNG (INSTRUC-TIONS)**	**ANTWORTOPTIONEN (RESPONSE OPTIONS)**
Relatedness (-)	*Ich habe mich von einem oder mehreren mir wichtigen Menschen nicht wertgeschätzt gefühlt. (I felt unappre-ciated by one or more important people.)		
Relatedness (+)	Ich habe eine starke Vertrautheit mit den Menschen ge-spürt, mit denen ich Zeit verbracht habe. (I felt a strong sense of intimacy with the people I spent time with.)		
Relatedness (-)	*Ich hatte Unstimmigkeiten oder Konflikte mit Men-schen, mit denen ich normal gut zurecht komme. (I had disagreements or conflicts with people I usually get along with.)		
Competence (+)	Ich habe erfolgreich eine schwierige Aufgabe oder ein schwieriges Projekt abgeschlossen. (I was successfully completing difficult tasks and projects.)		
Competence (-)	*Ich hatte das Gefühl, bei irgendetwas versagt zu haben oder nicht gut in etwas zu sein. (I experienced some kind of failure, or unable to do well at something.)		
Competence (+)	Ich habe große Herausforderungen angenommen und gemeistert. (I took on and mastered hard challenges.)		
Competence (-)	*Ich habe etwas Dummes gemacht und mich deshalb in-kompetent gefühlt. (I did something stupid, that made me feel incompetent.)		
Competence (+)	Ich war erfolgreich, selbst bei schwierigen Dingen. (I did well even at the hard things.)		
Competence (-)	*Ich habe mich mit etwas schwer getan, das ich eigent-lich gut kann. (I struggled doing something I should be good at.)		
Autonomy (+)	Ich hatte den Freiraum Dinge so zu tun, wie ich es wollte. (I was free to do things my own way.)		
Autonomy (-)	*Ich habe viel Druck gespürt, auf den ich lieber verzich-tet hätte. (I had a lot of pressure I could do without.)		
Autonomy (+)	Meine Handlungen waren Ausdruck meines ‘‘wahren Ichs.’’ (My choices expressed my ‘‘true self.’’)		

SKALA/VARIABLE (SCALE/VARIABLE)	**ITEMS (ITEMS)**	**AUSFÜLLAN-WEISUNG (INSTRUC-TIONS)**	**ANTWORTOPTIONEN (RESPONSE OPTIONS)**
Autonomy (-)	*Andere Menschen haben mir vorgeschrieben, was ich tun soll. (There were people telling me what I had to do.)		
Autonomy (+)	Ich habe wirklich das getan, was mich interessiert. (I was really doing what interests me.)		
Autonomy (-)	*Ich musste Dinge gegen meinen Willen tun. (I had to do things against my will.)		

Note: The survey was available in German language only, English translation of all items are in parentheses. [a] Own translation of items from German to English (own items/original scale in German), but in consultation with a bilingual colleague for the final version printed here. [b] Translation from English to German (original scale/s in English) by author, back-translation by bilingual colleague and final version for the questionnaire after consultation about ambiguous items. [c] Translation based on the RFMMH by Naab and Schnauber (2014). [d] Translation based on Schnauber (2017). [e] Original based on Orbell and Verplanken (2010) and Verplanken and Orbell (2003). [f] Original by Verplanken and Orbell (2003). [g] Original based on Orbell and Verplanken (2010). [h] Original items by Tangney, Baumeister, and Boone (2004), German version by Bertrams and Dickhäuser (2009).[i] Original Items by Hays and DiMatteo (1987), German version by Döring and Bortz (1993). *. [j] Original items by Sheldon & Hilpert (2012), German version by Neubauer and Voss (2016). An asterisk indicates reverse-coded items (for the ULS-8, only for the German version of the first item).

Table A 4

Ranking of Negative Experiences

	Frequency (based on mean, highest to lowest)	Freq. *M* (*SD*)	Strain (based on mean, highest to lowest)	Strain *M* (*SD*)	Frequency and Strain (based on Pearson correlation, highest to lowest)	Frequency and Strain (*r*)	Qualitative Ranking (frequency)
	Endangerment 3rd	4.87 (1.14)	Endangerment 3rd	4.34 (1.37)	Endangerment 3rd	.62**	
	Media Bubble 3rd	4.62 (1.22)	Media Bubble 3rd	3.86 (1.44)	Media Bubble 3rd	.43**	
1	Interruption	3.70 (1.65)	Loss of Time	3.84 (1.55)	Emot. Stress	.85**	Media Bubble
2	Loss of Time	3.63 (1.74)	Interruption	3.82 (1.59)	Overkill	.81**	Overkill
3	Auto Use	3.61 (1.69)	Overkill	3.54 (1.38)	Interruption	.79**	Emot. Stress
4	Way of Comm	3.54 (1.44)	Emot. Stress	3.53 (1.37)	Loss of Time	.78**	Auto Use
5	Insignificance	3.53 (1.62)	Way of Comm	3.41 (1.45)	Insignificance	.74**	Endangerment
6	Overkill	3.50 (1.53)	Endangerment	3.32 (1.59)	Way of Comm.	.66**	Insignificance
7	Emot. Stress	3.20 (1.61)	Insignificance	3.26 (1.49)	Auto Use	.48**	Interruption
8	Media Bubble	2.43 (1.26)	Auto Use	3.18 (1.55)	Media Bubble	.43**	Loss of Time
9	Endangerment	1.97 (1.22)	Media Bubble	2.83 (1.40)	Endangerment	.43**	Way of Comm.

Note. Freq. by strain all *p*s < .000; third-person experiences listed but not included in the ranking because of their different quality; media bubble and endangerment not separated for first- and third-person perspective in the qualitative ranking, only frequency of mentions over all 26 interviews (counted once per interview max.).

Table A 5

Correlations of Media Use Frequency and Negative Experiences

			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1	Messenger Use																										
2	Social Networking App Use	*r*	.418**																								
		p	.000																								
		n	264																								
3	Smartphone Exposure	*r*	.750**	.914**																							
		p	.000	.000																							
		n	264	264																							
4	Media Bubble freq	*r*	.220**	.335**	.342**																						
		p	.000	.000	.000																						
		n	264	264	264																						
5	Media Bubble 1st strain	*r*	.078	.029	.057	.426**																					
		p	.285	.695	.434	.000																					
		n	189	189	189	189																					

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
6 Media Bubble 3rd freq	*r*	.066	.062	.074	.226**	.220**																				
	p	.288	.319	.231	.000	.002																				
	n	264	264	264	264	189																				
7 Media Bubble 3rd strain	*r*	.074	-.017	.021	.167**	.347**	.433**																			
	p	.234	.790	.735	.007	.000	.000																			
	n	263	263	263	263	189	263																			
8 Overkill freq	*r*	.102	.095	.114	.286**	.337**	.248**	.376**																		
	p	.098	.125	.064	.000	.000	.000	.000																		
	n	264	264	264	264	189	264	263																		
9 Overkill strain	*r*	.043	.060	.062	.354**	.419**	.311**	.331**	.805**																	
	p	.512	.358	.338	.000	.000	.000	.000	.000																	
	n	238	238	238	238	175	238	237	238																	
10 Emotional Stress freq	*r*	.164**	.111	.154*	.299**	.349**	.283**	.312**	.620**	.626**																
	p	.008	.073	.012	.000	.000	.000	.000	.000	.000																
	n	264	264	264	264	189	264	263	264	238																
11 Emo-tional	*r*	.165*	.151*	.184**	.281**	.399**	.286**	.337**	.531**	.576**	.849**															

			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
		p	.014	.026	.006	.000	.000	.000	.000	.000	.000	.000															
		n	219	219	219	219	166	219	218	219	207	219															
12	Auto Use freq	*r*	.358**	.471**	.502**	.380**	.100	.186**	-.001	.178**	.113	.266**	.216**														
		p	.000	.000	.000	.000	.171	.002	.988	.004	.082	.000	.001														
		n	264	264	264	264	189	264	263	264	238	264	219														
13	Auto Use strain	*r*	.214**	.248**	.276**	.296**	.295**	.115	.130	.344**	.345**	.448**	.413**	.481**													
		p	.001	.000	.000	.000	.000	.086	.052	.000	.000	.000	.000	.000													
		n	225	225	225	225	172	225	225	225	208	225	193	225													
14	Endangerment 1st freq	*r*	.155*	.149*	.178**	.305**	.314**	.092	.107	.299**	.250**	.263**	.230**	.301**	.337**												
		p	.011	.015	.004	.000	.000	.134	.082	.000	.000	.000	.001	.000	.000												
		n	264	264	264	264	189	264	263	264	238	264	219	264	225	264											
15	Endangerment 1st strain	*r*	.236**	.087	.171*	.240**	.359**	.034	.206*	.155	.178*	.171*	.200*	.075	.286**	.428**											
		p	.005	.302	.041	.004	.000	.688	.014	.066	.039	.042	.022	.376	.001	.000											
		n	142	142	142	142	119	142	141	142	136	142	131	142	131	142											
16	Endangerment 3rd freq	*r*	.018	.045	.041	.158	.243**	.481**	.204*	.322**	.350**	.239**	.146	.139	.218*	.122	.176*										
		p	.836	.597	.632	.061	.008	.000	.015	.000	.000	.004	.097	.100	.012	.147	.036										
		n	142	142	142	142	119	142	141	142	136	142	131	142	131	142	142										

