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DISSERTATION

The Association between Social Rank, Attachment, Self-Compassion and Paranoia.

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Abstract

In a narrative review, Freeman and Garety (2014) discuss and review research on putative causal factors involved in paranoid symptom formation and maintenance. Targeting these mechanisms could improve the way we treat delusions, which is important given the fact that state-of-the-art Cognitive Behavioral Therapy for psychosis (CBTp) has only small to medium effects on paranoid delusions (Mehl, Werner, & Lincoln, 2015; van der Gaag, Valmaggia, & Smit, 2014). Thus, further elaboration on putative causal variables involved in paranoid symptom formation as well as testing theoretically founded interventions for paranoia seems warranted. The latter notion is corroborated by a recent meta-analysis investigating the effect of CBTp on delusions that suggested interventions focusing on causal mechanisms (causal interventionist approach) bring about larger changes in delusions than first-generation studies (Mehl, Werner, & Lincoln, 2015).

The present dissertation focused on extending our understanding of the emergence and maintenance, as well as on exploring recently emerging avenues of potential treatment of paranoia, from three perspectives: social rank and social competition (Study 1 – experimental approach), insecure adult attachment and emotion regulation (Study 2 – cross-sectional approach), and self-compassion (Study 3 – causal interventionist approach). Social rank, insecure attachment and emotion regulation, as well as self-compassion, constitute potential vulnerability and maintaining factors for paranoia that can be derived from the cognitive model of persecutory delusions (Freeman & Garety, 2014). The planned projects attempted to fill research gaps concerning these variables by taking into account interdisciplinary perspectives.

Study 1 looked at paranoid symptom formation from the perspective of social rank theory using a randomized experimental pre-post design with healthy, female participants (N = 172). Results indicated that although the experimental manipulation had a strong effect on

state social rank, there was no significant effect on paranoia. Insecure striving (trend-level effect), (i.e. a striving to maintain or gain social rank in order to avoid being perceived as inferior by others) and fears of rejection (i.e. believing that others will generally reject or exclude an individual that cannot 'keep up'), (see Gilbert et al., 2007) acted as moderators (small effects) regarding paranoid reactions to the experimental manipulations. In sum, the results suggest that social rank changes per se are not causal to paranoia. However, insecure striving and fears of rejection may be additional cognitive vulnerability factors, predictive of differential paranoid reactions across individuals, in according triggering situations.

Study 2 tested assumptions derived from an attachment theory of emotion regulation in adults, using a cross-sectional design in a patient sample with psychosis (N = 60). The results revealed significant group differences between a healthy control group (N = 40) and the psychosis group, with the means of the latter being significantly higher regarding insecure attachment dimensions (namely attachment anxiety [i.e. being preoccupied with attachment] vs. avoidance [i.e. denying the importance of intimate relationships]) and dysfunctional emotion regulation (ER) patterns (i.e. hyperactivating ER = strategies that aggravate negative emotions, such as catastrophization or rumination; vs. blaming others ER). Moreover, hyperactivating ER significantly mediated between attachment anxiety and paranoia, whereas blaming others did not mediate this association. Conversely, blaming others ER mediated between attachment avoidance and paranoia, whereas hyperactivating ER did not mediate this association. In conclusion, the study suggests that predictions inferred from attachment theories of adult emotion regulation could contribute to a more differentiated view on the potential emergence and maintenance of paranoid symptoms in psychosis.

Study 3 investigated the potential causal role of self-compassion in paranoia by using an experimental design, following the causal interventionist approach. A guided introduction to compassion-focused imagery (CF) vs. a neutral control condition was delivered to a clinical

sample with a present diagnosis of a psychotic disorder and a history of paranoid delusions (N = 51). There were no specific effects of the imagery intervention on paranoia. The intervention was also non-effective regarding secondary outcomes (i.e. negative emotions, self-criticism, sympathetic arousal, and self-compassion). However, CF imagery had significant effects on self-reassurance (i.e. being kind, warm and understanding towards oneself; see Gilbert, Clarke, Hempel, Miles, & Irons, 2004), (small effect) and happiness (medium effect). Explorative analyses revealed that a majority (≈ 60%) of the participants appraised the intervention positively, indicating good acceptance. To the best of my knowledge Study 3 was one of the first demonstrations that compassion-focused imagery is feasible and accepted in psychotic patients. This finding is not trivial, as many scholars and clinicians were previously convinced that these kinds of interventions were counter-indicated in psychosis. However, since the effects were restricted to a few secondary outcomes, only an adjunct or supportive role of CF imagery in the treatment of psychosis can be recommended at this point.

Taken together, despite several limitations that will be discussed critically in this dissertation, the present studies may add to a more detailed understanding of paranoid symptoms from different perspectives, defining avenues for further investigation.

1. Theoretical Background

1.1 Paranoid Delusions and the Paranoia Continuum

The most recent definition of delusions according to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, reads as follows: *'Delusions are fixed beliefs that are not amenable to change in light of conflicting evidence. Their content may include a variety of themes (e.g. persecutory, referential, somatic, religious, grandiose). Persecutory delusions (i.e. belief that one is going to be harmed, harassed, and so forth by an individual, organization or other group) are most common. […] The distinction between a delusion and a strongly held idea is sometimes difficult to make and depends in part on the degree of conviction with which the belief is held despite clear or reasonable contradictory evidence regarding its veracity'*, (American Psychiatric Association, 2015). Although delusions also occur in the context of other disorders such as bipolar disorder, depression, or drug abuse, they are most frequent in schizophrenia spectrum disorders (see Appelbaum, Robbins, & Roth, 1999). For example, in a large help-seeking patient group with signs of schizophrenia (N = 1379) paranoid delusions occurred in about 50% of cases (Sartorius et al., 1986). Similarly, more recent studies in acute psychosis suggested that more than 50% of patients exhibited delusions, of which 80% were of the paranoid type (Brakoulias & Starcevic, 2008).

Nowadays it is commonly acknowledged that paranoid beliefs are not restricted to their clinical manifestations, but that clinically relevant psychotic symptoms, including paranoid delusions, constitute the extreme end of a continuum (Johns & van Os, 2001; van Os, Linscott, Myin-Germeys, Delespaul, & Krabbendam, 2009). The paranoia continuum may range from a few and milder paranoid thoughts at the lower end (e.g. socio-evaluative concerns) and numerous, odd, more distressing and strongly held paranoid beliefs (delusions) at the upper end (e.g. others trying to cause significant harm), (Freeman et al., 2005, Lincoln, 2007). The continuum view of paranoia allows for studying the phenomenon in the general

population. Furthermore, the same causal mechanisms that underlie extreme forms of paranoia (paranoid delusions) can be hypothesized to also explain milder manifestations of symptoms.

1.2 A Cognitive Model of the Emergence of Paranoia

Cognitive models of paranoia postulate that symptoms emerge as the result of an interaction between vulnerability (e.g. cognitive biases, negative schemas about the self and others) and stressors (e.g. major life events), (see Freeman & Garety, 2014; Freeman, Garety, Kuipers, Fowler, & Bebbington, 2002). In the most recent conceptualization of the cognitive model of paranoid symptom formation based on a review of the literature (Freeman and Garety, 2014), the formation of a paranoid delusion starts with a precipitator which would usually be a highly stressful event or chain of stressful events, sleep disturbances, or drug intake. Consequently, the individual will find him or herself in a state of heightened arousal and distress. On the one hand, regarding the 'emotion' part of the cognitive model (see Figure 1) it is postulated that both pre-existing vulnerabilities formed through upbringing, such as negative schemas about the self [e.g. inferior in social rank, and thus more vulnerable to potential attacks] and others [e.g. rejecting, hostile]), and emotion regulation difficulties (e.g. heightened anxiety levels, worry) play a role in symptom formation. On the other hand, the 'reasoning' part of the cognitive model suggests that aberrant reasoning (e.g. reasoning biases such as Jumping to Conclusions[1] and confirmation bias[2]) poses an important vulnerability factor for paranoid symptoms. When individuals are in an internally unsettle state due to a highly distressing precipitating event, the emotion-based and the reasoning-based

[1] hasty decision making in probability-based tasks, which is based on only inadequately limited evidence, observed frequently in individuals with deluded vs. non-deluded schizophrenia (see Huq, Garety, & Hemsley, 1988)

[2] a tendency to seek confirmatory evidence that is congruent with a certain belief, while discarding/ ignoring disconfirmatory evidence (see Freeman, Garety, Kuipers, Fowler, & Bebbington, 2002)

vulnerabilities foster a misinterpretation both of this internal state and discrepant, ambiguous or otherwise stressful external events as being the result of threat posed by others. A lack of social contacts and feedback (= lack of corrective input) further contribute to the formation of the belief that threat is the origin of the disturbances.

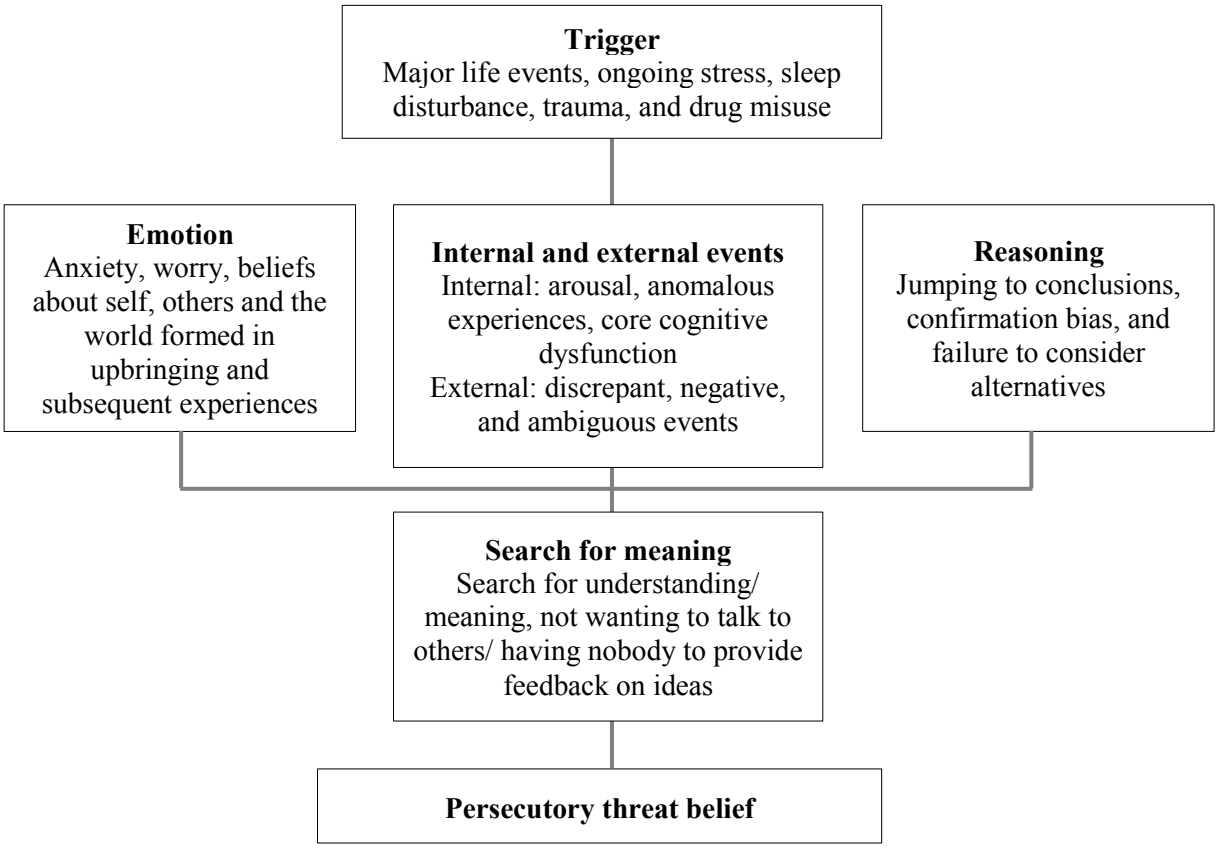

Figure 1. Model of the emergence of paranoia (adopted from Freeman & Garety, 2014)

1.2.1 Deepening the view on the 'emotion' part of the cognitive model: negative beliefs about the self, social rank and paranoia. *'After university, however, I failed to really get a good start to my career, I was working part time and living with my parents, I had no clue about what I really wanted to do, and because I had no money, I couldn't go out very much. Probably, as a result of being isolated again, the thoughts began to come back. However, this time I began to be under the impression that I had some sort of social handicap, similar to autism and that people could tell this just by the way that I did or didn't make eye contact with them. Consequently, going out on the street became an ordeal because the more self-conscious I felt about my eye contact, the more uncomfortable I felt when looking at people. Eventually, I was convinced that when I was out on the street, everyone who saw me instantly knew I had some sort of social handicap. It actually started to feel as if everybody who met me pretended to treat me normally and then laughed at me behind my back once I'd gone.'* (Adam, 2011, p. 656).

The quote above stems from a first person account from an individual with suspicious thoughts that had also been cited by Freeman and Garety (2014), illustrating negative thoughts about the self as associated with paranoia. The way Adam describes himself and his experiences could also be interpreted as a sense of social inferiority. Notably, his inferior status could instantly be sensed and used against him by others. In line with the idea of paranoia being associated with negative thoughts about the self, research has shown that individuals with persecutory delusions exhibit high levels of self-criticism (Hutton, Kelly, Lowens, Taylor, & Tai, 2013) as well as generally low and unstable self-esteem (for a review see Kesting & Lincoln, 2013). Further, negative self-schemas or self-related thoughts have been shown to prospectively predict symptoms of paranoid delusions (Ben-Zeev, Morris, Swendsen, & Granholm, 2012; Fowler et al., 2011; Oliver, O'Connor, Jose, McLachlan, & Peters, 2012). In their narrative review, Freeman and Garety (2014) further emphasize that

negative thoughts about the self are associated with negative affect, such as anxiety and depression, which are reported to predict paranoid thoughts in experimental and experience sampling studies (e.g. Kesting, Bredenpohl, Klenke, Westermann, & Lincoln, 2013; Thewissen et al., 2011).

In this context, Freeman et al. (2014) emphasized that the perceived relative position to others (social rank), emerging via social comparisons, may be an important element in arriving at the conclusion of the self as inferior and hence vulnerable in social contexts. The appraisal of having low social rank may rise alertness and vigilance – states or behaviors which could be considered to be markers of paranoia (see Preti & Cella, 2010). Theoretically, paranoia may be considered to be an adaptive response to avoid harm by others (Gilbert, 2001), which makes particular sense when one feels exposed and vulnerable in terms of low social rank. This seems to be corroborated by animal studies, suggesting that subordinate animals within the hierarchy often display hypervigilant behavior, alongside with heightened physiological stress-levels (e.g. Sapolsky, 1989; 2005).

There have been only a handful of cross-sectional studies investigating paranoia from a social rank perspective (Anderson & Freeman, 2013; Freeman et al., 2005; Gilbert, Boxall, Cheung, & Irons, 2005). Freeman et al. (2005) reported that lower social rank was significantly, although modestly, associated with higher frequency and distress of paranoid thoughts. In the Gilbert, Boxall, Cheung & Irons (2005) study, social power was a significant predictor of paranoia, and this effect was stable even after controlling for depression. However, the effect was of opposite direction as expected - thus higher perceived social power was associated with higher levels of paranoia. The authors speculated that individuals who possess a very high position within the social hierarchy may also need to be particularly vigilant and cautious in order to maintain their superior status. In a more recent study by Anderson and Freeman (2013) the authors found that an orientation towards striving to avoid

inferiority significantly predicted paranoia, providing a hint that beyond rank per se, a striving to prevent an 'unwantedly' low social position plays an additional role in paranoia.[3]

In the only experimental study on this topic, Freeman et al. (2014) conducted an experimental two-condition two-period crossover trial. Sixty female participants did a virtual-reality train ride twice: once with their actual body height and once with an experimentally manipulated, reduced height. In the reduced height condition, participants exhibited significantly more paranoid thoughts, and this effect was fully mediated by current appraisals of social rank. The authors consequently concluded that social status perceptions may play a causal role in the emergence of paranoia. Although the rank manipulation in the study by Freeman et al. (2014) was conducted in a well-controllable manner, the effects of a height manipulation might not be generalizable to the every-day social comparison processes that take place on a more subjective and cognitive level. In addition, reducing height might not be an ideal experimental manipulation, because it is likely that the 'oddness' of it (i.e. everyone is suddenly taller, train may appear larger) might not readily reflect rank-challenging situations in daily life. Further, the study by Freeman et al. (2014) left some questions unanswered. First, the role of affect (particularly those affects mainly implicated in the emergence of paranoia: sadness and anxiety) was not investigated. Considering these variables may nevertheless be important, as previous research indicates that lower social rank

[3] Insecure striving is defined as a striving to avoid low social rank, as this is feared because others may look down on someone who fails to compete and keep up (Gilbert et al., 2007). Insecure striving correlates with several mental pathologies like stress, anxiety and depression and is associated with validation seeking, and hypercompetitive attitudes. Moreover, it is significantly associated with fears of passive or active rejection by others, anticipated for when one fails in competing and striving for social rank, as well as with fearing to lose access to important resources (e.g. miss out on chances in life), (see Gilbert et al., 2007; Gilbert, McEwan, Bellew, Mills, & Gale, 2009).

is associated with elevated levels of depression and anxiety (see Gilbert, 2000) and these emotions are postulated to be particularly relevant for paranoia (see Preti & Cella, 2008). Second, as Anderson and Freeman (2013) found that insecure striving was also associated with paranoia and this variable, together with fears of social rejection, have been postulated to influence the responses to low social rank or rank loss (Gilbert et al., 2007), it could be speculated that these variables pose important moderators that might be helpful to explain inter-individual variances in the reaction towards social rank challenges. Third, besides down-ranking, that hypothetically enhances paranoia, up-ranking could reduce paranoia levels, which has not yet been tested, but may be of particular interest regarding intervention.

1.2.2 Deepening the view on the 'emotion' part of the cognitive model: insecure attachment, emotion regulation and paranoia. The cognitive model of paranoia (see Figure 1) conceptualizes negative self-schema as vulnerability for the symptoms, which may be partly acquired through adverse experiences in upbringing. Insecure attachment styles, encoded in negative internal working models of the self and of others, and directing behaviors, emotions and cognitions in attachment relationships, can be regarded as originally adaptive responses to adverse and rejecting primary caregivers or broader adverse social environments (e.g. growing up in a children's home) (see Bowlby, 1991). It seems intuitively plausible to assume that paranoia may be rooted in insecure attachment that may have occurred as an originally adaptive coping response to adverse interpersonal experiences. Insecure attachment has been shown to be modestly to moderately associated with psychosis (see Gumley, Taylor, Schwannauer, & MacBeth, 2014, for a review). Beyond this global association, attachment anxiety and attachment avoidance have been shown to be related to paranoia in healthy samples (MacBeth, Schwannauer, & Gumley, 2008; Pickering et al., 2008). More importantly, preliminary evidence suggests that attachment anxiety and attachment avoidance are specifically associated with paranoia, but not hallucinations, both in

a patient sample (Wickham, Sitko, & Bentall, 2015) and in a healthy sample (Pickering, Simpson, & Bentall, 2008). Furthermore, insecure attachment has been shown to mediate the link between paranoia and childhood adversity in a large national comorbidity survey sample (Sitko, Bentall, Shevlin, O'Sullivan, & Sellwood, 2014).

In an attachment model of psychosis (Read & Gumley, 2010) the authors link childhood adversities to psychosis; from attachment via attachment-related translating mechanisms, such as theory of mind, schemas of the self and others, and emotion regulation. A study examining the mediating role of emotion regulation between insecure attachment and paranoia might be particularly promising, as it would combine the attachment model of psychosis and the cognitive model of paranoia as outlined by Freeman and Garety (2014), (that includes both schemas acquired through upbringing and disturbances in emotion regulation). This could be useful for our theoretical understanding of paranoia from a developmental and attachment perspective. Further, investigating this mediation may help to identify target variables for intervention.

Evidence for emotional problems and dysfunctional emotion regulation in paranoia is accumulating. For instance, a cross-sectional study in healthy individuals reported paranoia to be associated with catastrophization. The same study showed that self-blaming prospectively predicted paranoia after one month (Westermann, Boden, Gross, & Lincoln, 2013). In another study, worry predicted the stability of paranoid delusions over the course of three months in a psychosis sample (Startup, Freeman, & Garety, 2007). In an experimental study, a rumination induction was associated with subsequent increases in paranoia (Martinelli, Cavanagh, & Dudley, 2013). Rumination also preceded increases in persecutory delusions in a study using a momentary ecological assessment approach (Hartley, Haddock, Vasconcelos e Sa, Emsley, & Barrowclough, 2014). Furthermore, paranoid delusions have been shown to be related with blaming others for negative events (An et al., 2010; Janssen et al., 2006; Kinderman &

Bentall, 1997; Martin & Penn, 2002; McKay, Langdon, & Coltheart, 2005; So, Tang, & Leung, 2015).

Interestingly, recent developments in attachment theory have suggested that the attachment dimensions of attachment anxiety vs. avoidance are associated with different patterns of dysfunctional ER in adults (see Shaver & Mikulincer, 2002, 2007). Attachment anxiety has been conceptually characterized by a negative model of the self, whereas attachment avoidance has been characterized by a negative model of others. Attachment anxiety is further defined by a strong dependence on others, preoccupation about relationships, and fears related to the attachment partner being unavailable or rejecting. In contrast, attachment avoidance has been conceptually characterized by being uncomfortable with closeness and intimacy, denial of the importance of close relationships, and an emphasis on interpersonal independence (see Bartholomew & Horowitz, 1991; Griffin & Bartholomew, 1994). Preliminary evidence shows that attachment anxiety and attachment avoidance are associated with distinct patterns of emotion regulation. While individuals with high levels of attachment anxiety tend to exaggerate their incompetence (e.g. self-blame) and negative affect, individuals with high levels of attachment avoidance tend to minimize it and to attribute negative events to others (see Shaver & Mikulincer, 2002, 2007, for an overview).

In sum, it appears thus promising to test assumptions of adult attachment theory in individuals with psychosis in order to shed light on the potential dynamics and mechanisms that mediate the association between insecure attachment and paranoia. This is relevant in so far as it may help to develop a more differentiated view on the emergence and maintenance of symptoms, and, in the long term, individually tailor potential interventions by taking attachment into account.

1.2.3 Deepening the view on the 'emotion' part of the cognitive model: self-compassion and paranoia. It has been recognized that negative emotions, such as anxiety or depression, are likely involved in the formation and maintenance of paranoid delusions (e.g. Freeman, 2007; Lincoln, Lange, Burau, Exner, & Moritz, 2010; Oliver et al., 2012). This notion has been backed up by ecological momentary assessment and experimental studies (e.g. Lincoln, Peter, Schäfer, & Moritz, 2009; Thewissen et al., 2011). In addition, individuals with paranoid delusions, compared to healthy controls, reported to attack themselves and engage in harsh self-criticism more strongly, while they reported to be less reassuring towards themselves (Hutton et al., 2013). Moreover, low global self-esteem and self-esteem instability have been found to be related to paranoia in several studies that applied different methodologies, including cross-sectional and experimental (for a review see Kesting & Lincoln, 2013).

In sum, it could thus be concluded that one route to reduce paranoia may be to target emotion regulation and the way individuals relate to themselves. This kind of treatment approach has seemingly been under-represented in comparison - for instance - to cognitive interventions for paranoid delusions (see Freeman & Garety, 2014, for a review). Nevertheless, interventions focusing on resources rather than problems and symptoms could be particularly agreeable for patients.

Recently, Gilbert (2009) introduced a new treatment approach, labelled Compassion Focused Therapy (CFT). CFT was conceived to establish better emotion regulation and positive self-relating (self-compassion) in individuals with severe mental disorder and high levels of shame and self-criticism. Neff (2003) defined self-compassion as follows: *'self-compassion entails being kind and understanding toward oneself in instances of pain or failure rather than being harshly self-critical; perceiving one's experiences as part of the larger human experience rather than seeing them as isolating; and holding painful thoughts*

and feelings in mindful awareness rather than over-identifying with them' (p.223). Within the CFT framework, self-criticism has been understood as a trigger for negative emotions and vice versa, which can interfere with the therapeutic progress. Both self-criticism and symptoms are proposed to be ameliorated by improving self-compassion in the patient (Gilbert & Procter, 2006).

Furthermore, introducing CFT, Gilbert (2009) proposed that at least three regulatory systems can be derived from neuroscientific and evolutionary research (e.g. Depue & Morrone-Strupinsky, 2005; LeDoux, 1998; Panksepp, 1998). First, it is postulated that there exists a *threat system* which entails emotions that signal threat, such as anger, anxiety, or disgust. When activated, behaviors such as fight, flight, freeze, or submission are rapidly initiated. Second, the *soothing system* has been postulated to entail positive and calm emotional states linked to contentment, soothing, and well-being. The soothing system initiates and responds to behaviors that are 'affiliative', such as signals of caring and kindness, which are associated with social engagement and attachment. Lastly, there is the *drive and excitement system*, entailing anticipation and pleasure associated with rewarding goals (e.g. material goods [e.g. food], and self-esteem-related goals [e.g. status and fame]), and activation of approach behaviors towards these goals. For a schematic figure of the postulated affect regulation systems, see Figure 2 (p. 16).

An imbalance of these regulatory systems is postulated to relate to a range of emotional and behavioral problems, including mental illness. Gilbert (2009) presents an array of techniques to ameliorate these problems, such as imagery, cognitive restructuring, and meditation practices etc., subsumed under the label 'compassionate mind training' (CMT) that are applied in order to re-establish a balance of the emotion regulation systems. The major aim of CMT is to teach individuals how to self-soothe (and thus dampen the predominance of the threat system) via being accepting of as well as warm, understanding, and kind towards

themselves (self-compassion, self-reassurance). Regarding paranoia it has been postulated that symptoms may emerge as the long-term consequence of negative interpersonal experiences (e.g. neglect, rejection), during critical developmental periods, which may predispose individuals to a certain extent to be highly distrustful of others. At the same time these individuals may possess a limited ability to self-soothe (see MacBeth et al., 2008). This claim can be interpreted in terms of the threat-system being sensitized and possibly 'hyperactive' in order to quickly detect threat. By stimulating the soothing system, the predominance of threat-related thoughts and affect may accordingly be dampened.

In sum, it seems reasonable to assume that compassion-focused interventions could be helpful to reduce paranoid symptoms in individuals with psychosis, as they target emotional problems and self-relating – variables that have been found to be involved in the emergence of paranoia. In the so far largest investigation of CFT in psychosis, conducted by Braehler et al. (2013), the authors compared CFT + treatment as usual (TAU) with TAU alone in a clinical sample with psychosis. No adverse events and a low attrition rate of 18% in the CFT group were reported, indicating feasibility of the intervention. Relative to TAU, CFT+TAU had a stronger effect regarding improvements of the global clinical impression. Although these results are promising, the study precludes any inferences about efficacy of the intervention regarding psychotic symptoms.

To my knowledge, so far (i.e. until December 2016) there have been only two studies reporting on the effect of compassion focused interventions on paranoid symptoms. In a case series study, Mayhew and Gilbert (2008) investigated effects of compassionate mind training in individuals with a diagnosis of schizophrenia who were hearing malevolent voices. Two of the participants were diagnosed with paranoid schizophrenia. Paranoia decreased in all patients from baseline to post CMT. Furthermore, the quality of the voices was reported as less malevolent and less persecuting, while the perceived benevolence of the voices increased.