			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
17	Endangerment 3rd strain	*r*	.110	.117	.136	.172*	.259**	.338**	.305**	.308**	.343**	.304**	.238**	.166*	.284**	.151	.446**	.619**									
		p	.194	.167	.108	.042	.005	.000	.000	.000	.000	.000	.006	.049	.001	.073	.000	.000									
		n	141	141	141	141	118	141	140	141	135	141	130	141	130	141	141	141									
18	Insignificance freq	*r*	.026	.026	.030	.202**	.316**	.313**	.237**	.446**	.416**	.402**	.251**	.172**	.285**	.346**	.183*	.340**	.392**								
		p	.670	.679	.624	.001	.000	.000	.000	.000	.000	.000	.000	.005	.000	.000	.030	.000	.000								
		n	264	264	264	264	189	264	263	264	238	264	219	264	225	264	142	142	141								
19	Insignifica-nce strain	*r*	.010	.052	.041	.278**	.399**	.241**	.300**	.371**	.436**	.372**	.324**	.103	.293**	.285**	.213*	.322**	.435**	.738**							
		p	.875	.430	.528	.000	.000	.000	.000	.000	.000	.000	.000	.116	.000	.000	.013	.000	.000	.000							
		n	234	234	234	234	172	234	233	234	216	234	204	234	204	234	137	137	136	234							
20	Interruption freq	*r*	.292**	.435**	.447**	.487**	.303**	.169**	.091	.207**	.219**	.359**	.322**	.537**	.420**	.382**	.304**	.120	.134	.202**	.194**						
		p	.000	.000	.000	.000	.000	.006	.141	.001	.001	.000	.000	.000	.000	.000	.000	.156	.113	.001	.003						
		n	264	264	264	264	189	264	263	264	238	264	219	264	225	264	142	142	141	264	234						
21	Interruption strain	*r*	.280**	.310**	.351**	.441**	.422**	.253**	.140*	.348**	.295**	.439**	.376**	.431**	.542**	.312**	.306**	.178*	.275**	.312**	.236**	.786**					
		p	.000	.000	.000	.000	.000	.000	.031	.000	.000	.000	.000	.000	.000	.000	.000	.037	.001	.000	.001	.000					
		n	237	237	237	237	177	237	236	237	214	237	197	237	210	237	137	137	136	237	212	237					
22	Loss of Time freq	*r*	.253**	.387**	.394**	.393**	.386**	.221**	.133*	.301**	.274**	.395**	.328**	.440**	.436**	.430**	.366**	.208*	.285**	.294**	.242**	.719**	.630**				
		p	.000	.000	.000	.000	.000	.000	.032	.000	.000	.000	.000	.000	.000	.000	.000	.013	.001	.000	.000	.000	.000				

			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
23	Loss of Time strain	*n*	264	264	264	264	189	264	263	264	238	264	219	264	225	264	142	142	141	264	234	264	237				
		r	.239**	.367**	.371**	.443**	.417**	.238**	.191**	.295**	.313**	.367**	.375**	.410**	.402**	.376**	.304**	.224**	.309**	.332**	.365**	.632**	.696**	.783**			
		p	.000	.000	.000	.000	.000	.000	.004	.000	.000	.000	.000	.000	.000	.000	.000	.009	.000	.000	.000	.000	.000	.000			
24	Way of Comm freq	*n*	224	224	224	224	167	224	223	224	207	224	193	224	197	224	135	135	134	224	207	224	211	224			
		r	.112	.034	.075	.152*	.272**	.171**	.213**	.354**	.338**	.379**	.276**	.086	.257**	.294**	.293**	.356**	.420**	.304**	.269**	.205**	.238**	.380**	.205**		
		p	.070	.578	.226	.014	.000	.005	.000	.000	.000	.000	.000	.165	.000	.000	.000	.000	.000	.000	.000	.001	.000	.000	.002		
25	Way of comm strain	*n*	264	264	264	264	189	264	263	264	238	264	219	264	225	264	142	142	141	264	234	264	237	264	224		
		r	.172**	.128*	.168**	.183**	.322**	.157*	.281**	.414**	.405**	.428**	.348**	.140*	.330**	.247**	.304**	.148	.340**	.278**	.300**	.243**	.355**	.308**	.339**	.658**	
		p	.007	.044	.008	.004	.000	.013	.000	.000	.000	.000	.000	.028	.000	.000	.000	.085	.000	.000	.000	.000	.000	.000	.000	.000	
		n	248	248	248	248	181	248	247	248	226	248	210	248	215	248	137	137	136	248	222	248	225	248	218	248	

Note: r = Pearson correlation (two-tailed); *n* = sample size.
* $p < .05$; ** $p < .01$

Table A 6

Multiple Regression Analyses of the Frequency and Strain Measures of Negative Experiences

Predictors	DV Messenger	R^2	DV SNS	R^2	DV Smartphone Exposure	R^2
MB	model ns[a)]	-.2%	frequency	3%	frequency	2%
OK	model ns[a)]	-.6%	model ns[a)]	-.4%	model ns [a)]	.9%
ES	ns[b)]	2%	strain	2%	strain	3%
AU	frequency	7%	frequency	15%	frequency	16%
EN	strain	5%	model ns[a)]	.1%	model ns[a)]	3%
IS	model ns[a)]	-.8%	model ns[b)]	.1%	model ns[b)]	-.5%
IR	frequency	9%	frequency	13%	frequency	17%
LoT	frequency	8%	frequency	18%	frequency	19%
WoC	strain	2%	strain	2%	strain	3%

Note. Reported is the measure (frequency/strain) of which the explanatory value was significant, the respective other measure was not significant in the multiple regression analysis. MB = Media Bubble 1st person, OK = Overkill, ES = Emotional Stress; AU = Auto Use, Endangerment 1st person= EN, Insignificance = IS, Interruption = IR, LoT = Loss of Time, WoC = Way of Communication; R^2 = adjusted R-squared; DV = dependent variable; ns stands for a $p > .05$; *model* ns means the *F*-test (ANOVA) was not significant, thus the coefficients can only be used descriptively. [a)] *b*-coefficient for frequency higher; [b)] *b*-coefficient for strain higher.

Table A 7

Explorative Factor Analysis of Negative Experiences

	Neg. Exp. frequency (all nine experiences)		Neg. Exp. frequency (endangerment removed)		Neg. Exp. Strain 1st run (all nine experiences)		Neg. Exp. freq. and strain (all 18 items)					Neg. Exp. freq. and strain (excl. MB, OK, WoC)			
Factor (loading)	1	2	1	2	1	2	1	2	3	4	5	1	2	3	4
Variance explained	57%		61%		55%				71%					74%	
Negative experiences per factor	IR (.87) AU (.76) LoT (.76) MB (.66) EN (.48)	LoT (.32) EN (.40) OK (.81) ES (.74) IS (.70) WoC (.65)	IR (.88) AU (.77) LoT (.75) MB (.66)	LoT (.33) OK (.82) ES (.76) IS (.70) WoC (.65)	OK (.87) IS (.78) MB (.64) ES (.58) IR (.91) LoT (.75) AU (.31) WoC (.46) EN (.32)	AU (.66) WoC (.48) EN (.33)	IRs (.84) IRf (.83) LoTf (.74) LoTs (.72) AUf (.62) AUs (.57) MBf (.39)	,844 ,825 ,744 LoTs (.31) ,621 MBf (.35) ISf (.88) ISs (.82) OKs (.69) OKf (.68)	AUs (.35) MBf (.31) OKs (.51) OKf (.43) ESf (.90)	AUf (-.35)	AUs (.33)	IRf (.85) IRs (.83) LoTf (75) LoTs (.71) AUf (.65) AUs (.62)	AUs (.37) ESf (9.4) ESs (.92)	LoTs (.31) IS f (.92) ISs (.87)	ENs (.82) ENf (.81)

	Neg. Exp. frequency (all nine experiences)		Neg. Exp. frequency (endangerment removed)		Neg. Exp. Strain 1st run (all nine experiences)		Neg. Exp. freq. and strain (all 18 items)					Neg. Exp. freq. and strain (excl. MB, OK, WoC)			
Factor (loading)	1	2	1	2	1	2	1	2	3	4	5	1	2	3	4
									ESs (.89)						
										ENs (.81)					
										ENf (.70)					
								MBs (.36)	MBs (.40)	MBs (.51)					
											WoCs (.82)				
								WoCf (.31)			WoCf (.80)				

Note: Factor solution based on rotated component matrix. Extraction method: principal component analysis. Rotation method: varimax with Kaiser normalization. MB = Media Bubble, OK = Overkill, ES = Emotional Stress; AU = Auto Use, Endangerment = EN, Insignificance = IS, Interruption = IR, LoT = Loss of Time, WoC = Way of Communication; s = strain, f = frequency .

Table A 8

Descriptives for Justifications per Negative Experience

Neg. Exp.		Justifications					
		Non-Evaluation	Pressure	Responsibility	FOMO	Pragmatism	Need-Balance
MB	*M*	2.80	2.92	2.46	2.78	3.22	3.56
	SD	1.55	1.51	1.42	1.45	1.35	1.50
OK	*M*	2.57	2.72	2.50	2.50	2.76	2.87
	SD	1.51	1.45	1.46	1.38	1.28	1.41
ES	*M*	2.52	3.15	2.77	2.60	2.80	2.84
	SD	1.42	1.53	1.55	1.48	1.26	1.42
AU	*M*	3.18	2.52	2.41	2.73	2.96	3.17
	SD	1.76	1.45	1.48	1.52	1.43	1.57
EN	*M*	2.42	2.37	2.18	2.06	2.40	2.28
	SD	1.65	1.50	1.42	1.38	1.50	1.40
IS	*M*	2.68	2.20	2.12	2.57	2.48	2.70
	SD	1.61	1.44	1.36	1.47	1.31	1.48
IR	*M*	2.60	2.54	2.38	2.71	2.50	2.76
	SD	1.51	1.52	1.46	1.54	1.29	1.48
LoT	*M*	2.74	2.46	2.37	2.75	2.61	2.84
	SD	1.56	1.41	1.44	1.46	1.28	1.42
WoC	*M*	2.53	2.71	2.49	2.48	2.87	2.81
	SD	1.61	1.61	1.58	1.46	1.49	1.55

Note. Minimum = 1, maximum = 6 for each item. See Table 6 for the exact item wording of each justification. For *n* of the justifications per negative experiences, see Table 15.

Table A 9

Descriptives for Averaged Justification Variables

Justification	*n*	Minimum	Maximum	*M*	*SD*
Non-Evaluation	264	1.00	5.56	2.59	1.13
Pressure	264	1.00	6.00	2.50	1.21
Responsibility	264	1.00	6.00	2.31	1.22
Fear of Missing Out	264	1.00	6.00	2.47	1.19
Pragmatism	264	1.00	6.00	2.67	1.02
Need-Balance	264	1.00	6.00	2.81	1.14

Note. See Table 6 for the exact item wording of each justification.

Table A 10

Summary of Exploratory Factor Analysis Results for Justifications of Negative Experiences per Experience

Items* (justifications)	Rotated factor loadings for each negative experience (2-factor-solution)																	
	Media Bubble		Overkill		Emotional Stress		Auto Use		Endangerment		Insignificance		Interruption		Loss of Time		Way of Communication	
	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
Others expect it from me		**.881**		**.908**		**.873**		**.912**		**.864**		**.926**		**.917**	**.903**			**.926**
It is my social responsibility		**.889**		**.888**		**.871**		**.877**		**.926**		**.930**		**.921**	**.903**			**.940**
I will not miss out (FOMO)	**.509**	.444	**.598**	.465	**.589**	.461	**.578**	.455	**.639**	.448	**.691**	.358	**.545**	.439	**.644**	.396	**.567**	.518
It's practical, uses and detriments keep in balance	**.824**		**.858**		**.870**		**.830**		**.879**		**.830**		**.876**			**.796**	**.851**	
Uses outweigh the detriments	**.794**		**.821**		**.876**		**.876**		**.874**		**.874**		**.850**			**.805**	**.843**	
I don't think about negative consequences	**.623**		**.616**		**.580**	.332	**.644**		**.603**	.376	**.680**		**.536**			**.616**	**.633**	

Items* (justifications)	Rotated factor loadings for each negative experience (2-factor-solution)																	
	Media Bubble		Overkill		Emotional Stress		Auto Use		Endangerment		Insignificance		Interruption		Loss of Time		Way of Communication	
	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
Eigenvalues	2.61	1.20	2.99	1.13	3.16	1.01	3.13	1.08	3.45	.98	3.25	1.19	2.95	1.15	3.03	1.02	3.22	1.11
% of variance	43.47	19.94	49.81	18.88	52.68	16.84	52.11	18.06	57.52	16.38	54.21	19.79	49.08	19.10	50.43	17.06	53.66	18.53
α	.69	.79	.76	.84	.78	.79	.78	.84	.82	.87	.81	.91	.72	.89	.82	.64	.77	.92
n	189		238		219		225		142		234		237		224		248	

Note. Factor solution based on rotated component matrix. Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Rotation converged in three iterations. Factor loadings over .5 that constitute one factor for reliability analysis (Cronbach's alpha) appear in bold, no factor loadings under .3 are shown. Part-whole-correction showed no improvement for alpha of the first six negative experiences if an item was dropped, but for the latter three. See text for details. *Items abbreviated for reasons of clarity (see appendix, Table A 3 for the exact phrasing).

Table A 11

Initial Factor Solution for U&G Based on Eigenvalues of the Factors

	Component		
I usually use messenger and/or social networking apps on my smartphone,…	Social interaction - self-presentation	Entertainment - relaxation	Safety - loneliness
…for entertainment.	.779		.309
…to use exciting content.	.754		
…because it‘s fun.	.703	.367	
…to relax.	.694		
…to pass time.	.637		.581
…to express myself.		.750	
…to stay informed with regards to (developments in) my circle of friends/acquaintances.		.713	
…to get to know certain things about friends/acquaintances.		.690	
…to communicate with other people.		.665	
…to show others things about me (e.g., things I do or places I am visiting).		.574	
…to be able to join in on a conversation in my circle of friends/acquaintances.		.559	.335
…to not feel lonely.			.806
…to escape my daily routine.	.561		.643
…to feel safe when I am out.			.508
Eigenvalues	5.13	1.84	1.13
% of variance	36.67	13.83	8.10

Note. Factor solution based on rotated component matrix. Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Rotation converged in five iterations. No factor loadings under .3 are shown.

Table A 12

Variance Explanation of Explorative Factor Analyses of the U&G Scale

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative%	Total	% of Variance	Cumulative%	Total	% of Variance	Cumulative%
First EFA:									
1	5.134	36.674	36.674	5.134	36.674	36.674	3.107	22.191	22.191
2	1.874	13.383	50.057	1.874	13.383	50.057	2.942	21.016	43.207
3	1.134	8.099	58.156	1.134	8.099	58.156	2.093	14.948	58.156
Second EFA:									
1	4.345	36.209	36.209	4.345	36.209	36.209	2.845	23.707	23.707
2	1.548	12.897	49.106	1.548	12.897	49.106	2.598	21.646	45.353
3	1.075	8.961	58.067	1.075	8.961	58.067	1.526	12.714	58.067
Third EFA:									
1	3.981	36.190	36.190	3.981	36.190	36.190	2.616	23.777	23.777
2	1.535	13.957	50.147	1.535	13.957	50.147	2.579	23.450	47.227
3	1.064	9.673	59.820	1.064	9.673	59.820	1.385	12.593	59.820

Note. Extraction Method: Principal Component Analysis. Shown are three explorative factor analyses—after the first, two items from the 14-item-scale were excluded due to ambiguous loadings on both factor 1 and three; one further item was excluded after the second analysis as it loaded ambiguously on factor 1 and three as well, leading to a better explanation of variance. Only the three factors with Eigenvalues over 1 are shown.

Table A 13

Initial Factor Solution for BMPN Based on Eigenvalues of the Factors

	Component				
	1	2	3	4	5
BMPN_relat_s2v3	.823				
BMPN_relat_s3v3	.802				
BMPN_relat_s1v3	.799				
BMPN_aut_s2v3	.434			.383	
BMPN_comp_s1v3		.871			
BMPN_comp_s2v3		.836			
BMPN_comp_s3v3	.328	.777			
BMPN_relat_d2v3_r			.758		
BMPN_relat_d1v3_r			.727		
BMPN_relat_d3v3_r			.723		
BMPN_aut_d3v3_r				.705	
BMPN_aut_s1v3				.696	
BMPN_aut_s3v3	.368	.309		.633	
BMPN_aut_d2v3_r			.499	.556	
BMPN_comp_d3v3_r					.804
BMPN_comp_d1v3_r			.359		.640
BMPN_comp_d2v3_r			.449		.603
BMPN_aut_d1v3_r				.534	.580
Eigenvalues	5.11	2.74	1.42	1.33	1.03
% of variance	28.39	15.21	7. 91	7.36	5.73

Note: Factor solution based on rotated component matrix. Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Rotation converged in eight iterations. No factor loadings under .3 are shown. Variance explained: 64.6%.

Table A 14

BMPN Variable Names and Labels

Variable name	Variable label
BMPN_relat_s1v3	I felt a sense of contact with people who care for me, and whom I care for.
BMPN_relat_s2v3	I felt close and connected with other people who are important to me.
BMPN_relat_s3v3	I felt a strong sense of intimacy with the people I spent time with.
BMPN_relat_d1v3_r	I was excluded or ostracized.
BMPN_relat_d2v3_r	I felt unappreciated by one or more important people.
BMPN_relat_d3v3_r	I had disagreements or conflicts with people I usually get along with.

Variable name	Variable label
BMPN_comp_s1v3	I was successfully completing difficult tasks and projects.
BMPN_comp_s2v3	I took on and mastered hard challenges.
BMPN_comp_s3v3	I did well even at the hard things.
BMPN_comp_d1v3_r	I experienced some kind of failure or was unable to do well at something.
BMPN_comp_d2v3_r	I did something stupid, that made me feel incompetent.
BMPN_comp_d3v3_r	I struggled doing something I should be good at.
BMPN_aut_s1v3	I was free to do things my own way.
BMPN_aut_s2v3	My choices expressed my ‘‘true self.’’
BMPN_aut_s3v3	I was really doing what interests me.
BMPN_aut_d1v3_r	I had a lot of pressure I could do without.
BMPN_aut_d2v3_r	There were people telling me what I had to do.
BMPN_aut_d3v3_r	I had to do things against my will.

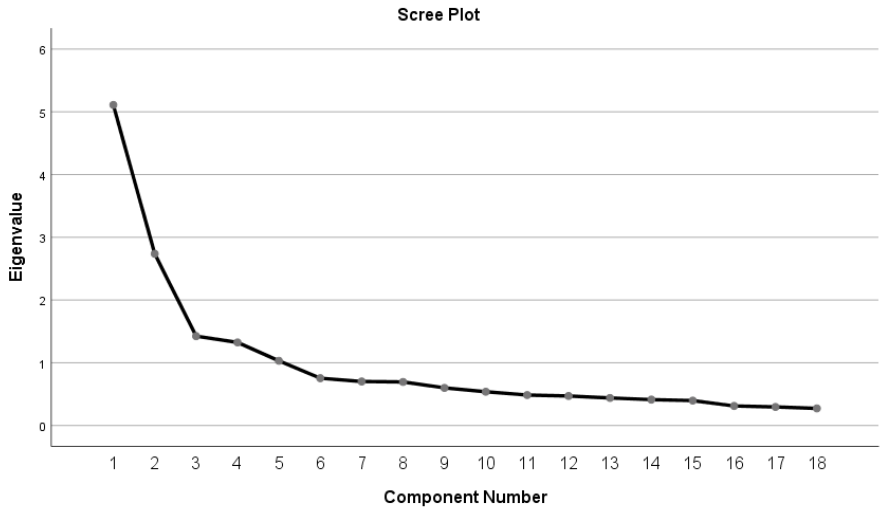

Figure A 2

Initial Scree Plot for BMPN Based on Eigenvalues of the Factors

Table A 15

Second EFA of BMPN without aut d1, aut d2, aut s2, comp d2

	Component			
	1	2	3	4
BMPN_relat_d3v3_r	.752			
BMPN_relat_d1v3_r	.726			
BMPN_relat_d2v3_r	.698			
BMPN_comp_d1v3_r	.664	.311		
BMPN_comp_d3v3_r	.530			
BMPN_comp_s1v3		.870		
BMPN_comp_s2v3		.837		
BMPN_comp_s3v3		.783	.306	
BMPN_relat_s2v3			.825	
BMPN_relat_s3v3			.808	
BMPN_relat_s1v3			.803	
BMPN_aut_s1v3				.762
BMPN_aut_d3v3_r	.338			.746
BMPN_aut_s3v3			.341	.652
Eigenvalues	4.35	2.11	1.31	1.19
% of variance	31.04	15.04	9.35	8.51

Note: Factor solution based on rotated component matrix. Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Rotation converged in five iterations. No factor loadings under .3 are shown. Variance explanation of this solution: 64%.