In a randomized-controlled experimental study in a healthy sample, Hohenhaus, Hartmann and Lincoln (2012) reported that a brief, 10-minute compassion-focused imagery intervention, in comparison to a neutral control imagery condition, was associated with stronger decreases in paranoia from pre-to-post. This effect was mediated by decreases in negative emotions. Furthermore, proneness to psychosis moderated the effect of the intervention on paranoia, suggesting that individuals with higher proneness benefitted more from the intervention.

As may have become apparent from this brief overview, there has been so far no randomized-controlled evidence that compassion-focused interventions can reduce paranoia in samples with psychosis. Initial results appear promising to test compassion-focused imagery in this target group.

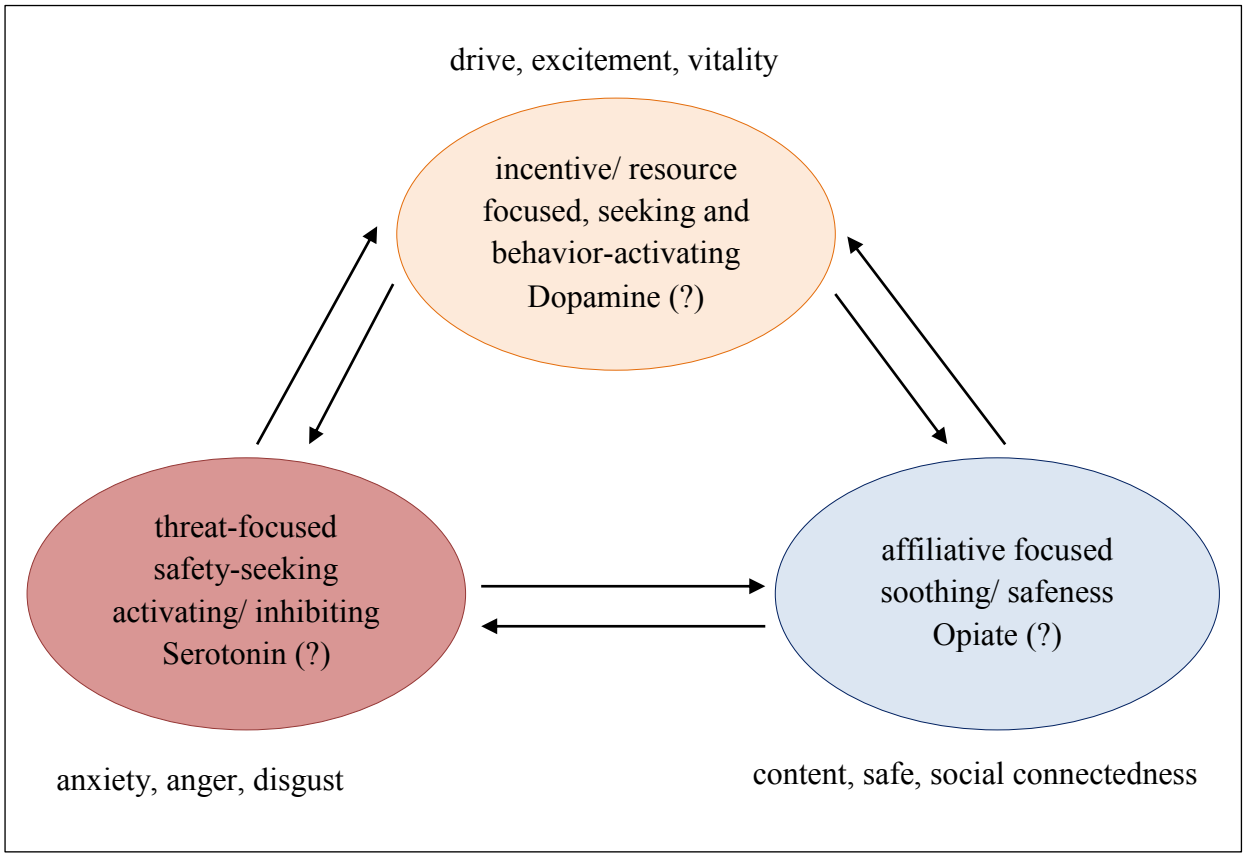

Figure 2. Affect regulation systems (adopted from Gilbert, 2009)

2. Brief Description of the Aims and Relevance of the Present Dissertation

The present dissertation focuses on furthering our understanding of paranoid symptoms from three perspectives: social rank, attachment theory (of emotion regulation), and self-compassion. The studies described in this dissertation aimed at filling research gaps concerning each of these variables, which I have determined by review of relevant literature. This has been briefly outlined in the previous chapters of this dissertation.

Broadening our knowledge about potential vulnerabilities and maintenance factors is of importance, as current state-of-the-art treatments for positive symptoms of psychosis - antipsychotic drugs and Cognitive Behavioral Therapy (CBTp) have shown to yield only small to medium effects on psychotic symptoms, including (paranoid) delusions, as evidenced by meta-analyses (e.g. meta-analysis on antipsychotic drugs for psychosis: Leucht, Arbter, Engel, Kissling, & Davis, 2009; e.g. meta-analyses on CBTp: Mehl et al., 2015; van der Gaag et al., 2014). Focusing on potential causal factors and broadening our understanding of psychosocial factors in the emergence of paranoia, as postulated in recent conceptualizations of the cognitive model of paranoia (Freeman & Garety, 2014), may be promising in order to improve our psychological understanding of symptoms. This is crucial in order to develop more effective interventions.

Research has progressively opened new research avenues regarding the 'emotion' part of the cognitive model. We have gradually shifted away from a 'biological deficit' explanation of psychotic symptoms, towards understanding them (at least partly) as the result of an individual's socio-environmental experiences (e.g. childhood adversity) and resulting changes in psychological (e.g. negative schemas about the self and others) and physiological variables (e.g. hypothalamic–pituitary–adrenal-axis dysfunction), (see Read, Bentall, & Fosse, 2009). Social rank, attachment and associated emotion regulation, as well as self-compassion may constitute potential environmental triggers (e.g. social rank loss) or vulnerability

variables (insecure striving, fears of rejection, attachment and emotion regulation, self-compassion) that potentially contribute to symptom formation and maintenance. All of these variables can be derived from the cognitive model of paranoia (Freeman & Garety, 2014). The present dissertation thus focused on answering the following three research questions:

1) *Can social rank changes evoke changes in state paranoia?* A positive result would indicate that changes in the representation of the individuals' current social position influence paranoid states (arguably, this is an 'adaptive' response to a 'sense of vulnerability' in comparison to others). In addition, besides changes in social rank, changes in negative affect (sadness and anxiety) may be responsible for alterations in paranoia after a social rank manipulation (specificity of social rank as mediator). Furthermore, theoretically derived moderators have to be taken into account: does an orientation towards striving to avoid inferiority and fears of being rejected (due to low social rank/ rank loss) moderate paranoid reactions in social comparison situations? Knowledge about moderators may be useful to identify particularly vulnerable individuals who are more responsive than others in terms of paranoid reactions to rank-challenging situations.
2) *Is insecure attachment associated with paranoia in individuals with psychosis? Is the association mediated via emotion regulation?* A more detailed understanding of the associations between insecure attachment dimensions, attachment anxiety and attachment avoidance, with paranoia, as being mediated via different patterns of (trait) emotion regulation (hyperactivating vs. blaming others) may be useful in order to get a more differentiated understanding of how paranoid states may emerge and be maintained from the perspective of attachment theory. In the long term, this may aid in individually tailoring interventions in accordance with attachment.

3) *Can compassion-focused imagery reduce state paranoia in individuals with a formal diagnosis of a psychotic disorder?* If paranoid states result from altered negative emotions and negative self-relating (i.e. self-criticism) and/ or a lack of positive self-relating (i.e. self-compassion/ self-reassurance) then improving these variables should have beneficial effects on symptoms. Study 3 integrates research on these putative causal variables in the emergence of paranoia and innovations in psychological intervention (Compassion Focused Therapy, Gilbert, 2009). A brief compassion-focused imagery intervention should theoretically reduce negative affect and negative self-relating, whilst increasing positive affect and positive self-relating. If the hypothesized causal variables would change as expected, paranoia levels should also be reduced. If these hypotheses were confirmed, this could be a starting point for broadening the intervention repertoire for paranoia within psychosis.

3. Study 1: Social Rank Appraisals and Paranoid Ideation: Can Changes in Social Rank Evoke Changes in Paranoia?

Ascone, L., Jaya, E.S. & Lincoln, T.M. (2016). The effect of unfavourable and favourable social comparisons on paranoid ideation: an experimental study. *Journal of Behavior Therapy and Experimental Psychiatry*. doi:10.1016/j.jbtep.2016.08.002.

Introduction

The perception of the self as possessing lesser 'resources' that make oneself attractive and desirable to others, not fitting in social groups, as well as being less powerful and competent relative to others (= components of social rank; see Allan & Gilbert, 1995) might result in a sense of heightened vulnerability of the self. In combination with the notion of a hostile environment, this sense of vulnerability could enhance paranoid states in response. However, there have been conflicting views on the causal relationship between social rank and paranoia. For one, it is commonly known among clinicians that psychosis itself has an impact on social rank (e.g. losing a job). On the other hand, in the only study that experimentally tested the impact of social rank on paranoia, Freeman et al. (2014) showed that reduced body height in a virtual reality environment resulted in increased paranoia levels. The effect was fully mediated by decreases in perceived social rank.

Critically, although the study by Freeman et al. (2014) was an innovative way of manipulating rank, it precludes a generalization of the effects to a more 'cognitive realm' of social comparisons; such as comparisons that take place in the domain of performance and abilities. Further, Freeman et al. (2014) did not test for alternative mediators of their experimental manipulation on social rank. Amongst likely candidates are sadness and anxiety, as both variables have been particularly emphasized to be involved in the emergence of

paranoia (e.g. Preti & Cella, 2010)[4] and have been shown to mediate between a manipulation of self-evaluations (e.g. self-other discrepancy) and paranoid states (Hartmann, Sundag, & Lincoln, 2014). Furthermore, modern developments in social rank theory have stressed the importance of the value that individuals assign to social rank. It is possible that individuals vary in their orientation towards social competition, with some being 'ambitious strivers' and rank-focused, whilst others do not assign such a high value to striving for social rank. Gilbert et al. (2007) have developed a 'striving to avoid inferiority scale', designed to reflect inter-individual differences in competitive striving, which was hypothesized to hold explanatory potential for psychopathology in western societies. The scale assesses insecure striving, which is defined as a striving for social rank out of fearing the consequences of inferiority. Gilbert et al. (2007, p. 634) speculated about the origins of insecure striving (excerpt): *'Competitive environments focus people on the competitive nature of their social relationship (Lasch, 1979), which can activate a rank-focused, social mentality related to heightened social comparison, concerns with inferiority and consequent rejection (...)'*. Fears of active (i.e. being intentionally excluded by others) and passive rejection (i.e. being overlooked/ unintentionally excluded by others) have been postulated to constitute an important motive for individuals to strive to achieve and maintain social rank (Gilbert et al., 2007). Ostracism is also known to be related to paranoia (Kesting et al., 2013; Kim, Lee, Yi, & Lee, 2014; Westermann, Kesting, & Lincoln, 2012). Accordingly, it may be interesting to test for insecure striving and fears of rejection as moderators of paranoid reactions in rank-challenging situations. Ultimately, the effect of up-ranking has not yet been tested, which will be covered by the present study.

[4] Interestingly, behavioral manifestations of anxiety (e.g. hypervigilance) and depression (e.g. passive withdrawal, apathy) also seem to constitute main behavioral responses observed in animal research that investigated behavioral patterns after social rank loss (von Holst, 1986).

Method

The experiment was conducted online, applying a randomized pre-post-control design. Female undergraduate students, age 18-25 (N = 172) were included in the study. The sample was restricted in order to recruit a relatively homogenous target group to which the comparison (profile) material could be easily adapted (social comparisons are more likely when there is similarity between the comparing individual and the target). First, a brief study description was given, stating that the purpose of the study was to test the attractiveness of personal profiles based on salient features. This was followed by an assessment of socio-demographic variables, striving to avoid inferiority and fears of rejection. Immediately before the exposure to the manipulations, state social rank, negative emotions (sadness, anxiety), and paranoia were assessed (T1). Thereafter, participants were randomly exposed to a rank-threatening (unfavorable) vs. a non-rank-threatening (favorable) profile (comparison) condition. The profiles were previously validated, and depicted as well as described a) an attractive and high-ranking, same-aged (matched to participant's age) female student (unfavorable comparison condition) vs. b) an unattractive and low ranking, same-aged female student (favorable comparison condition). In both conditions, participants were instructed to carefully attend to profile texts and profile pictures. Hereafter, a second assessment with the same items as at T1 took place (T2). After completion of the study, participants were debriefed.

Results

There was a strong effect of the experimental manipulations on state social rank as indicated by a significant interaction effect of the ANOVA for group (experimental condition) x time (pre-post assessment of social rank), (F (1, 170) = 40.1, $p < .001$, $\eta^2_{partial} = .191$). There was no effect of the rank manipulations on paranoia, as indicated by a non-significant interaction (group x time) effect of the ANOVA (F (1, 170) = 0.77, $p = .381$, $\eta^2_{partial} = .005$).

A similar result emerged for anxiety: there was no significant group x time interaction effect (F (1, 170) = 0.61, p = 0.435, $\eta^2_{partial}$ = .004). For sadness there was a small, significant group x time interaction effect (F (1, 170) = 5.88, p = 0.016, $\eta^2_{partial}$ = .033). Striving to avoid inferiority was a trend-level significant moderator of how strongly individuals responded in terms of post-test paranoia levels to the rank manipulations while controlling for baseline-paranoia. This was evidenced by a marginally significant interaction term z-insecure striving x group (experimental condition; 0 = favorable, 1 = unfavorable) in the multiple regression analysis (method: enter; independent variables: baseline paranoia, group, z-insecure striving, z-insecure striving x group; dependent variable: post-test paranoia), (z-insecure striving x group: B = 2.15, SE (B) = 1.14, t = 1.88, p = .061). Using the same type of regression analysis, fears of active and passive rejection were found to be significant moderators of the reactions to the experimental manipulations in that they predicted post-test paranoia (fear of active rejection: B = 2.86, SE (B) = 1.24, t = 2.17, p = .031; fear of passive rejection: B = 2.34, SE (B) = 0.96, t = 2.44, p = .016). All moderation effects were small (f^2 between 0.03 and 0.04).