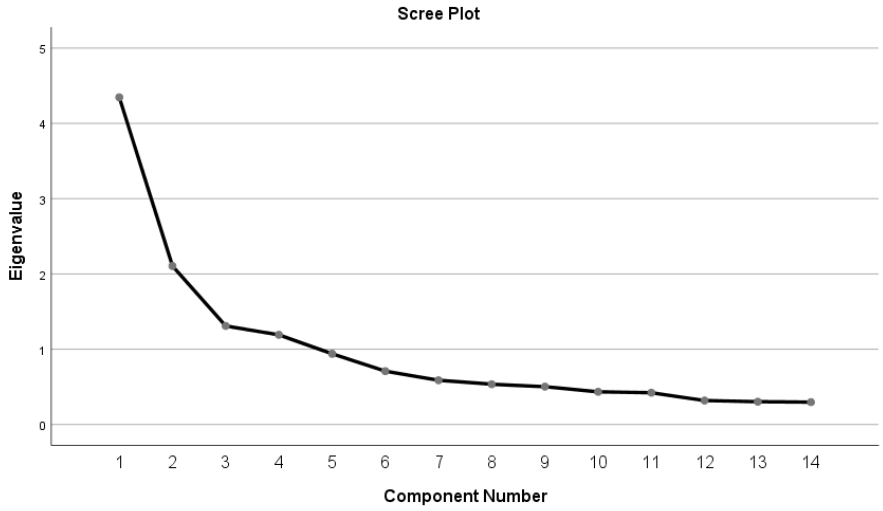

Figure A 3

Scree Plot for BMPN Based on Eigenvalues of the Factors—Second EFA

Table A 16

Third EFA with a Three-Factor-Structure

	Component		
	1	2	3
BMPN_comp_d2v3_r	.749		
BMPN_comp_d1v3_r	.702		
BMPN_relat_d3v3_r	.683		
BMPN_relat_d1v3_r	.669		
BMPN_relat_d2v3_r	.647		
BMPN_aut_d1v3_r	.552	.355	
BMPN_comp_d3v3_r	.537		
BMPN_aut_d2v3_r	.500	.383	
BMPN_aut_d3v3_r	.470	.429	
BMPN_aut_s3v3		.728	
BMPN_aut_s1v3		.693	
BMPN_relat_s2v3		.676	.372
BMPN_aut_s2v3		.587	
BMPN_relat_s1v3		.580	.428
BMPN_relat_s3v3		.557	.330
BMPN_comp_s1v3			.786
BMPN_comp_s3v3			.776
BMPN_comp_s2v3			.756
Eigenvalues	5.11	2.74	1.42
% of variance	28.39	15.21	7.91

Note: Factor solution based on rotated component matrix. Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Rotation converged in seven iterations. No factor loadings under .3 are shown. Variance explanation of this solution: 51.5%.

Table A 17

Fourth EFA with a Six-Factor-Structure

	Component					
	1	2	3	4	5	6
BMPN_comp_s1v3	.886					
BMPN_comp_s2v3	.846					
BMPN_comp_s3v3	.742					
BMPN_relat_s3v3		.846				
BMPN_relat_s2v3		.784		.311		
BMPN_relat_s1v3		.759				
BMPN_relat_d2v3_r			.799			
BMPN_relat_d3v3_r			.775			
BMPN_relat_d1v3_r			.634			.327
BMPN_aut_s1v3				.684		.316
BMPN_aut_s2v3				.628		
BMPN_aut_s3v3				.627		
BMPN_aut_d1v3_r				.548	.518	
BMPN_comp_d3v3_r					.847	
BMPN_comp_d1v3_r			.370		.631	
BMPN_comp_d2v3_r			.478		.578	
BMPN_aut_d3v3_r						.766
BMPN_aut_d2v3_r			.306			.731
Eigenvalues	5.11	2.74	1.42	1.33	1.03	.75
% of variance	28.39	15.21	7. 91	7.36	5.73	4.19

Note: Factor solution based on rotated component matrix. Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Rotation converged in seven iterations. No factor loadings under .3 are shown. Variance explanation of this solution: 68.8%.

Table A 18

Initial Factor Solution for SRHI Based on Eigenvalues of the Factors

	Component	
	1	2
I have no need to think about doing.	.845	
I do without meaning to do it.	.828	
I start doing before I realize I am doing it.	.814	
I do without having to consciously remember.	.760	.379
I do automatically.	.751	.438
I do without thinking.	.688	
That makes me feel weird if I do not do it.	.568	.511
I do frequently.		.793
I have been doing for a long time.		.758
That belongs to my daily routine.	.348	.746
That I would find hard not to do.		.708
That is typically ‘‘me’’.	.449	.648

	Component	
	1	2
That would require effort not to do it.	.455	.578
Eigenvalues	7.14	1.34
% of variance	54.94	10.32

Note. Factor solution based on rotated component matrix. Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Rotation converged in three iterations. No factor loadings under .3 are shown. Variance explanation of this solution: 65%.

Table A 19

Initial Factor Solution for SCS-K-D Based on Eigenvalues of the Factors

	Component		
	1	2	3
I say inappropriate things.	.697		
Pleasure and fun sometimes keep me from getting work done.	.657	.324	
I am lazy.	.612	.466	
I have trouble concentrating.	.599	.327	
I often act without thinking through all the alternatives.	.486		
I am able to work effectively toward long-term goals.		.773	
People would say that I have iron self-discipline.		.740	
I wish I had more self-discipline.	.477	.551	
I refuse things that are bad for me.			.724
I am good at resisting temptation		.342	.647
I do certain things that are bad for me, if they are fun.	.469		.625
I have a hard time breaking bad habits.	.449		.571
Sometimes I can’t stop myself from doing something, even if I know it is wrong.	.535		.552
Eigenvalues	4.82	1.35	1.07
% of variance	37.04	10.39	8.21

Note. Factor solution based on rotated component matrix. Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Rotation converged in seven iterations. No factor loadings under .3 are shown. Variance explanation of this solution: 55.6%.

Table A 20

Factor Suggestions for SCS-K-D after Exclusion of Ambiguous Items

	Component	
	1	2
I am able to work effectively toward long-term goals.	.766	
People would say that I have iron self-discipline.	.743	
I am good at resisting temptations.	.587	.330
I refuse things that are bad for me.	.569	
I say inappropriate things.		.721

	Component	
	1	2
I have trouble concentrating.		.699
Pleasure and fun sometimes keep me from getting work done.	.328	.630
I often act without thinking through all the alternatives. (SCSKD11)		.624
Eigenvalue (with SCSKD11)	2.78	1.19
% of variance (with SCSKD11)	34.79	14.90
α (with SCSKD11)	.65	.64
Eigenvalue (without SCSKD11)	2.55	1.14
% of variance (without SCSKD11)	36.43	16.34
α (without SCSKD11)	.65	.59

Note. Factor solution based on rotated component matrix. Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Rotation converged in three iterations (in both analyses). No factor loadings under .3 are shown. Variance explanation of the 8-item solution: 49.7% and 52.8% without the low-loading-item (SCSKD11). Order of items was the same in both analyses with the SCSKD11 joining in on the last rank, loading on factor 2, in the 8-item solution. Part-whole correction suggests to also exclude "I say inappropriate things" from factor 2 (w/o SCSKD11) for an improved α of .63.

Table A 21

Inhibitory and Initiatory Self-Control Items as Found in Previous Research

Inhibitory self-control

1. I am good at resisting temptation.
2. I have a hard time breaking bad habits (R).
3. I do certain things that are bad for me, if they are fun (R).
4. I refuse things that are bad for me.
5. Sometimes I can't stop myself from doing something, even if I know it is wrong (R).
6. Pleasure and fun sometimes keep me from getting work done.

Initiatory self-control

1. I am lazy (R).
2. I have trouble concentrating (R).
3. I am able to work effectively toward long-term goals.
4. I often act without thinking through all the alternatives (R).

Items not categorized

I say inappropriate things (R).

I wish I had more self-discipline.

People would say that I have iron self-discipline

Note. Items categorized by de Ridder et al. (2011) shown here to allow for a comparison with the found factor structure in this study.

Table A 22

Initial Factor Solution for ULS-8 Based on the Eigenvalues of the Factors

	Component	
	Feelings of isolation	Sociability
I feel isolated from others.	.831	
I am unhappy being so withdrawn.	.779	
I feel left out.	.767	
There is no one I can turn to.	.767	
I lack companionship.	.709	.400
I am an outgoing person. (R)		.911
People are around me but not with me.	.314	.617
I can find companionship when I want it. (R)	.482	.485
Eigenvalues	4.02	1.05
% of variance	50.26	13.13

Note. Factor solution based on rotated component matrix. Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Rotation converged in three iterations. No factor loadings under .3 are shown. Variance explanation of this solution is 63.4%.

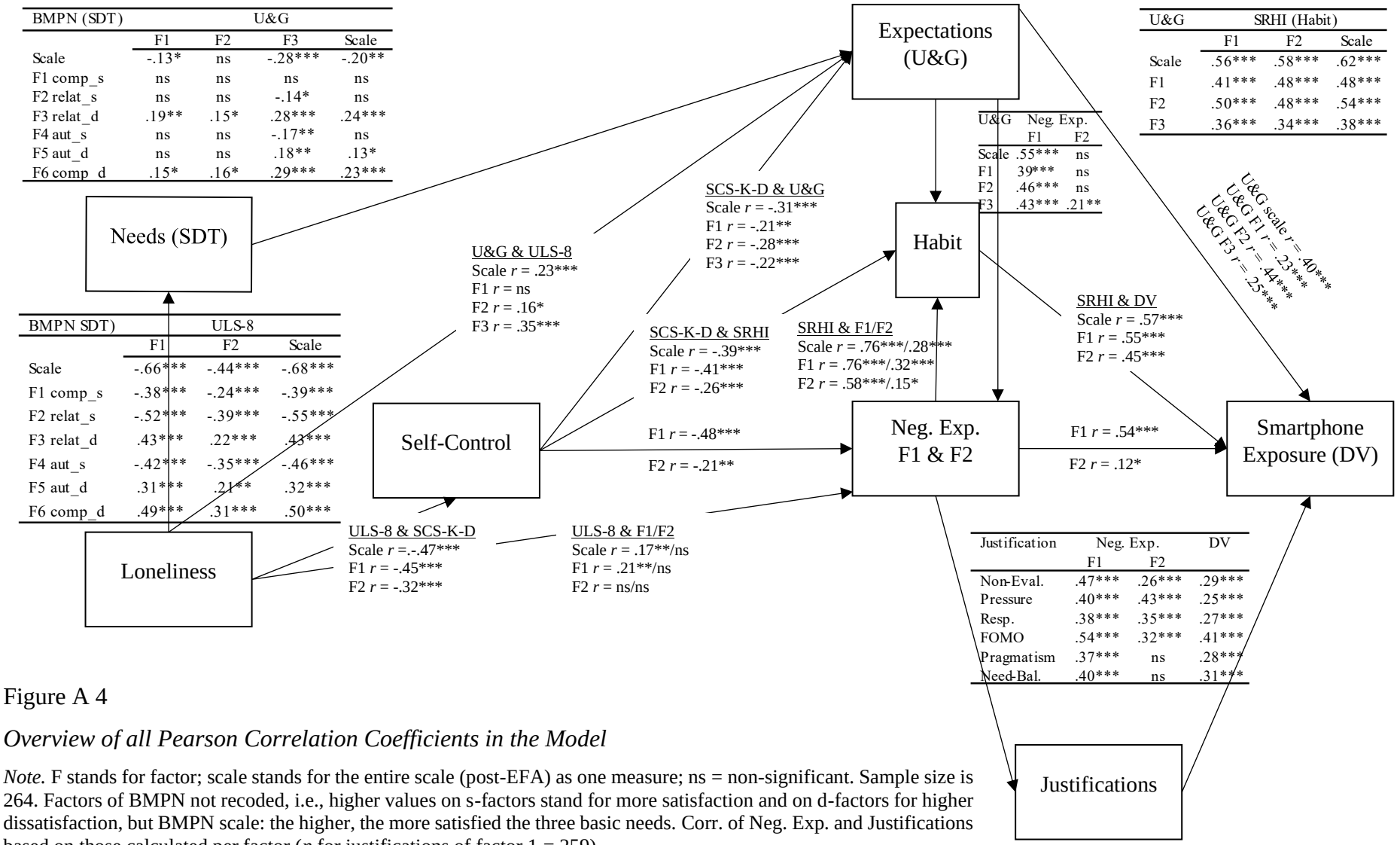

Figure A 4

Overview of all Pearson Correlation Coefficients in the Model

Note. F stands for factor; scale stands for the entire scale (post-EFA) as one measure; ns = non-significant. Sample size is 264. Factors of BMPN not recoded, i.e., higher values on s-factors stand for more satisfaction and on d-factors for higher dissatisfaction, but BMPN scale: the higher, the more satisfied the three basic needs. Corr. of Neg. Exp. and Justifications based on those calculated per factor (*n* for justifications of factor 1 = 259).
* $p < .05$, ** $p < .01$, *** $p < .000$

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Table A 23

Hierarchical Regression to Explain Smartphone Use via U&G and Negative Experiences

Model		Unstandardized Coefficients		Standardized Coefficients			95% CI for B		Correlations			Collinearity Statistics	
		B	*SE*	ß	*t*	*p*	LL	UL	Zero-order	*B*	*SE*	ß	VIF
1	(Constant)	3.20	.24		13.401	.000	2.733	3.674					
	Neg. Exp. F1	.62	.06	.59	10.347	.000	.504	.741	.54	.54	.54	.822	1.217
	Neg. Exp. F2	-.14	.06	-.13	-2.191	.029	-.270	-.014	.12	-.13	-.11	.822	1.217
2	(Constant)	3.10	.28		11.037	.000	2.549	3.656					
	Neg. Exp. F1	.53	.07	.50	7.185	.000	.385	.676	.54	.41	.37	.543	1.842
	Neg. Exp. F2	-.14	.07	-.13	-1.998	.047	-.287	-.002	.12	-.12	-.10	.658	1.520
	Non-Evaluation	-.03	.08	-.03	-.448	.655	-.185	.117	.27	-.03	-.02	.620	1.612
	Pressure	-.06	.12	-.06	-.530	.597	-.288	.166	.25	-.03	-.03	.240	4.166
	Responsibility	.08	.11	.07	.752	.452	-.131	.293	.27	.05	.04	.270	3.708
	FOMO	.18	.09	.16	2.086	.038	.010	.346	.41	.13	.11	.456	2.193
	Pragmatism	-.03	.11	-.03	-.301	.764	-.248	.182	.28	-.02	-.02	.373	2.681
	Need-Balance	.04	.10	.04	.432	.666	-.151	.235	.31	.03	.02	.372	2.686
3	(Constant)	2.97	.36		8.313	.000	2.266	3.673					
	Neg. Exp. F1	.48	.08	.45	6.185	.000	.324	.627	.54	.36	.31	.479	2.087
	Neg. Exp. F2	-.12	.07	-.11	-1.678	.095	-.263	.021	.12	-.11	-.08	.635	1.575
	Non-Evaluation	-.06	.08	-.05	-.733	.465	-.203	.093	.27	-.05	-.04	.616	1.623
	Pressure	-.03	.11	-.03	-.293	.769	-.256	.190	.25	-.02	-.01	.238	4.205
	Responsibility	.08	.11	.07	.760	.448	-.128	.290	.27	.05	.04	.266	3.761
	FOMO	.19	.09	.17	2.147	.033	.016	.364	.41	.13	.11	.405	2.470
	Pragmatism	-.01	.11	-.01	-.135	.893	-.227	.198	.28	-.01	-.01	.366	2.730

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Model		Unstandardized Coeffi-cients		Standardized Coefficients			95% CI for B		Correlations			Collinearity Statistics	
		B	*SE*	ß	*t*	*p*	LL	UL	Zero-or-der	*B*	*SE*	ß	VIF
	Need-Balance	-.03	.10	-.03	-.294	.769	-.225	.166	.31	-.02	-.01	.347	2.886
	U&G F1	-.13	.08	-.10	-1.650	.100	-.280	.025	.23	-.10	-.08	.654	1.530
	U&G F2	.27	.07	.24	3.728	.000	.125	.406	.44	.23	.19	.627	1.594
	U&G F3	-.03	.06	-.03	-.468	.641	-.145	.089	.25	-.03	-.02	.728	1.374
4	(Constant)	2.94	.35		8.500	.000	2.260	3.623					
	Neg. Exp. F1	.27	.09	.25	2.966	.003	.089	.443	.54	.18	.14	.330	3.028
	Neg. Exp. F2	-.12	.07	-.11	-1.778	.077	-.261	.013	.12	-.11	-.09	.635	1.575
	Non-Evaluation	-.10	.07	-.08	-1.346	.180	-.244	.046	.27	-.08	-.07	.604	1.657
	Pressure	.00	.11	.00	.014	.989	-.215	.218	.25	.00	.00	.236	4.229
	Responsibility	.01	.10	.01	.097	.923	-.195	.215	.27	.01	.00	.259	3.863
	FOMO	.22	.09	.19	2.530	.012	.048	.387	.41	.16	.12	.402	2.485
	Pragmatism	-.05	.10	-.04	-.471	.638	-.256	.157	.28	-.03	-.02	.364	2.748
	Need-Balance	-.02	.10	-.02	-.234	.815	-.212	.167	.31	-.01	-.01	.346	2.887
	U&G F1	-.20	.08	-.16	-2.634	.009	-.354	-.051	.23	-.16	-.13	.618	1.618
	U&G F2	.19	.07	.17	2.675	.008	.050	.331	.44	.17	.13	.588	1.702
	U&G F3	-.02	.06	-.02	-.320	.749	-.132	.095	.25	-.02	-.02	.727	1.376
	SRHI	.40	.10	.36	4.186	.000	.213	.591	.57	.26	.20	.322	3.109

Note. DV = smartphone exposure. The final (fourth) model explains 37.3% of variance. R^2 = .30 for step 1 (R^2 unadjusted: 30, $F(2, 261) = 56.409$, $p < .000$); ΔR^2 = .02 for step 2 ($F(6, 255) = 1.268$, $p = .27$); ΔR^2 = .04 for step 3 ($F(3, 525) = 4.941$, $p < .000$), and ΔR^2 = .04 ($F(1, 251) = 17.524$, $p < .000$) for step 4. BCa bootstrapped CI based on 5000 samples.

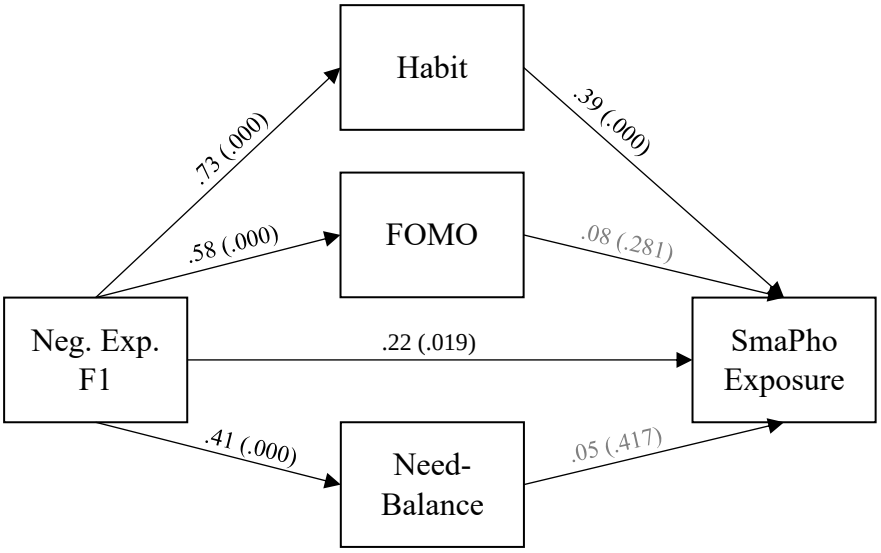

Figure A 5

Model of Acceleration Experiences (Factor 1) Predicting Frequent Smartphone Use Mediated by Habit, FOMO, and Need-Balance

Note. Unstandardized regression coefficients are reported. The *p*-values are in parentheses after *b*-coefficients. Non-significant effects are in gray font for clarity. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 5000 samples.