Discussion

The expected effect of a social rank manipulation on state paranoia was not found, despite of a large manipulation effect on social rank. This may have been for several reasons. One of them is that cognitive social rank appraisals are not a relevant predictor for paranoia – at least not in a specific context (comparison with a single target within a certain cohort). Furthermore, possibly other translators that may be triggered by rank-challenging situations (e.g. anxiety) but were not triggered in the present study may be more relevant than the cognitive appraisal of social rank. However, the fact that insecure striving and fears of rejection in interaction with the manipulations were associated with post-test paranoia, after controlling for pre-test paranoia, hints to a potential role of this type of vulnerabilities as being potential 'amplifiers' for paranoid reactions in response to rank-challenges.

4. Study 2: Insecure Attachment and Paranoia in Psychosis: The Mediating Role of Emotion Regulation.

Ascone, L., Sundag, J. and Lincoln, T.M. (2016). Differential pathways from insecure attachment to paranoia: the mediating role of hyperactivating emotion regulation vs. blaming others. *(submitted)*

Introduction

Although there is already considerable evidence that insecure attachment is associated with paranoia, so far potential mechanisms that mediate this link have hardly been addressed. According to a theoretical model, a likely candidate is emotion regulation (ER; Gumley & Read, 2010). Furthermore, two differential linkages between insecure attachment dimensions (attachment anxiety vs. attachment avoidance) and paranoia via emotion regulation can be assumed. Recent theorizing and research has emphasized that adult individuals with higher levels of attachment anxiety tend to 'amplify' negative emotions via regulatory strategies such as, for example, rumination, worry, or catastrophization (= hyperactivating ER; Shaver & Mikulincer, 2002, 2007). On the other hand, individuals with attachment avoidance have been postulated to handle negative affect via externalization (i.e. they 'project' the source of negative events upon others, thereby generating a distance between themselves and the accused = blaming others ER; see Shaver & Mikulincer, 2002). This has not yet been tested for individuals with psychosis, but may be useful to further differentiate associations between insecure attachment dimensions and paranoid symptoms in this group.

Method

Sixty in- and outpatients with a psychotic disorder (current diagnosis from the schizophrenia spectrum) were included in the cross-sectional study. The data was based on baseline assessments from a larger research project on emotion regulation. Participants filled

out questionnaires on attachment and emotion regulation, as well as a measure of paranoia. In order to test whether there were differences between the psychosis group and a healthy control sample in the variables of interest, namely attachment anxiety and avoidance, hyperactivating ER, and blaming others ER, a series of *t*-tests was calculated. Hereafter, mediation analyses using a bootstrap approach (Hayes, 2013) were conducted in order to test for the presence of a mediation effect within the psychosis sample. It was assumed that there would be a specific indirect effect from attachment anxiety to paranoia, mediated via hyperactivating ER (while controlling for the effect of blaming others ER), and a specific indirect effect from attachment avoidance to paranoia, mediated via blaming others ER (while controlling for hyperactivating ER).

Results

The psychosis group had significantly higher group means than the healthy control group regarding both insecure attachment dimensions (attachment anxiety: t (98) = 2.67, p = .009; attachment avoidance: t (98) = 5.41, $p < .001$). The means of the dysfunctional emotion regulation patterns also differed significantly between the groups, with the psychosis group exhibiting higher means (hyperactivating ER: t (98) = 5.24, p <.001; blaming others ER: t (97.7) = 3.35, p = .001). For reasons of simplicity, the results of the mediation analyses are depicted in graphical form (see Figure 3, next page). There was a significant indirect effect for attachment anxiety predicting paranoia via hyperactivating ER, but not via blaming others ER. Conversely, there was a significant indirect effect for attachment avoidance predicting paranoia via blaming others ER, but not via hyperactivating ER.

Discussion

The findings reported in this study speak for a specific pattern of associations between attachment anxiety and hyperactivating ER vs. attachment avoidance with blaming others ER, which is well in line with attachment theory of emotion regulation and according findings in

adults (Shaver & Mikulincer, 2002, 2007). This may be important to further our understanding of via which routes paranoid states could emerge and help us to develop more differentiated interventions in psychosis for individuals with paranoia. Longitudinal and interventionist research is necessary for further replication and clarification of causality.

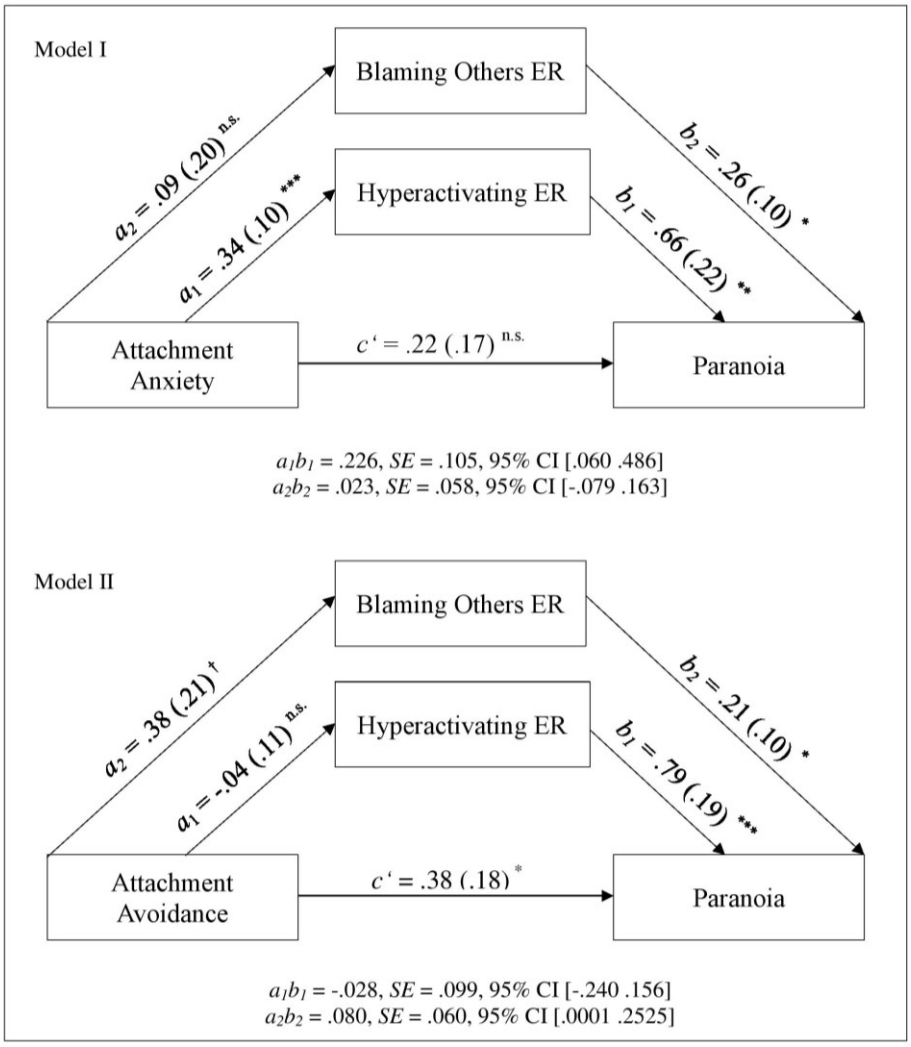

Figure 3. Mediation analyses of the association between attachment anxiety or attachment avoidance and paranoia via blaming others vs. hyperactivating ER strategies.

Note. n.s. = not significant, †p < .10, *p < .05, **p < .01, ***p < .001; ER = Emotion Regulation; *ab* = indirect effect; *SE* = standard error; CI = confidence interval. Unstandardized coefficients are reported with standard errors in brackets

5. Study 3: Feasibility and Effects of a Brief Compassion-Focused Imagery Intervention in Psychotic Patients with Paranoid Ideation

Ascone, L., Sundag, J., Schlier, B. and Lincoln, T. M. (2016). Feasibility and effects of a brief compassion-focused imagery intervention in psychotic patients with paranoid ideation: a randomized experimental pilot study. *Clinical Psychology & Psychotherapy*. doi:10.1002/cpp.2003.

Introduction

Negative emotions are prominent in paranoia and studies have repeatedly shown evidence for a potential causal involvement (Fowler et al., 2011; Lincoln, Peter, Schäfer, & Moritz, 2009; Myin-Germeys & van Os, 2007; Thewissen et al., 2011). Furthermore, reduced or unstable self-esteem has been shown to be robustly associated with paranoia (for a review see Kesting & Lincoln, 2013). It can be argued at a level of face validity that a way of targeting the aforementioned potential causal pathways may be achieved by focusing on positive self-relating and emotion regulation.

Moreover, theories on affiliation (see Depue & Morrone-Strupinsky, 2005, Porges, 2001) claim that affiliative input is crucial in the development of a sense of safety, and paranoid individuals clearly seem to lack this sense of safety. In addition, it has been postulated that affiliation has numerous effects on physiological processes, such as a down-regulation of sympathetic activity through the 'vagal break'[5] (Porges, 2001). Similarly, Porges (2003) suggests that when the evolutionary 'younger' social engagement system is not sufficiently stimulated through affiliative action, more primitive defence, freeze or flight

[5] i.e. the nervus vagus, stimulated by affiliative behavior, increases paravagal activity, thereby dampens the nervus sympaticus, modulates the heart rate, and dampens stress reactions of the hypothalamic–pituitary–adrenal (HPA) axis. This helps individuals to enter into a state of quiescence (see Porges, 2003).

mechanisms 'take over', impeding social engagement to the favor of a state of altered suspiciousness and vigilance. Compassion Focused Therapy (Gilbert, 2010) is to a significant extent theoretically rooted in these ideas and focuses on the stimulation of positive affect and compassionate self-relating, which is believed to promote soothing and reduce threat responses (e.g. shame, anxiety on an emotional level, self-criticism[6] on a cognitive level). Imagery techniques are introduced as an intuitive way to achieve this.

Study 3 thus attempts to answer the question whether compassion-focused imagery can reduce paranoid thoughts in a clinical sample with a diagnosis of psychosis, while potential causal mechanisms (self-relating, emotions, and physiological arousal) will be addressed. Beyond the theoretical foundations, this study was also based on previous empirical evidence for the efficacy of CF imagery in reducing paranoia in healthy participants. In that study, those with higher proneness to psychosis benefitted more strongly from the intervention (Lincoln et al., 2012). Altogether, both theory and findings suggest that the next reasonable step is to test CF imagery in a sample with psychosis. Study 3 thus was designed to test whether compassion-focused imagery significantly altered self-reassurance, self-compassion, and happiness (= positive self-relating and positive affect). In a next step, it was tested whether the imagery could reduce self-criticism and negative affect (= negative self-relating and negative affect) as well as skin conductance level. Ultimately, the effect on paranoia was tested.

[6] Self-criticism, at least in its excessive, hateful form, can be seen as a type of self-attacking that alters the activity of the 'threat system' (see Gilbert, 2009). Previous studies have shown that individuals with paranoid delusions do engage in significantly more hateful self-attacking (and less self-corrective criticism) as well as less self-reassuring behavior than non-clinical controls (Hutton, Kelly, Lowens, Taylor, & Tai, 2013)

Method

A randomized-controlled pre-post design was applied in 51 patients with a diagnosis of psychosis, including a randomized assignment to CF imagery (warm and understanding being, person or object, conveying warmth, understanding and soothing to the self) vs. a neutral imagery (detailed imagery of a chair) control condition (= CC). Skin conductance was assessed throughout the entire session to measure sympathetic activation (a hypothesized marker of threat-related arousal). After demographic assessment and a calm-breathing baseline, stress was induced via imagery of a socially distressing situation (30 sec.). This was done in order to mimic everyday-life social stressors individuals with psychosis may face, in order to yield a relevant level of negative emotions and paranoia to be down-regulated by the interventions. This was followed by an assessment of positive and negative self-relating (self-reassurance, -compassion, -criticism) as well as emotions (positive and negative), [T1]. Afterwards, a randomized assignment to the imagery conditions, that both lasted for approximately ten minutes, took place. This was followed by a post-assessment [T2] of the variables of interest as assessed in T1. The experiment ended with a brief interview regarding the subjective appraisal of the interventions. Verbal comments made by the patients were later assigned to one out of three categories (*negative, neutral, positive*) by a rater who was unaware of treatment allocation and unfamiliar with the study rationale.

Results

The stress induction significantly altered skin conductance levels, as indicated by a large and significant time effect, (F (1, 45) = 18.61, $p < .001$, $\eta^2_{partial} = .293$), (repeated measures ANOVA with experimental group [CF vs. CC] as between factor and skin conductance levels during relaxation vs. during emotion induction as repeated measures factor). Omnibus tests of the MANOVA including positive self-relating and positive affect revealed a significant multivariate group x time effect of large magnitude (F (3, 47) = 3.76, p

= .017, $\eta^2_{partial}$ = .193). Post-hoc univariate follow up tests showed that only the group x time interaction effects for happiness (F (1, 49) = 10.26, p = 0.002, $\eta^2_{partial}$ = 0.173) and self-reassurance (F (1, 49) = 4.25, p = 0.045, $\eta^2_{partial}$ = 0.080) were significant. There were no significant interaction effects (group x time [pre-to-post intervention]) regarding skin conductance (F (1, 45) = 0.106, p = 0.746, $\eta^2_{partial}$ = .002), or negative self-relating and negative affect (F (2, 48) = 0.30, p = 0.742, $\eta^2_{partial}$ = 0.012). There was no group x time interaction effect regarding paranoia (F (1, 49) = 0.40, p = 0.532, $\eta^2_{partial}$ = 0.008). Individuals in the CF condition perceived the imagery as more beneficial as did patients in the CC condition at a trend-level (t (49) = 1.74, p = .087, d = .49). Furthermore, individuals in the CF intervention (vs. individuals in the CC condition) responded to the intervention significantly (p < .05) more often positively (≈ 60% vs. ≈ 20%), and less often negatively (≈ 20% vs. ≈ 40%).

Discussion

This brief intervention study based on a compassion-focused rationale for paranoia in psychosis demonstrated that short-term improvements in 'positive' outcome variables (self-reassurance and happiness) can be yielded through the imagery, but there are no such effects on 'negative' outcomes (i.e. skin conductance, negative self-relating and negative affect, or paranoia). Nevertheless, the medium effect (albeit only trend-level significant) regarding perceived benefit through the intervention and positive reactions towards it speak for its feasibility and good acceptance. In sum, compassion-focused imagery could thus be useful for individuals with psychosis in order to elicit short-term improvements in positive affect and self-relating.

6. General Discussion and Directions for Future Research

In the present dissertation three areas of research associated with an 'emotional' vulnerability (as outlined in the cognitive model by Freeman and Garety, 2014, see section 1.2.), namely social rank, attachment, and self-compassion, were further explored. In the following sections I will discuss each of the studies, reflect upon their limitations, and delineate implications and potential directions for future research.

6.1 Social Rank and Paranoia

Study 1 failed to demonstrate that social rank changes affected paranoia, suggesting that social rank may not be causal to symptoms – at least when the social rank manipulation is restricted to a given 'domain' of comparison targets (i.e. a student population). At first glance, the fact that there was no manipulation effect on paranoia, despite the presence of a large manipulation effect on social rank, is surprising especially in the light of a previous study showing that manipulating social rank altered paranoia levels (Freeman et al., 2014). Several explanations may account for this apparent discrepancy. First, in the Freeman et al. (2014) study the changes in social rank may have been of a more global nature, because a (hypothetically) global marker of social rank was manipulated (i.e. body height). In addition, in a virtual train ride, as applied in that study, there are many more opportunities for making social comparisons. Conversely, in Study 1 social rank was manipulated referring to a certain comparison group (student cohort), and a single target was used. Thus, it is possible that more 'generalized' changes in social rank, possibly resulting from multiple comparisons, are needed to elicit paranoid responses. In addition, the Freeman et al. (2014) study only included participants with a baseline vulnerability to paranoia (i.e. participants reported to have experienced paranoid thoughts in the past month, defined as a cut-off ≥ 17 on the Paranoid Thoughts Scale by Green et al., 2008), whereas in Study 1 there was no such inclusion

criterion. The presence of such vulnerability may have altered paranoid responses in the Freeman et al. (2014) study.

Study 1 nevertheless provides insight in a vulnerability factor that could be related to the emergence of paranoia: more insecure striving (trend-level effect) and fears of rejection, anticipated for when one fails to compete and gain/ maintain social rank, predicted higher post-test paranoia levels in interaction with the social comparison manipulations. This may hint to a vulnerability at the level of dysfunctional competitive attitudes (e.g. one is only respected in society if one strives to achieve things and is successful, see Gilbert et al., 2007) in that individuals who are less secure regarding their social position may be more vulnerable to develop symptoms in according triggering situations.

Of interest, a study found that external shame (i.e. shame arising from the belief that others look negatively or down upon the self), was more strongly related with paranoia as compared to internal shame (i.e. shame arising from the self, judging the self in an unfavorable manner) that was more strongly associated with social anxiety (Matos, Pinto-Gouveia, & Gilbert, 2013). Furthermore, interpersonal sensitivity, defined as *'feeling vulnerable in the presence of others due to the expectation of criticism or rejection'* (Bell & Freeman, 2014), has recently been brought into focus as a vulnerability for paranoia (Freeman & Garety, 2014). In a first uncontrolled pilot intervention trial aiming at a reduction of interpersonal sensitivity, large reductions in paranoid delusions were reported (Bell & Freeman, 2014). These findings suggest that individuals with paranoia may be particularly sensitive to negative evaluations by others, and a reduction of this sensitivity may be an important target of intervention. Study 1 suggests that this sensitivity could also manifest in the domain of social comparisons and competition. 'Feeling vulnerable' (and hence probably being more paranoid) could occur as the result of holding certain beliefs about social rank (i.e.

the belief that social exclusion or rejection/ criticism occurs if one fails to compete and is of low social rank).

6.1.1 Limitations Study 1: social rank and paranoia. The generalizability of the findings of Study 1 is limited, as it was conducted in a healthy, female student sample. Although including female students as participants has some advantages, for example students falling into the age range typical for the onset of psychosis and tending to exhibit more delusional symptoms than the general population (Lincoln & Keller, 2008), the representativeness of the sample is limited. Thus, further replication in larger population-based samples, including both males and females is necessary. Furthermore, there was no neutral comparison condition. This could have allowed for a more clear-cut interpretation of the manipulation effects as distinguishable from time effects.

6.1.2 Implications and outlook Study 1: social rank and paranoia. First, future research should include vulnerable groups as participants in order to make sure sufficient reactivity in paranoia as response to the social rank manipulations. This could be achieved via applying an empirically derived cut-off for a given measure of psychosis-vulnerability, for instance the cut-off for Ultra-High risk of psychosis of the Community Assessment of Psychic Experiences (Mossaheb et al., 2012) or a similar criterion as applied in the Freeman et al (2014) study. In addition, an optimized manipulation could be applied. Ideally this manipulation should yield more global changes in cognitive representations of social rank. Probably one could develop an algorithm that takes into account participant information on, e.g. income, job position, etc., and based on this information generates several comparison profiles the participant could compare with. A further important factor may be to consider individual facets of social rank that had previously been identified by factor analysis for the Social Comparison Scale (Allan & Gilbert, 1995). These facets are: rank (including relative strength, power, and ability/ competence), group fit (including perceived kinship, similarity to

others, and sense of belonging), and attractiveness (including skills and physical features that make one desirable to others and alters chances 'to be chosen over others' in social competition). It is possible that effects of social rank manipulations on paranoia are driven differentially by these facets. This notion is somewhat corroborated by a study by Freeman et al. (2005), who reported that the item 'left out – accepted' (representative of the group fit facet of the Social Comparison Scale) was most strongly associated with paranoia.

In a broader context, it would also be interesting to compare means of insecure striving and fears of rejection between patient groups with persecutory delusions, healthy samples, and clinical control groups (e.g. a sample with major depressive disorder). Although this would not clarify the issue of causality, it could give some insight in the potential clinical relevance and specificity of these constructs for paranoia. Further, it may be interesting to explore whether insecure striving and fears of rejection are influenced by cultural or social contexts. Candidates for investigation are cultures where highly competitive values prevail, or social groups that strongly focus on achievements and rank. Insecure striving has been postulated to be typical of western competitive societies (or highly masculine[7] ones) where there is a *"...heightened awareness of winners and losers",* along with *"concerns with inferiority and what others think about the self"* (Gilbert, McEwan, Bellew, Mills, & Gale, 2009, p. 124). For anxiety and depression it was found that these variables correlate positively with masculinity across cultures (see Arrindell et al., 2004; Arrindell, Steptoe, & Wardle, 2003). Investigating these kinds of associations with masculinity as predictor, insecure striving and fears of rejection as moderators and paranoia as outcome across cultures, may be interesting.

[7] High levels on the masculinity dimension of a nation represent a preference in society for achievement, assertiveness and gaining material rewards for success. Society at large is highly competitive. Failure is attributed to personal characteristics of the person that fails (Hofstede & Hofstede, 2001)

6.2 Insecure Attachment, Emotion Regulation and Paranoia

In Study 2, previous findings that found insecure attachment and paranoia to be related could be replicated. Further, the study contributes to our accumulating knowledge about emotion regulation difficulties in individuals with psychotic disorders (see O'Driscoll, Laing, & Mason, 2014, for a meta-analysis) and confirms previous research in that dysfunctional emotion regulation is more strongly pronounced in individuals with psychosis compared to healthy controls. Furthermore, the study demonstrates that postulates and findings derived from attachment-based theories of emotion regulation (see Shaver & Mikulincer, 2002, 2007) could be transferred to research in psychosis. Attachment anxiety and attachment avoidance are both associated with paranoia; but Study 2 suggests that these associations could be explained via different pathways (exaggerating and amplifying negative emotions [hyperactivating ER] vs. blaming others for negative events). This may be a starting point for further longitudinal and experimental research with the broader aim to understand symptom development from an attachment perspective, and to individually tailor treatments to reduce paranoia for individuals with psychosis in accordance with attachment.

6.2.1 Limitations Study 2: insecure attachment, emotion regulation and paranoia.

Critically, Study 2 was based on cross-sectional questionnaire data, and thus caution is warranted regarding the interpretation of the findings. Longitudinal or experimental studies are warranted for replication. Another limitation concerns the measure of attachment-specific emotion regulation patterns. For attachment avoidance, only blaming others [3 items] was assessed; whereas for attachment anxiety, a composite score of hyperactivating ER strategies [9 items] was investigated. Despite appropriate internal consistencies, a more balanced assessment of attachment-specific emotion regulation strategies would have been useful and more representative of the current literature on ER in attachment, which besides blaming others also suggests that a minimization of affect (affective suppression) is typical for

individuals with high levels of attachment avoidance. Lastly, although the mediation effect of the association between attachment avoidance and paranoia via blaming others was significant, the correlation coefficient between attachment avoidance and blaming others was small and only trend-level significant, suggesting that the association may not be very strong.

6.2.2 Implications and outlook Study 2: insecure attachment, emotion regulation and paranoia. Study 2 could inform further differentiation of theories about paranoid symptom formation. For instance, dysfunctional emotion regulation has been postulated to be a vulnerability factor (e.g. Freeman & Garety, 2014; Westermann et al., 2012) and this may particularly be the case for individuals with insecure attachment. Moreover, a theory by Bentall et al. (2001) suggests that paranoia emerges as the result of an external attribution bias (others are responsible for negative events) that serves to maintain self-esteem in situations of heightened self-ideal discrepancies, but this comes at the cost of believing that others are bad. Within the context of this theory, it had already been speculated that insecure attachment may contribute to this phenomenon, and Study 2 suggests that particularly attachment avoidance may predispose individuals to make external attributions for negative events.

Study 2 also could have practical implications regarding the treatment of paranoid symptoms in psychosis. Hyperactivating strategies such as rumination and catastrophization could be reduced by worry interventions that have already shown promise in psychosis (e.g. Foster, Startup, Potts, & Freeman, 2010), and to reduce distress associated with persecutory delusions (Hepworth, Startup, & Freeman, 2011). Patients with high levels of attachment avoidance could benefit from a reduction of overt self-reliance and from learning how to express affect more openly (instead of minimizing it or 'projecting' it onto others). Bringing these patients into contact with their attachment needs and emotions while validating these changes contingently has been postulated as a primary goal for establishing a basis for effective psychotherapy with avoidant individuals (Wallin, 2007).

As a cautionary note, it has to be stated that all of these claims are at the level of conceptualizations and ideas, and need rigorous investigation.

6.3 Compassion-Focused Imagery as an Intervention for Paranoia

To my knowledge, Study 3 was the first demonstration, based on a randomized-controlled design, showing that affiliative imagery is accepted and feasible in psychotic patients. The imagery also had beneficial effects on happiness and self-reassurance. Nevertheless, the expected effects on self-criticism, negative emotions, skin conductance levels and paranoia were not found. Further, Study 3 does not corroborate the results of a forerunner study that found compassion-focused imagery to reduce state paranoia in a healthy sample (Lincoln et al., 2012). This divergence could be explained by clinical status. Possibly, the effect of brief compassion-focused imagery on paranoia is restricted to healthy populations or populations with only slightly elevated levels of positive symptoms and an extension of the intervention would be necessary to yield comparable effects in patients. However, there are also other explanations, which will briefly be addressed in the following two paragraphs.

Interestingly, in a study that focused on enhancing positive self-beliefs while reducing negative self-beliefs in a patient sample with persistent persecutory delusions, no significant reductions in paranoia were observed, but there was a large effect on positive self-beliefs (Freeman, Pugh, et al., 2014). To a certain extent, the findings reported in the present dissertation seem to resemble the study by Freeman, Pugh et al. (2014): despite significant changes in ‘positive’ variables, namely self-reassurance and happiness, paranoia did not change in Study 3. However, similar to the intervention by Freeman, Pugh, et al. (2014) we found that the intervention was well-accepted and appraised positively by a majority of patients, with only a few exceptions. In sum, it may thus be speculated that interventions focusing on positive self-belief (self-relating) variables, such as self-compassion, self-

reassurance, and so forth, are agreeable for patients, but may not directly change paranoia symptoms in clinical samples.

Alternatively, interventions like compassion-focused imagery may simply take more time for effects on symptoms to unfold. Long-term enhancement of positive self-relating and mood might activate resources in the patients in the sense of the 'broaden-and-build theory' (Fredrickson, 1998, 2001). This in turn might dampen the occurrence of paranoid thinking in response to stressors, via counterbalancing the high prevalence of emerging negative thoughts and feelings with more positive ones.

The findings of Study 3 should thus not be underestimated. For instance, the fact that happiness was altered by CF imagery can be considered important, as happiness has been shown to correlate positively with resilience, optimism, and personal mastery (Palmer, Martin, Depp, Glorioso, & Jeste, 2014), and with global levels of social and occupational functioning (Agid et al., 2012) in psychosis. Interestingly, focusing on general well-being and global level of functioning as primary outcomes has been advocated for mindfulness interventions in psychosis: *'(...) people can learn to respond to them* (psychotic symptoms) *differently and thus be less distressed and disabled by them. With mindfulness for psychosis, the primary outcome needs therefore to measure general psychological well-being (...)'* (Chadwick, 2014, p. 333). Compassion-focused imagery interventions have been postulated to share central commonalities with mindfulness interventions (Hofmann, Grossman, & Hinton, 2011), and thus Chadwick's (2014) claim may be transferred to future investigations of compassion-focused imagery in individuals with psychosis.