The model explains 34.7% of variance of smartphone exposure. Total effect $b = .57$, $p < .000$. Indirect effect for habit $b = .35$, Boot *SE* .07, 95% BCa CI [.204, .492].
Indirect effect via Need-Balance *ns.* Sample size $n = 259$. Need-Balance as only mediator aside from habit, explains 34.4% of variance in a mediator model (not depicted) with an indirect effect of $b = .29$, Boot *SE* .07, 95% BCa CI [.157, 429].

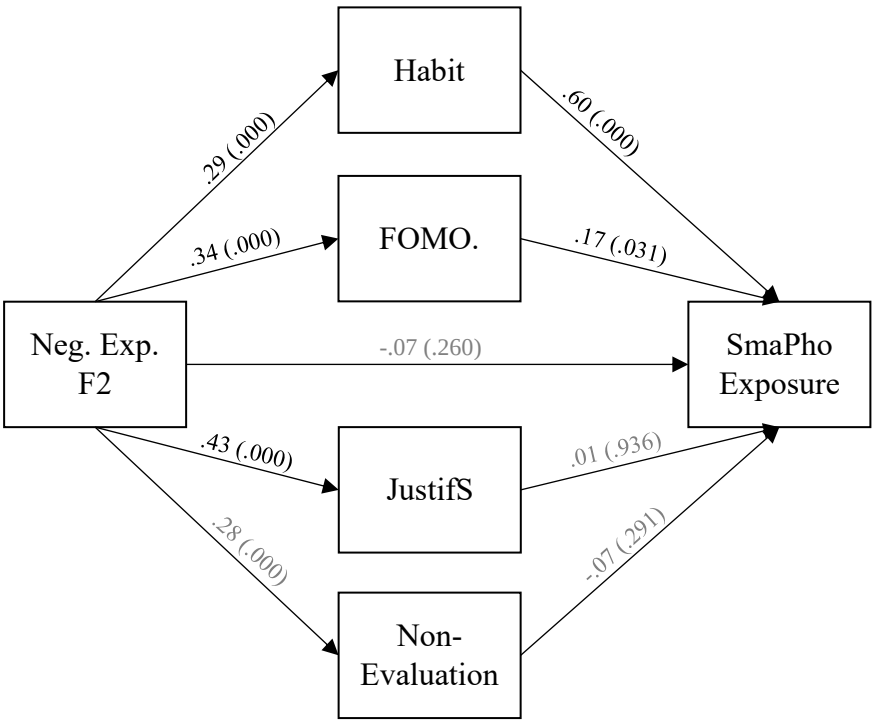

Figure A 6

Model of Adaptation Experiences (Factor 2) Predicting Frequent Smartphone Use Mediated by Habit, FOMO, Justification Factor 2, and Non-Evaluation

Note. Unstandardized regression coefficients are reported. The *p*-values are in parentheses after *b*-coefficients. Non-significant effects are in gray font for better clarity. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 5000 samples.

The model explains 34.2% of variance of smartphone exposure. Total effect $b = .14$, $p = .045$. Indirect effect for habit $b = .17$, Boot *SE* .04, 95% BCa CI [.096, .264]. Indirect effect for FOMO $b = .06$, Boot *SE* .03, 95% BCa CI [.006, .119]. Indirect effects via Justification Factor2 and Non-Evaluation *ns.*
JustifS as only mediator aside from habit explains 32.8% of variance in a simple mediator model (not depicted) with an indirect effect that is *ns*. Non-Evaluation as only mediator aside from habit explains 32.6% (also not depicted) with an indirect effect that also is *ns.*

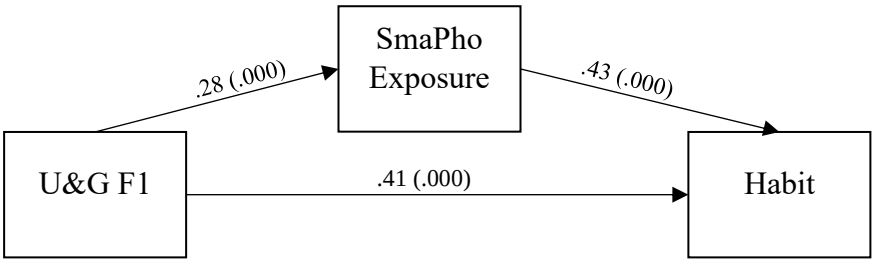

Figure A 7

Model of U&G (Factor 1) Predicting Habit Mediated by Frequent Smartphone Exposure

Note. Unstandardized regression coefficients are reported. The *p*-values are in parentheses after *b*-coefficients. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 5000 samples.

The model explains 45.5% of variance of habitualized smartphone use. Total effect $b = .54$, $p < .000$. Indirect effect $b = .10$, Boot *SE* .03, 95% BCa CI [.061, .187].

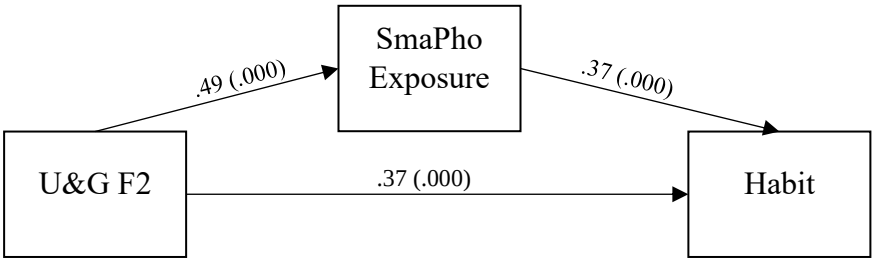

Figure A 8

Model of U&G (Factor 2) Predicting Habit Mediated by Frequent Smartphone Exposure

Note. Unstandardized regression coefficients are reported. The *p*-values are in parentheses after *b*-coefficients. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 5000 samples.

The model explains 43.2% of variance of habitualized smartphone use. Total effect $b = .55$, $p < .000$. Indirect effect $b = .18$, Boot *SE* .03, 95% BCa CI [.122, .245].

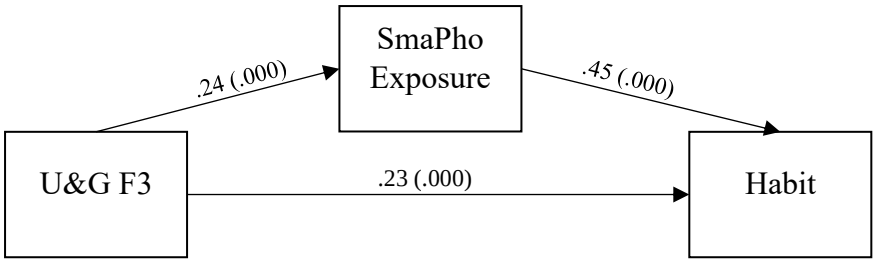

Figure A 9

Model of U&G (Factor 3) Predicting Habit Mediated by Frequent Smartphone Exposure

Note. Unstandardized regression coefficients are reported. The *p*-values are in parentheses after *b*-coefficients. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 5000 samples.

The model explains 38.8% of variance of habitualized smartphone use. Total effect $b = .35$, $p < .000$. Indirect effect $b = .11$, Boot *SE* .03, 95% BCa CI [.056, .172].

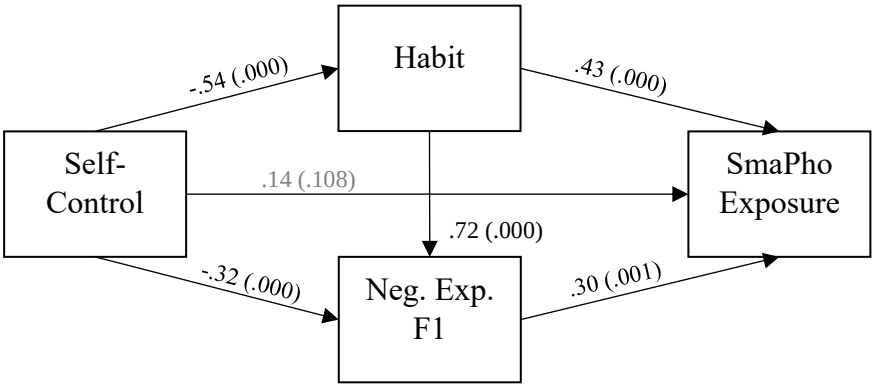

Figure A 10

Serial Model of Self-Control Predicting Smartphone Exposure Mediated by Habit and Neg. Exp. F1

Note. Unstandardized regression coefficients are reported. The *p*-values are in parentheses after *b*-coefficients. Non-significant effects are in gray font for clarity. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 5000 samples.

The model explains 36.6% of variance of frequency of smartphone exposure. Total effect $b = -.30$, $p = .002$. Indirect effect 1 (S-C → Habit → DV) $b = -.18$, Boot *SE* .04, 95% BCa CI [-.260, -.099]. Indirect effect 2 (S-C → Neg. Exp. F1 → DV) $b = -.10$, Boot *SE* .03, 95% BCa CI [-.169, -.037]. Indirect effect 3 (S-C → Habit → Neg. Exp. F1 → DV) $b = -.12$, Boot *SE* .04, 95% BCa CI [-.201, -.048].

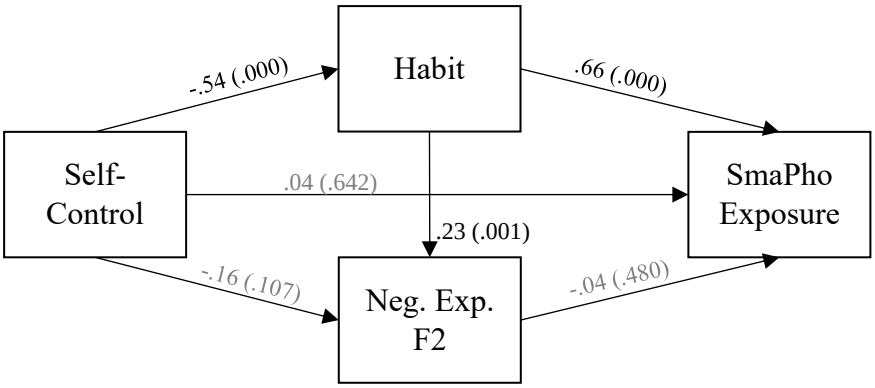

Figure A 11

Serial Model of Self-Control Predicting Smartphone Exposure Mediated by Habit and Neg. Exp. F2

Note. Unstandardized regression coefficients are reported. The *p*-values are in parentheses after *b*-coefficients. Non-significant effects are in gray font for clarity. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 5000 samples.

The model explains 32.6% of variance of frequency of the respective negative experiences as subsumed under Factor 1. Total effect b = -.30, p = .002. Indirect effect 1 (S-C → Habit → DV) b = -.36, Boot *SE* .06, 95% BCa CI [-.476, -.242]. Indirect effect 2 (S-C → Neg. Exp. F1 → DV) *ns.* Indirect effect 3 (S-C →Habit → Neg. Exp. F1 → DV) *ns.*

Table A 24

Hierarchical Multiple Regression Model Explaining Negative Experiences Factor 1

		Unstandardized Coeffi-cients		Standardized Coefficients			95% CI for B		Correlations			Collinearity Statistics	
Model		B	*SE*	ß	*t*	*p*	LL	UL	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	6.145	.738		8.330	.000	4.693	7.598					
	BMPN (Post-EFA)	.082	.139	.049	.594	.553	-.190	.355	-.238	.037	.032	.436	2.293
	SCS-K-D (Post-EFA)	-.778	.099	-.534	-7.878	.000	-.973	-.584	-.483	-.439	-.426	.637	1.570
	ULS-8 (Post-EFA)	-.064	.102	-.047	-.627	.531	-.265	.137	.170	-.039	-.034	.530	1.888
2	(Constant)	2.176	.573		3.796	.000	1.047	3.305					
	BMPN (Post-EFA)	-.035	.096	-.021	-.361	.718	-.225	.155	-.238	-.023	-.013	.428	2.337
	SCS-K-D (Post-EFA)	-.324	.075	-.222	-4.341	.000	-.471	-.177	-.483	-.262	-.162	.531	1.882
	ULS-8 (Post-EFA)	-.088	.073	-.064	-1.210	.227	-.232	.055	.170	-.075	-.045	.493	2.030
	U&G F1	-.006	.052	-.005	-.124	.901	-.109	.096	.394	-.008	-.005	.707	1.413
	U&G F2	.022	.049	.020	.439	.661	-.075	.118	.458	.027	.016	.650	1.537
	U&G F3	.144	.042	.151	3.429	.001	.061	.227	.426	.210	.128	.714	1.401
	SRHI (Post-EFA)	.650	.054	.615	12.076	.000	.544	.756	.765	.602	.451	.536	1.865
3	(Constant)	2.104	.573		3.673	.000	.976	3.232					
	BMPN (Post-EFA)	-.011	.095	-.007	-.121	.904	-.199	.176	-.238	-.008	-.004	.412	2.427
	SCS-K-D (Post-EFA)	-.314	.073	-.215	-4.319	.000	-.457	-.171	-.483	-.264	-.156	.525	1.904
	ULS-8 (Post-EFA)	-.095	.072	-.069	-1.327	.186	-.236	.046	.170	-.084	-.048	.481	2.078
	U&G F1	-.073	.053	-.062	-1.356	.176	-.178	.033	.394	-.085	-.049	.630	1.587
	U&G F2	.009	.050	.008	.172	.864	-.090	.107	.458	.011	.006	.591	1.692
	U&G F3	.118	.042	.124	2.829	.005	.036	.200	.426	.176	.102	.680	1.471
	SRHI (Post-EFA)	.586	.057	.555	10.255	.000	.474	.699	.765	.544	.371	.447	2.238
	Non-Eval.	.064	.052	.058	1.244	.215	-.037	.166	.485	.078	.045	.605	1.653

Model		Unstandardized Coefficients		Standardized Coefficients			95% CI for B		Correlations			Collinearity Statistics	
		B	*SE*	ß	*t*	*p*	LL	UL	Zero-order	Partial	Part	Tolerance	VIF
	Pressure	.122	.073	.118	1.671	.096	-.022	.266	.432	.105	.060	.263	3.801
	Resp.	-.093	.072	-.090	-1.282	.201	-.235	.050	.415	-.081	-.046	.265	3.772
	FOMO	.192	.059	.181	3.246	.001	.076	.309	.565	.201	.117	.419	2.387
	Pragmatism	-.106	.074	-.086	-1.435	.152	-.252	.040	.398	-.090	-.052	.360	2.777
	Need-Bal.	.033	.067	.030	.501	.616	-.098	.165	.432	.032	.018	.354	2.824

Note. DV = Neg. Exp. F1. Method: enter. The final (third) model explains 65.6% of variance. R^2 = .24 for step 1 (R^2 unadjusted: .67, $F(3, 260) = 27.167$, p = .000); ΔR^2 = .41 for step 2 ($F(4, 256) = 72.762$, p = < .000); ΔR^2 = .03 for step 3 ($F(6, 250) = 3.769$, p = .001). BCa bootstrapped CI based on 5000 samples.

Table A 25

Hierarchical Multiple Regression Model Explaining Negative Experiences Factor 2

Model		Unstandardized Coefficients		Standardized Coefficients			95% CI for B		Correlations			Collinearity Statistics	
		B	*SE*	ß	*t*	*p*	LL	UL	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	5.756	.761		7.560	.000	4.256	7.255					
	BMPN (Post-EFA)	-.272	.143	-.173	-1.901	.058	-.553	.010	-.192	-.117	-.115	.436	2.293
	SCS-K-D (Post-EFA)	-.209	.102	-.155	-2.051	.041	-.410	-.008	-.208	-.126	-.124	.637	1.570
	ULS-8 (Post-EFA)	-.138	.105	-.108	-1.309	.192	-.345	.070	.082	-.081	-.079	.530	1.888
2	(Constant)	4.725	.821		5.756	.000	3.108	6.342					
	BMPN (Post-EFA)	-.275	.138	-.175	-1.990	.048	-.547	-.003	-.192	-.123	-.115	.428	2.337
	SCS-K-D (Post-EFA)	-.085	.107	-.063	-.792	.429	-.295	.126	-.208	-.049	-.046	.531	1.882
	ULS-8 (Post-EFA)	-.142	.105	-.111	-1.356	.176	-.348	.064	.082	-.084	-.078	.493	2.030
	U&G F1	-.064	.075	-.058	-.853	.395	-.210	.083	.087	-.053	-.049	.707	1.413

Model		Unstandardized Coefficients		Standardized Coefficients			95% CI for B		Correlations			Collinearity Statistics	
		B	*SE*	ß	*t*	*p*	LL	UL	Zero-order	Partial	Part	Tolerance	VIF
	U&G F2	-.195	.070	-.198	-2.777	.006	-.333	-.057	.023	-.171	-.160	.650	1.537
	U&G F3	.127	.060	.144	2.118	.035	.009	.246	.206	.131	.122	.714	1.401
	SRHI Post-EFA)	.320	.077	.326	4.145	.000	.168	.471	.283	.251	.239	.536	1.865
3	(Constant)	4.584	.785		5.842	.000	3.038	6.129					
	BMPN (Post-EFA)	-.210	.130	-.134	-1.611	.109	-.467	.047	-.192	-.101	-.086	.413	2.421
	SCS-K-D (Post-EFA)	-.101	.100	-.075	-1.016	.311	-.297	.095	-.208	-.064	-.054	.525	1.903
	ULS-8 (Post-EFA)	-.162	.098	-.127	-1.652	.100	-.355	.031	.082	-.104	-.088	.481	2.079
	U&G F1	-.115	.073	-.106	-1.580	.115	-.259	.028	.087	-.099	-.084	.634	1.578
	U&G F2	-.123	.068	-.125	-1.800	.073	-.257	.012	.023	-.113	-.096	.595	1.681
	U&G F3	.081	.057	.092	1.423	.156	-.031	.194	.206	.089	.076	.681	1.468
	SRHI Post-EFA)	.184	.078	.187	2.347	.020	.030	.338	.283	.147	.125	.448	2.234
	Non-Eval.	.091	.070	.089	1.300	.195	-.047	.229	.237	.082	.069	.613	1.632
	JustifS	.286	.065	.300	4.429	.000	.159	.414	.406	.269	.237	.621	1.611
	FOMO	.198	.081	.202	2.441	.015	.038	.358	.302	.152	.130	.419	2.389
	Pragmatism	-.105	.101	-.092	-1.034	.302	-.304	.095	.089	-.065	-.055	.362	2.763
	Need-Bal.	-.223	.092	-.219	-2.439	.015	-.403	-.043	.016	-.152	-.130	.354	2.823

Note. DV = Neg. Exp. F2. Method: enter. The final (third) model explains 24.9% of variance. R^2 = .06 for step 1 (R^2 unadjusted: .28.3, $F(3, 260) = 5.195$, p = .002); ΔR^2 = .09 for step 2 ($F(4, 256) = 7.047$, p = < .000); ΔR^2 = .13 for step 3 ($F(5, 251) = 9.324$, p = .000). BCa bootstrapped CI based on 5000 samples.