6.3.1 Limitations Study 3: compassion-focused imagery and paranoia. Among major limitations of this study is the potential (self-) selection bias of the sample. Patients who were previously informed, that imagery was going to be applied, volunteered for the intervention. Thus, likely only patients who had a certain affinity for such interventions and

who were sufficiently motivated participated. It is thus also likely that less symptomatic patients participated, which limits the generalizability of findings. Another limitation is the brevity of the intervention. It is still possible that repeated imagery, better preparation of patients (i.e. a psycho-educative introduction) and optimized administration (discussing and removing obstacles during the imagery, optimization of the personal imagery) could have improved the effects on paranoia. Another limitation is the use of 'intuitively' guided item selections for measuring some of the variables (e.g. self-reassurance, self-criticism, and self-compassion). As a consequence, some measures had low reliability (self-compassion). This could limit the interpretability of findings regarding these outcomes. Furthermore, instead of using potential reductions in skin conductance as a marker of calming through the intervention, heart rate variability (HRV) might have been a better indicator, as higher HRV has been theorized to reflect the ability to (self-)soothe (see Porges, 2001). Importantly, HRV has been shown to be reduced (large effect) in individuals with psychosis in a recent meta-analysis (Clamor, Lincoln, Thayer, & Koenig, 2016), and thus benefits of compassion-focused interventions on indicators of HRV may be of particular interest. Ultimately, an initial formal rating of the severity of current psychotic symptoms would have made it possible to draw a clearer picture of the patient sample. This could have also allowed for an analysis of illness severity as a potential moderator of any intervention effects.

6.3.2 Implications and outlook Study 3: compassion-focused imagery and paranoia. Contradicting the claim that experience-based methods, such as imagery techniques, are generally counter-indicated in psychosis, as still believed by many clinicians, the present study suggests that compassion-focused imagery may be used as beneficial adjunct to traditional Cognitive Behavioral Therapy for patients with psychosis in order to stimulate positive mood and self-reassurance. Future studies could use the pilot study presented in this dissertation as a starting point for investigating extended compassion-

focused interventions, whereby longitudinal and 'build-up' effects on putative mediators (both positive self-relating and positive affect as well as negative self-relating and negative affect), and cumulative effects on paranoid symptoms should be examined. Furthermore, I would recommend symptom distress, well-being, and global levels of functioning to be assessed as additional study outcomes. Future research should also clarify potential reasons for negative reactions to compassion-focused imagery (e.g. Mayhew & Gilbert, 2008), which were also observed in the present study. Initial research on this matter suggests that likely candidates are fears of compassion, self-coldness, self-criticism, insecure attachment, depression, anxiety, and stress (see Gilbert, McEwan, Matos, & Rivis, 2011). Illness severity should be measured using established formal assessments, and the effect of this variable as a moderator of intervention effects should be tested.

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Appendix A – Study 1

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The effect of unfavourable and favourable social comparisons on paranoid ideation: An experimental study

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ABSTRACT

Background and objectives: Low social rank is associated with paranoia, but there is a lack of evidence for causality. We tested the effects of social comparisons on negative affect and paranoia with an online social rank paradigm, and whether striving to avoid inferiority or fears of social rejection moderated paranoid reactions.
Method: Female students ($N = 172$) were randomly exposed to one of two validated online profiles depicting a same-aged, high (unfavourable comparison) vs. low rank (favourable comparison) female student. Moderators were assessed at baseline. Social rank, anxiety, sadness and paranoia were assessed pre and post profile-exposure.
Results: There was a large effect of the experimental manipulation on social rank ($p < 0.001$, $\eta^2_{partial} = 0.191$). The manipulations had no effects on anxiety and paranoia ($p > 0.38$). Sadness was significantly altered ($p = 0.016$, $\eta^2_{partial} = 0.033$). There were significant moderation effects between the experimental conditions and insecure striving (trend-level) as well as fears of rejection.
Limitations: Our findings may be biased (overestimation of effects) as students are likely to be more competitive compared to the general population.
Conclusion: Our rank manipulations did not alter paranoia. This suggests that changes in the cognitive representation of social rank alone - without triggering a strong emotional response – do not suffice to evoke paranoia. Although our results do not support the notion that threats to social rank cause paranoid symptoms, they suggest that threats to social rank are more likely to trigger paranoid states in those who are insecure in regard to their social position.

1. Background

Social rank appraisals reflect an individual's perception as how attractive the individual is to others, how much potential he or she has to challenge and win over others, and how likely it is for him or her to be included by social groups (Allan & Gilbert, 1995). Occupying a position of low social rank is associated with negative affect and psychopathology, such as social anxiety and depression (Gilbert, 2000). Recent research has focused on the association of social rank with psychosis and particularly paranoia. For example, Allison, Harrop, and Ellett (2013) found patients with first episode psychosis to exhibit a lower perceived social rank compared to matched controls, and several population-based studies showed an association between social rank and paranoia (e.g. Freeman et al., 2005; Wickham, Shryane, Lyons, Dickins, & Bentall, 2014). However, so far the question of whether reductions in social rank cause paranoia or merely result from it remains unclear. To our knowledge, only one experimental study tested the effect of social rank manipulations on paranoia. Freeman et al. (2014) manipulated social rank in a virtual reality environment by reducing participants' body height in thirty adult females. As expected, the manipulation resulted in increased levels of paranoia, and the effect was fully mediated by decreases in perceived social rank.

The manipulation in the study by Freeman et al. (2014) was a creative way of manipulating social rank in a well-controllable manner in order to investigate the associations of interest. However, the effects of a height manipulation might not be generalizable to the everyday social comparison processes that take place on a more subjective and cognitive level. In addition, as the authors

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point out themselves, the manipulation only involved decreasing social rank while the effect of increasing social rank was not covered. Favourable social comparisons have been established conceptually and empirically as an active coping-strategy with a range of benefits such as increases in well-being and regulation of negative affect (see Buunk, Gibbons, & Buunk, 2013). If social rank is causal to paranoia, increasing social rank via favourable social comparisons should be expected to reduce it.

The present study extends the research conducted by Freeman et al. (2014) by investigating the effects of both unfavourable and favourable social comparisons and by applying an approach to manipulate social rank that more readily reflects social comparisons in every-day life. Building on vulnerability-stress based theoretical models that postulate an affective pathway from social stressors to paranoia (see Freeman & Garety, 2014) and on the accumulating evidence for the role of affect as a precursor of paranoia (e.g. Lincoln, Lange, Burau, Exner, & Moritz, 2010; Lincoln, Mehl et al., 2010; Thewissen et al., 2011; Fowler et al., 2011; Oliver, O'Connor, Jose, McLachlan, & Peters, 2011), we included anxiety and sadness as additional dependent variables, which we expected to act as mediators of the effect of the rank manipulation on paranoia in situations of self-evaluation. The focus on these emotions was justified by the fact that both anxiety and sadness have been linked to clinical and non-clinical paranoia in theoretical models (Preti & Cella, 2010; Freeman, 2007) and in experimental studies that manipulated self-evaluations (e.g. Hartmann, Sundag, & Lincoln, 2014; Kesting, Bredenpohl, Klenke, Westermann, & Lincoln, 2013). Furthermore, it is reasonable to assume that individuals differ in their reactions to changes of social rank. In this context it has been postulated that insecure striving (i.e. striving to avoid inferiority) and fears of social rejection are important moderators for psychopathological reactions to social rank challenges (Gilbert et al., 2007). Consequently, we tested insecure striving and fears of rejection as moderator variables regarding the impact of our rank manipulations on paranoia.

In order to induce decreases versus increases in social rank, we used exposure to online profiles. These profiles either presented participants a high-ranking and attractive (unfavourable comparison condition) or a low-ranking and unattractive (favourable comparison condition) person. We tested the effect of the manipulations on paranoia and a potentially mediating effect through anxiety and sadness. Moreover, we tested whether individuals with higher compared to lower levels of insecure striving and fears of rejection show more pronounced paranoid reactions to the rank manipulations.

2. Method

2.1. Sample selection and recruitment

Because social comparisons require a target that is similar to oneself (see Festinger, 1954) we designed the profiles to describe a female psychology student, as these were the largest homogeneous target group that could feasibly be recruited in the university setting in which the research was conducted. Inclusion criteria were thus being a female bachelor student and being between 18 and 25 years old. Exclusion criteria were any past or current mental health problems for which a potential participant had received a diagnosis. By agreeing to the consent statements, individuals indicated that they fulfilled the requirements for participation. The decision to exclude participants with mental health problems was based on ethical considerations. Due to the online nature of the study, we would have been unable to recognize and attend to any severe mental distress triggered by the study. The recruitment was implemented by uploading the link onto the university's study platform that serves students to gain participation credits which are required for graduation.

2.2. Participants

Initially, 206 participants entered the study. Incomplete data was deleted list-wise resulting in a sample of 172 (83.5%). The majority of participants were primarily enrolled as Bachelor of Science psychology students, 16 participants were also enrolled in other curricula.

2.3. Design and procedure

We conducted the experiment online, applying an independent groups experimental design with two conditions. The experiment started with a brief study description stating that the purpose of the study was to investigate the attractiveness of personal online profiles based on salient features. Participants were told that at the end of the study they would have to judge the profile based on central features. After the informed consent, we assessed socio-demographic data and insecure striving, as well as fears of rejection. Hereafter, social rank anxiety, sadness and paranoia were measured, followed by a randomized exposure to either the unfavourable or favourable profile condition with the following instruction: '*You will now see an online profile. Please attend to it carefully. It is a profile of a person from your cohort of B.Sc. psychology students. Please take your time while attending to the profile and try to gain an impression of the person. You will then be asked to fill out some further questionnaires and rate the profile based on specific criteria. As there will be some time lag between viewing the profile and rating it, it is important that you attend to it carefully in order to remember it accurately*'. This was followed by a reassessment of social rank, anxiety, sadness, and paranoia. At the end of the study we used an open question (textbox) to assess whether participants had noticed anything about the study. This was done to identify individuals who had figured out what the study was about. In addition, we asked how realistic they had perceived the profile (1 = '*very unrealistic*' to 7 = '*very realistic*'). All participants were debriefed after completion of the study.

2.4. Measures

Social rank was assessed with the Social Comparison Scale (SCS, Allan & Gilbert, 1995) that measures the perceived social rank of the respondent in comparison to others in regard to eleven dimensions by asking them to complete the sentence '*In comparison to others I generally feel … '*, followed by each of the dimensions: '*inferior-superior*', '*incompetent - competent*', '*unlikeable - likeable*', '*left out - accepted*', '*different - same*', '*untalented - more talented*', '*weaker - stronger*', '*unconfident - more confident*', '*undesirable - more desirable*', '*unattractive - more attractive*', '*outsider - insider*'. The eleven items are rated on a 10-point scale (values ≤ 5 indicating inferior and ≥ 6 superior status concerning the attribute in question). Similar to the experimental study by Freeman et al. (2014) we adapted the scale to a state format (instruction: '*Please indicate how you feel in comparison to other female fellow students of your cohort at the moment*'). Cronbach's α of the adapted scale was 0.91 in the present study.

To assess negative emotions, we used intensity rating scales labelled with adjectives describing each emotional state (scaling ranging from 1 = '*not applicable*' to 11 = '*completely applicable*'). The adjectives were for sadness: '*sad*', '*depressed*', '*miserable*', and '*dejected*', and for anxiety: '*frightened*', '*timid*', '*afraid*', and '*scared*'.

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These items were originally developed by Stemmler, Heldmann, Pauls, and Scherer (2001) who found them to be positively associated with psychophysiological responses and sensitive to emotion inductions. Moreover, convergent validity has been demonstrated for these items in a previous study by Hartmann et al. (2014).

Paranoia was assessed with the Paranoia Checklist (Freeman et al., 2005). The scale measures ideas of persecution and reference as facets of paranoia (e.g. persecution item: *'People would harm me if given an opportunity'*, e.g. reference item: *'There might be negative comments being circulated about me'*). For the purpose of the present study, we used a preliminary state-adapted 11-item version of the original Paranoia Checklist consisting of state-adapted change sensitive items identified in experimental studies (Schlier 2014; unpublished data). Deviating from the original that assesses frequency, distress and conviction during the last four weeks for each item, we asked participants to *'indicate to what degree each of the following statements applies to you at the moment'* on an 11-point Likert-scale format (1 = *'not applicable'*, 11 = *'completely applicable'*). Similar state adapted forms of the German version of the Paranoia Checklist have been shown to have good reliability and validity (Lincoln, Peter, Schäfer, & Moritz, 2009). Accordingly, Cronbach's α in our study was good (0.88).

Insecure striving was assessed with the Striving to Avoid Inferiority Scale (SAIS; Gilbert et al. 2007). The SAIS assesses the type of striving (Part I) along with related fears (Part II). Part I subdivides into two subscales assessing insecure (19 items, e.g. *'Acceptance is something you have to earn and compete with others for'*) and secure non-striving (12 items, e.g. *'People accept me whether I'm successful or not'*), rated on 5-point Likert scales (0 = *never*, 4 = *always*). Part II subdivides into three subscales addressing reasons and insecurities that can cause insecure striving. These are active rejection (4 items), passive rejection (4 items), and losing out on opportunities (3 items). Items are rated on 10-point Likert scales (1 = *'don't agree'* to 10 = *'completely agree'*). The items complete the sentence: *'If you don't compete with others and succeed … '* (e.g. *'People will pass you over'* (passive rejection), *'Others will be critical and shame you'* (active rejection)). In the present study, we used a German translation of the SAIS but only analyzed moderation effects for insecure striving, as well as active and passive rejection. Cronbach's α for each of the translated scales used for the analyses was excellent (0.87 - 0.92).