Table A 26

Hierarchical Regression Model Containing all Model-Variables

Model		Unstandardized Coeffi-cients		Standardized Coefficients			95% CI for B		Correlations			Collinearity Statistics	
		B	*SE*	ß	*t*	*p*	LL	UL	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	5.746	.871		6.601	.000	4.032	7.460					
	BMPN (Post-EFA)	.173	.163	.097	1.058	.291	-.149	.495	-.041	.065	.064	.436	2.293
	SCS-K-D	-.414	.117	-.269	-3.554	.000	-.644	-.185	-.196	-.215	-.215	.637	1.570
	ULS-8 (Post-EFA)	-.048	.121	-.033	-.400	.689	-.286	.189	.026	-.025	-.024	.530	1.888
2	(Constant)	1.976	.850		2.324	.021	.302	3.651					
	BMPN (Post-EFA)	.005	.135	.003	.037	.970	-.260	.270	-.041	.002	.002	.421	2.374
	SCS-K-D	.135	.107	.088	1.261	.209	-.076	.346	-.196	.079	.062	.494	2.023
	ULS-8 (Post-EFA)	-.040	.102	-.028	-.397	.691	-.241	.160	.026	-.025	-.019	.488	2.050
	U&G F1	-.135	.072	-.109	-1.870	.063	-.277	.007	.229	-.117	-.092	.705	1.418
	U&G F2	.204	.069	.182	2.947	.004	.068	.340	.436	.182	.144	.627	1.595
	U&G F3	.003	.060	.003	.050	.960	-.114	.120	.245	.003	.002	.679	1.472
	SRHI (Post-EFA)	.377	.093	.338	4.032	.000	.193	.561	.569	.245	.197	.341	2.929
	Neg. Exp. F1	.337	.091	.319	3.695	.000	.157	.516	.538	.226	.181	.322	3.110
	Neg. Exp. F2	-.092	.064	-.081	-1.440	.151	-.217	.034	.124	-.090	-.071	.767	1.304
3	(Constant)	2.130	.882		2.416	.016	.393	3.867					
	BMPN (Post-EFA)	.050	.137	.028	.363	.717	-.219	.318	-.041	.023	.018	.406	2.462
	SCS-K-D	.113	.107	.073	1.049	.295	-.099	.324	-.196	.066	.051	.489	2.046
	ULS-8 (Post-EFA)	-.028	.103	-.019	-.271	.787	-.230	.175	.026	-.017	-.013	.473	2.113
	U&G F1	-.202	.077	-.163	-2.623	.009	-.353	-.050	.229	-.164	-.128	.618	1.619
	U&G F2	.198	.071	.177	2.776	.006	.058	.339	.436	.174	.135	.583	1.714

Model		Unstandardized Coefficients		Standardized Coefficients			95% CI for B		Correlations			Collinearity Statistics	
		B	*SE*	ß	*t*	*p*	LL	UL	Zero-order	Partial	Part	Tolerance	VIF
	U&G F3	-.008	.060	-.008	-.125	.900	-.127	.112	.245	-.008	-.006	.656	1.524
	SRHI (Post-EFA)	.390	.097	.349	4.017	.000	.199	.581	.569	.247	.196	.314	3.180
	Neg. Exp. F1	.304	.093	.288	3.266	.001	.121	.488	.538	.203	.159	.305	3.276
	Neg. Exp. F2	-.118	.070	-.104	-1.684	.094	-.257	.020	.124	-.106	-.082	.624	1.602
	Non-Evaluation	-.092	.074	-.079	-1.255	.211	-.238	.053	.273	-.079	-.061	.600	1.665
	Pressure	-.007	.111	-.006	-.060	.952	-.225	.211	.247	-.004	-.003	.233	4.293
	Responsibility	.020	.104	.019	.193	.847	-.185	.226	.271	.012	.009	.257	3.886
	FOMO	.219	.086	.196	2.530	.012	.048	.389	.405	.159	.123	.398	2.514
	Pragmatism	-.032	.106	-.025	-.302	.763	-.240	.176	.276	-.019	-.015	.357	2.804
	Need-Balance	-.028	.097	-.024	-.289	.773	-.218	.162	.314	-.018	-.014	.343	2.918

Note. DV = smartphone exposure. Method: enter. The final (third) model explains 37.4% of variance. R^2 = .04 for step 1 (R^2 unadjusted: .05, $F(3, 260) = 4.364$, p = .005); ΔR^2 = .34 for step 2 ($F(6, 254) = 23.847$, p = < .000); ΔR^2 = .02 for step 3 ($F(6, 248) = 1.330$, p = .244). BCa bootstrapped CI based on 5000 samples.

Zusammenfassung

Haben Sie schonmal negative Erfahrungen mit Medien gemacht? Nutzen Sie diese dennoch weiter? Warum?—Warum nutzen Sie ein Medium weiter, wenn negative Konsequenzen der Nutzung sehr wahrscheinlich dessen Folge sind? Das ist die Hauptfragestellung, mit der sich dieses empirische Forschungsprojekt beschäftigt. Zunächst wurden explorative Interviews (n = 26) geführt. Aufbauend auf den Ergebnissen der Interviewstudie sowie der eingangs aufgearbeiteten und verknüpften Forschungsliteratur, wurde eine die darauffolgende quantitative Studie (n = 264) entwickelt. Den Ausgangspunkt bildet der Nutzen- und Belohungsansatz (U&G) aus der Kommunikationswissenschaft, der mit psychologischen Konzepten erweitert wurde, um sich der Kritik an diesem zu widmen und damit eine Forschungslücke zu adressieren, nämlich: alltägliche, persistente negative Erfahrungen, die (noch) keine psychische Störung darstellen. In den Interviews wurde das Smartphone als Medium identifiziert, mit dem die meisten dieser Erfahrungen gemacht werden. Außerdem konnten neun negative Erfahrungen und sechs Cluster mit Gründen für deren Persistenz extrahiert werden. Diese wurden in der zweiten Studie bekräftigt. Darüber hinaus wurde die Modellerweiterung getestet und die meisten antizipierten Pfade ebenfalls inferenzstatistisch bestätigt. Das Modell konnte 37% Varianz an täglicher Smartphonenutzung zu Kommunikationszwecken erklären. Zu den interessanten Befunden gehören Third-Person Effekte, die zumindest für zwei negative Erfahrungen nachgewiesen wurden, aber auch die überraschende positive Assoziation von gesuchten (bedürfnis-befriedigenden, also U&G) und ungewollten (negativen) Erfahrungen. Die wichtigen Rollen von Selbstkontrolle oder auch der Angst etwas zu verpassen (FOMO) wurden deutlich und ganz besonders diejenige von Gewohnheiten in der alltäglichen Smartphonenutzung. Wichtig zu erkennen ist jedoch auch, dass Gewohnheiten negative Erfahrungen nicht in ihrer Gänze erklären können und nicht automatisch die aktive Mediennutzung zum Zweck der Bedürfnisbefriedigung ausschließen. Mögliche Implikationen für eine Umsetzung in der täglichen Nutzungspraxis wurden außerdem abgeleitet.

Abstract

Have you ever had a negative experience with media? Do you keep using them, nonetheless? Why?—Why would you use a medium again if use is most likely accompanied by negative outcomes? These are the main questions this empirical research project was designed to elucidate. For that, two studies were conducted: an explorative qualitative interview study (n = 26) and a subsequent quantitative online survey (n = 264) that was based upon the results of the former as well as on a broad range of reviewed research. The Uses-and-Gratifications Approach from communication studies constitutes the base of the project and was extended with concepts from psychology to address the classic model's open ends and thereby also a gap in research. That is, research on negative experiences persistent in everyday life that do not constitute mental disorders (yet). The smartphone was identified as the device most negative experiences were reported with. The interviews further indicated the existence of nine negative experiences and six clusters of justifications that would address the "why" of their persistence in everyday life. These were tested and mostly confirmed in the second study. Moreover, the extended model was tested and explained 37% of variance in smartphone exposure for communication purposes. Influences of smartphone-independent variables on those directly related to usage were detected and the connections depicted in the model confirmed. Interesting insights came to light during the different analyzes, such as a third-person effect for at least two of the experiences, a positive relationship of sought (i.e., U&G) and unwanted (negative) experiences as well as the pre-eminent influence of self-control or FOMO. Most importantly, the key role of habitual smartphone use in everyday life was evident, but also that this does not automatically exclude actively chosen use for reasons of need-fulfillment. Practical implications were derived from the results.

Prior Publications

Data from this project was not published in form of an article prior to the submission of this thesis, but for presentations at conferences and diverse PhD colloquia.

A force of habit – or why can't we resist our smartphones' calls? (Feb 28, 2020). Poster at Society for Personality and Social Psychology's (SPSP) Annual Convention (Feb 27-29, 2020) in New Orleans, Louisiana.

It's not yet off the table! Not too smart phone habits & why we don't change what's negative (Feb 8, 2019). Poster at Society for Personality and Social Psychology's (SPSP) Annual Convention (Feb 7-9, 2019) in Portland, Oregon.

Not too smart - habits' and needs' interplay might lead users to unhealthy smartphone practices (Sep 18, 2018). Poster at the German Addiction Congress 2018 (Sep 17-19, 2018) held at University Hospital Hamburg-Eppendorf, Germany.

You cannot not communicate!? A proposition of an extended Uses-and-Gratifications-Model to explain smartphone use despite persistent negative experiences (Nov 3, 2018). Presentation at the 7th European Communication Conference in Lugano, Switzerland (Oct 31 - Nov 3, 2018).

Persistent negative media experiences – new media, new challenges? (Sep 29, 2017). Presentation at Audiences 2030 – Imagining a future for audiences (Sep 28-29, 2017), conference held at Universidade Católica Portuguesa in Lisboa, Portugal.

The dark side of media. Persistent negative experiences with mass media and possible explanations from research on identity. Presentation of my PhD project at the European Media and Communication Doctoral Summer School 2016 (Jul 25 - Aug 5, 2016) held at Università Cattolica del Sacro Cuore in Milan, Italy.

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