2.5. Materials

2.5.1. Unfavourable vs. favourable social comparison online profiles

Our online profile approach was inspired by other paradigms used to induce social comparison processes (e.g. see Mitchell & Schmidt, 2014). Participants were presented with either a profile of a highly successful and attractive – and thus high-ranking - female (unfavourable comparison condition) or with a profile of an unsuccessful and unattractive - and thus low-ranking - female (favourable comparison condition). The profiles consisted of a photo of a young female, described to be a B.Sc. psychology undergraduate student along with a text in tabular form (see Appendix). Both profiles had the same structure and a comparable word count. The indicated age of the female described in the profile was always adapted to the age of the respective participant. Two undergraduate students of the target cohort provided advice in constructing the profiles. They generated descriptive personal attributes based on the items of the SCS (Allan & Gilbert, 1995) they deemed relevant for students (e.g. for the SCS item *'outsider-insider'* the students came up with 'social network', and generated the items *'small social network with low quality relationships'* (low rank) vs. *'large social network with high quality relationships'* (high rank)). Further content for the profiles was generated based on national norms and pre-existing validated stimuli where possible. For example, for the height indicated in the profile we used data of the German Federal Office of Statistics (year 2013): the 5th (low rank) vs. 95th (high rank) percentile of the height distribution among German women between ages 18–20. For the personal attributes (last two paragraphs of the profiles: personality) we used a German semantic atlas (see Schwibbe et al., 1981) selecting adjectives with a similar but opposite valence (positive vs. negative), such as surly (valence = −2.33) vs. sociable (valence = + 2.20). For the photos we selected photos with a low attractiveness rating from the Radboud Faces Dataset (Langner et al., 2010). As the Radboud dataset did not provide sufficiently attractive young females, we photographed faces of attractive volunteers and matched the style of these photos to the style used in the Radboud Dataset. The profile texts and photos were validated in a sample from the target population of female undergraduate psychology students ($N = 14$; age, $M = 23.1$, $SD = 3.0$). Photos and content were presented separately with varied presentation of high-rank and low-rank stimulus material. The photos were rated for attractiveness (1 = *very unattractive*, 7 = *very attractive*). The profile texts were rated using the SCS (see methods section) with the following instruction (*'Please indicate how you rate the person described in the profile in comparison to the cohort of female B.Sc. psychology students for each of the items'*). We selected photos that differed significantly in attractiveness (unfavourable comparison photo, $M = 5.86$ $SD = 0.66$; favourable comparison photo, $M = 2.21$ $SD = 0.58$; $t(13) = -13.5$, $p < 0.001$). The profile texts differed significantly in their average assigned social rank ($M_{high} = 76.6$; $SD = 6.73$ vs. $M_{low} = 44.3$; $SD = 10.94$; $t(13) = 8.10$, $p < 0.001$).

2.6. Analyses

In a first step, we tested for differences in baseline variables between the unfavourable and favourable comparison condition in any of the variables of interest. As a manipulation check we tested the interaction effect for condition as between subject variable (unfavourable vs. favourable comparison) with pre-test vs. post-test social rank as within group variable, using repeated measures ANOVA. The effect of the manipulation on the emotions and paranoia was tested using repeated measures MANOVA, entering condition as between subject factor (unfavourable vs. favourable comparison) and paranoia (pre-test vs. post-test) as within subject factor. A significant interaction effect would indicate that the manipulations differentially affected the variables of interest (i.e. negative emotions, paranoia). The use of a multivariate analysis was justified by the fact that paranoia, sadness, and anxiety correlated significantly with one another at pre-test (r between 0.34 and 0.64). We used partial eta squared as effect size, following rules of thumb for interpretation: small ≈ $0.01 \leq \eta^2_{partial} < 0.06$, medium ≈ $0.06 \leq \eta^2_{partial} < 0.14$, and large ≈ $\eta^2_{partial} \geq 0.14$ (see Gray & Kinnear, 2011, p. 285). In a second step, we planned to conduct a mediation analysis for the experimental condition effect on paranoia with anxiety and sadness as putative mediators, following the four step approach suggested by Baron and Kenny (1986). In order to test the moderator hypotheses we calculated multiple sets of regression analyses (method: enter) specifying post-intervention paranoia as outcome variable. We entered paranoia at baseline, condition (0 = favourable vs. 1 = unfavourable), the z-transformed insecure striving variable (or z-transformed active/passive rejection variable), and the interaction term for condition x z-insecure striving (or z-transformed active/passive rejection variable). As recommended for enhanced validity and power in recent statistical

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research, we calculated our regressions using the script HCREG that allows to calculate the heteroscedasticity-resistant HC3 estimator (see Hayes & Cai, 2007). Furthermore, we calculated the f^2 statistic as a measure of the interaction effect size following a formula by Selya, Rose, Dierker, Hedeker, and Mermelstein (2012). We used the following rule of thumb to interpret the f^2 effect size: small ≈ 0.02, medium ≈ 0.15, and large ≈ 0.35.

3. Results

3.1. Analyses of differences between the conditions at baseline

None of the variables of interest, namely social rank, anxiety, sadness, paranoia, insecure striving, active and passive rejection, significantly differed at baseline between the unfavourable vs. favourable experimental condition (all $p > 0.20$).

3.2. Manipulation check

The multivariate analysis revealed a significant experimental condition (unfavourable vs. favourable) x time (pre-post manipulation) interaction effect of large magnitude (F (1, 170) = 40.1, $p < 0.001$, $\eta^2_{partial} = 0.191$). Post-hoc inspection of the graphical interaction plot revealed that social rank increased in the favourable and decreased in the unfavourable comparison condition (see Fig. 1), as expected.

3.3. Effects of unfavourable versus favourable comparisons on negative emotions and paranoia

The multivariate omnibus test revealed no significant interaction effect ($F(3, 168) = 2.09$, $p = 0.104$, $\eta^2_{partial} = 0.036$). Exploratory inspection of post-hoc tests and plots revealed that there were no significant interaction effects for anxiety or paranoia (anxiety: $F(1, 170) = 0.61$, $p = 0.435$, $\eta^2_{partial} = 0.004$; paranoia: $F(1, 170) = 0.77$, $p = 0.381$, $\eta^2_{partial} = 0.005$), however there was a significant small interaction effect experimental condition x time for sadness ($F(1, 170) = 5.88$, $p = 0.016$, $\eta^2_{partial} = 0.033$). Inspection of the graphical plots revealed that there were decreases in sadness in the favourable comparison condition (see Fig. 1). Moreover, there was a significant time effect for paranoia (F (1, 170) = 149, $p < 0.001$, $\eta^2_{partial} = 0.468$). Inspection of graphical plots revealed that paranoia levels dropped over time in both conditions (see Fig. 1).

3.4. Mediation of the experimental effect on paranoia through negative emotions

As there was no significant effect of the manipulation on anxiety or paranoia, we refrained from analysing the mediation effect in more detail.

3.5. Moderation effects

In the first regression, entering pre-test paranoia, experimental group, and the z-transformed insecure striving variable, pre-test paranoia was the only significant predictor and the model explained about 79% (R^2) of the variance in post-test paranoia. The explained variance increased to ≈ 80% after inclusion of the interaction term experimental group x z-insecure striving. The effect size for the trend-level significant interaction term was small ($f^2 = 0.03$). This result indicates that the post-test paranoia levels were higher for those with higher levels of insecure striving in the unfavorable comparison condition (and lower for those with lower levels of insecure striving in the favorable comparison condition). A similar pattern of results emerged for fears of active and passive rejection. In the first sets of regressions entering the pre-test paranoia score, experimental group, and the z-transformed active (or passive) rejection variable, pre-test paranoia was always the only significant predictor in the model, with a total of about 79% explained variance. Inclusion of the respective moderators, z-active rejection x group (or z-passive rejection x group) increased the explained variance to ≈ 80%, and both moderator variables were significant in the respective models. The effect sizes for the interactions were both small with $f^2 = 0.04$ for active, and $f^2 = 0.03$ for passive rejection. This result indicates that post-test paranoia levels were higher for participants with higher fears of active or passive rejection in the unfavorable comparison condition (and lower for participants with lower levels of fears of rejection in the favorable comparison condition, respectively). Further statistical details can be found in Table 1.

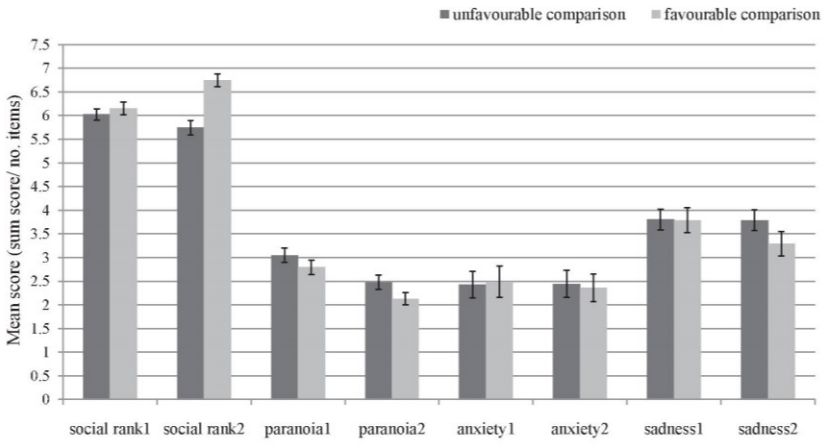

Fig. 1. Pre- and post-test scores for social rank and paranoia in the unfavourable vs. favourable social comparison condition. **Note.** 1 = pre-test, 2 = post-test; error bars indicate standard errors of the means.

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Table 1
Regression analyses for moderation effects of insecure striving and fears of active and passive rejection on post-test paranoia.

	Predictors	B	SE(B)	t	p	R^2
Insecure striving moderator model						
Post-test Paranoia	Pre-test paranoia	0.78	0.55	14.2	<0.01	0.79*
	Condition	1.55	1.02	1.53	0.129	
	z-insecure striving	1.07	0.68	1.57	0.117	
Post-test Paranoia	Pre-test paranoia	0.78	0.055	14.3	<0.01	0.80*
	Condition	1.56	1.02	1.53	0.127	
	z-insecure.striving	−0.11	0.83	−0.13	0.896	
	z-insecure.striving*con	2.15	1.14	1.88	0.061	
Active rejection moderator model						
Post-test paranoia	Pre-test paranoia	0.79	0.58	13.7	<0.01	0.79*
	Condition	1.51	1.03	1.47	0.144	
	z-active.rejection	0.80	0.77	1.04	0.299	
Post-test paranoia	Pre-test paranoia	0.79	0.06	13.6	<0.01	0.80*
	Condition	1.52	1.02	1.48	0.140	
	z-active.rejection	−0.60	0.95	−0.63	0.576	
	z-active.rejection*con	2.68	1.24	2.17	0.031	
Passive rejection moderator model						
Post-test paranoia	Pre-test paranoia	0.80	0.05	14.8	<0.01	0.79*
	Condition	1.53	1.02	1.49	0.138	
	z-passive.rejection	0.63	0.55	1.13	0.258	
Post-test paranoia	Pre-test paranoia	0.79	0.05	14.7	<0.01	0.80*
	Condition	1.55	1.02	1.52	0.132	
	z-passive.rejection	−0.45	0.69	−0.65	0.517	
	z-passive.rejection*con	2.34	0.96	2.44	0.016	

Note. con = *condition*, condition (0 = favourable, 1 = unfavourable), active.rejection = *fear of being rejected*, passive.rejection = *fear of being overlooked*.
*p < .05.

3.6. Additional analyses

Our post-hoc assessments revealed that participants in the unfavourable comparison condition perceived the respective profile as significantly more realistic than participants in the favourable comparison condition ($M_{unfavourable}$ = 3.64, $SD_{unfavourable}$ = 1.38, $M_{favourable}$ = 2.88 $SD_{favourable}$ = 1.66, t (170) = −3.25, p < 0.001) and that two participants guessed correctly what the experiment was about. In order to control for the effect of these factors, we repeated the analyses described above for a) the interaction effect of experimental condition x time for social rank and b) the multivariate interaction effect experimental condition x time for anxiety, sadness, and paranoia by excluding the two cases that had guessed the experimental intention and entering the rating of how realistic the profile was perceived as covariate. The obtained results did not significantly differ from our original results. There still was a significant interaction effect of the condition on social rank ($F(1, 167) = 35.7$, $p < 0.001$, $\eta^2_{partial} = 0.176$) and a non-significant omnibus test for the interaction effect experimental condition x time for anxiety, sadness, and paranoia (F (1, 167) = 1.59, p = 0.193, $\eta^2_{partial}$ = 0.028), with a significant exploratory post-hoc interaction effect of experimental condition x time for sadness ($F(1, 167) = 3.87$, $p = 0.037$, $\eta^2_{partial} = 0.026$).

4. Discussion

Our manipulation via online profiles showed a strong effect on perceived social rank, which indicates that even short-term exposure to inferior or superior others can alter the immediate subjective perception of ones' social position. In contrast to our expectations, we did not find a significant effect of the manipulations on paranoia, and thus we were unable to test our hypothesis that anxiety and sadness would mediate the experimental effect on paranoia. However, in the exploratory post-hoc tests we found that there was a significant experimental effect on sadness. This corroborates the original formulations of the social competition hypothesis of depression (Price, Sloman, Gardner, Gilbert, & Rohde, 1994) and fits with the notion that favourable social comparisons serve the function of regulating negative affect (see Buunk et al., 2013). Our finding also supports research showing that the use of social media such as Facebook is associated with depressive symptoms, whereby this link appears to be mediated by envy or social comparisons in several of these studies (see Appel, Gerlach, & Crusius, 2016 for a review). However, the manipulations had no significant effect on anxiety. In consideration of the fact that our observed effect on sadness was small, the absence of stronger effects on emotions may be attributable to the fact that individuals often dismiss unfavourable social comparisons by downplaying the relevance of the attribute in question (e.g. Mussweiler, Gabriel, & Bodenhausen, 2000).

As the lack of a direct effect on paranoia in our study (despite showing a large effect on social rank) contradicts the findings reported by Freeman et al. (2014), we will briefly reflect on differences between the two studies which could account for this. Firstly, it may be that a change in rank that reflects only a shift in the cognitive representation of the self in comparison to (virtual) others, is not sufficient to alter paranoia. This possibility would raise the question, which types of rank-challenging situations may be relevant to paranoia and which additional processes might need to be triggered. The study by Freeman et al. (2014) suggests that physical aspects as well as an in-vivo encounter with others of higher social rank are important. Regarding putative additional processes, future research is warranted, whereby anxiety may be of particular interest as it was found to be more strongly linked to paranoia sadness in some previous studies (e.g. Morrison et al., 2015). Secondly, another difference to Freeman's study was that we did not specify a minimum level of paranoid thinking and that we recruited only individuals without any mental diagnoses. Possibly, Freeman et al. (2014) found an effect on paranoia because they recruited more vulnerable individuals. It has been suggested that heightened vulnerability (e.g. environmental, psychological and genetic risk factors for psychosis) 'sensitizes' individuals in

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terms of a greater amplitude in psychotic responses to even minor stressors (see Collip, Myin-Germeys, & van Os, 2008). An intuitive psychological risk factor likely to increase the reactivity to rank-threats is insecure attachment which, indeed, has been shown to be associated with psychopathology via a heightened tendency to engage in social comparisons (Irons & Gilbert, 2005). As our sample consisted of healthy students it can be expected that rates of insecure attachment and other relevant risk factors were low. Thus, we can assume that susceptibility to negative reactions regarding social comparisons was low in our sample. Nevertheless, the significant moderation effect for fears of rejection in our sample supports the idea that the presence of risk factors alters the sensitivity to stressors. Specifically, it suggests that people who are less secure in terms of their social position are more vulnerable to responding to social comparisons in terms of psychopathological symptoms such as paranoia.

Overall, our findings are in line with models of paranoia that are derived from cognitive models (Freeman, Garety, Kuipers, Fowler, & Bebbington, 2002) but encourage us to put more emphasis on the role of self-related concepts (Kesting & Lincoln, 2013). In the latter models, negative beliefs or expectations about others as being disrespectful or rejecting influence the way individuals react to everyday stressors. The model predicts that people, who hold these beliefs more strongly, are more likely to react with increases in paranoid ideation when they are confronted with a situation relevant to the belief (e.g. failing in a task). Our findings suggest that when individuals with fears of rejection notice that they are failing to compete or maintain social rank they exhibit stronger paranoid reactions than individuals without this type of vulnerability. Similarly, and promisingly from a therapeutic perspective, they also benefit more from favourable social comparisons. This fits in with the results of a previous study reporting that the expectation of not being accepted or respected by relevant others was most clearly related to psychotic symptoms, and explained more than half of the variance in paranoia in patients with psychosis (Lincoln, Mehl et al., 2010). Similarly, it also suggests that interpersonal sensitivity, which can also be characterized by a sense of vulnerability to criticism or rejection by others, may be an important risk factor. Interpersonal sensitivity has been found to be pronounced in individuals at an at-risk mental state for psychosis (Masillo et al., 2012) and to predict paranoid outcomes in a virtual reality study (Freeman et al., 2008).

4.1. Limitations

First, we may have overlooked immediate, but highly transient paranoid responses to the rank-inductions because we used a relatively long paranoia measure and assessed paranoia after the other self-report items. Second, building on social comparison theory which suggests that comparisons are most likely to occur among individuals who are similar in important regards (Festinger, 1954), we used a homogeneous target group of female students and generated a comparison target that was likely to be relevant for all individuals within this group. The downside of having a homogeneous group is the generalizability of findings. Female bachelor students, for example, can be expected to have an above-average social rank, which was also confirmed by baseline levels of social rank in our study and by the fact that the superior profile was perceived as significantly more realistic than the inferior profile. It has also been postulated that western industrialized societies overemphasize competitiveness, and that competitiveness is particularly high in young individuals and students (Gilbert et al., 2007). In addition, insecure striving has been shown to be associated with higher levels of psychopathology (e.g. McEwan, Gilbert, & Duarte, 2012). Thus, it is possible that the findings of our study may be biased towards an overestimation of the 'true' effect in the general population. In addition, social rank could play a different role in males than in females. Moreover, psychology students may be particularly prone to reflect upon the intentions of studies, which may have evoked response biases in some participants. Although excluding participants that saw through the experiment did not alter our findings, replication in other samples is warranted. However, the advantage of selecting a student population to investigate the emergence of paranoia is that students generally fall into the age range typical for the onset of psychosis and tend to exhibit more delusional beliefs and more associated distress than the general population (Lincoln & Keller, 2008). Thus, floor effects are less likely to occur. Our rationale for recruiting young female students and for developing the according profile stimuli was based on the high availability of this sample. Future studies could use other approaches to manipulate social rank which are less dependent upon inclusion of a homogeneous target group, such as developing an algorithm that adapts profile information to the characteristics provided by the participant (e.g. for an unfavourable comparison, when a participant provides the information on gender and education the algorithm would generate a same gender profile with a higher level of education). Another limitation is that we did not include a neutral control condition. This would have been of interest in order to disentangle the effects of unfavourable versus favourable comparisons.

4.2. Conclusion

First, our study indicates that exposure to high vs. low-ranking others has an immediate and significant influence on an individuals' perception of his or her current status within the social hierarchy. Second, it shows that short-term changes in rank perception do not seem to be followed by changes in paranoid ideation per se. Rather, threats to social rank appear more likely to be followed by paranoid reactions in individuals who already show signs of vulnerability, such as being concerned about not being able to compete with others and subsequently fearing to be rejected or criticized. There are several explanations for our findings. One explanation is that there may be a common underlying phenotype that causes both paranoia and competitive attitudes. Another explanation, derived from cognitive models of psychosis, is that negative interpersonal beliefs and sensitivities render people vulnerable to paranoia. Our study extends the cognitive formulation by indicating that a focus on competition may be a context in which these vulnerabilities are triggered. Further research on competitive attitudes thus seems promising and should clarify whether they are expressions of a common underlying phenotype or related to paranoia in a 'cause-and-consequence' manner, as inherent to the cognitive model.

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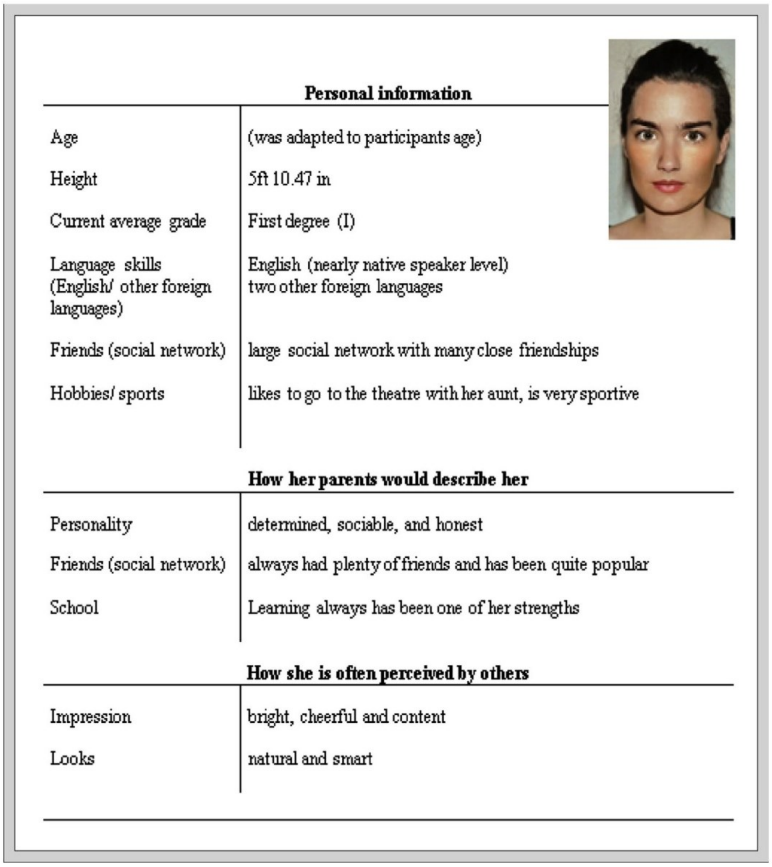
APPENDIX A. Unfavourable vs. Favourable comparison profile



Personal information	
Age	(was adapted to participants age)
Height	5ft 10.47 in
Current average grade	First degree (I)
Language skills (English/ other foreign languages)	English (nearly native speaker level) two other foreign languages
Friends (social network)	large social network with many close friendships
Hobbies/ sports	likes to go to the theatre with her aunt, is very sportive
How her parents would describe her	
Personality	determined, sociable, and honest
Friends (social network)	always had plenty of friends and has been quite popular
School	Learning always has been one of her strengths
How she is often perceived by others	
Impression	bright, cheerful and content
Looks	natural and smart

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Personal information	
Age	(was adapted to participants age)
Height	5ft 2.20 in
Current average grade	Second Lower (II:ii)
Language skills (English/ other foreign languages)	basic English skills no other foreign language
Friends (social network)	small social network with some online friends
Hobbies/ sports	Rather likes to hang out in front of TV/ play computer games, doesn't like sports very much/ rarely does sports
How her parents would describe her	
Personality	tight-fisted, undetermined, and surly
Friends (social network)	never had many friends, prefers to be on her own
School	Learning always has been one of her weaknesses
How she is often perceived by others	
Impression	insecure, indifferent, uncommunicative
Looks	dull and scruffy

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Appendix B – Study 2

Ascone, L., Sundag, J. and Lincoln, T.M. (under review). Differential pathways from insecure attachment to paranoia: the mediating role of hyperactivating emotion regulation vs. blaming others.

Abstract

Objectives. There is accumulating evidence for an association between insecure attachment and paranoid delusions but translator mechanisms between the two variables are not yet clear. Recent developments in attachment theory emphasize the differential relatedness of specific insecure attachment dimensions (i.e. attachment anxiety vs. avoidance) with specific emotion regulation (ER) strategies.

Design. Building on these theories, we tested whether the associations between attachment anxiety vs. avoidance and paranoia are mediated differentially, via hyperactivating (self-blame, rumination, catastrophization) vs. blaming others ER strategies, respectively, using a cross-sectional design.

Methods. Sixty in and out-patients with psychotic disorders and 40 healthy controls were recruited. We conducted standardized diagnostic interviews. Paranoia, attachment, and emotion regulation strategies (self-blame, rumination, catastrophization, and blaming others) were assessed.

Results. Two major findings emerged: we found that (a) patients exhibited significantly more attachment anxiety and avoidance, and both more pronounced blaming others and hyperactivating ER strategies than healthy controls, and (b) that the link between attachment anxiety and paranoia was specifically mediated via hyperactivating ER, while the link between attachment avoidance and paranoia was specifically mediated via blaming others.

Conclusions. Our study adds to gaining a more detailed understanding of how delusions could emerge from insecure attachment via different, attachment-specific regulatory pathways. This may contribute to developing interpersonally oriented psychological interventions with an emphasis on attachment processes and specific facets of ER for this group of patients.

Keywords: psychosis, paranoia, insecure attachment, hyperactivating ER, blaming others.

Practitioner Points

- Insecure attachment and dysfunctional emotion regulation strategies are more pronounced in individuals with psychosis than in healthy controls
- Specific types of emotion regulation link insecure attachment to symptoms, emphasizing that it may be useful to identify predominant attachment and regulatory strategies in patients to ameliorate paranoid symptoms in psychosis in an individually tailored manner
- Due to the cross-sectional design, caution regarding causal interpretations in warranted
- The selection of self-report measures to capture attachment-specific emotion regulation patterns could be optimized in future studies

Differential Pathways from Insecure Attachment to Paranoia: The Mediating Role of Hyperactivating ER vs. Blaming Others.

In recent years it has become increasingly recognized that childhood adversity poses a strong risk factor for psychosis, with a population attributable risk of 33% (Varese et al., 2012). Similarly, prevalence rates of childhood trauma in psychosis (e.g. 28-73%; Bendall, Jackson, Hulbert, & McGorry, 2008) and in those at ultra high risk (86.8%, Kraan, Velthorst, Smit, de Haan, & van der Gaag, 2015) are high. Building partly on these findings, Gumley and Read (2010) have put forward an attachment model of psychosis. The model links childhood adversities and trauma to attachment that predict psychosis via diverse translating mechanisms such as cognitive schemas, mentalisation or theory of mind, and affect regulation. In support of this model, a noteworthy amount of empirical evidence points to small to medium associations between insecure attachment and psychosis (Gumley, Taylor, Schwannauer, & MacBeth, 2014). More specifically, clinical and non-clinical studies find associations between two insecure attachment dimensions - attachment anxiety (preoccupied with relationships), and attachment avoidance (avoidant of intimacy) on the one hand and paranoia on the other (Korver-Nieberg et al., 2013; MacBeth, Schwannauer, & Gumley, 2008; Meins, Jones, Fernyhough, Hurndall, & Koronis, 2008; Pickering, Simpson, & Bentall, 2008; Sitko, Bentall, Shevlin, O'Sullivan, & Sellwood, 2014; Wickham, Sitko, & Bentall, 2015). Moreover, it has been shown that insecure attachment mediates the link between paranoia and childhood adversity (Sitko, Bentall, Shevlin, O'Sullivan, & Sellwood, 2014).

It is intuitively plausible to assume that suspiciousness and mistrust are the result of insecure attachment that originates in negative or even traumatic experiences with attachment figures. Attachment theory postulates that the degree to which the attachment figure is responsive to the infants' needs for exploration, providing a 'secure base', and is able to soothe and support it, providing a 'safe haven' in moments of distress, essentially shapes prototypical representations about attachment relationships in the person, termed internal

working models (Bowlby, 1973, 1982/1969). These internal models entail both models of the self and of others, and are postulated to determine behaviours and emotions in relationships. Work on the stability of attachment has suggested that early experiences are retained over time and that according attachment patterns continue to play a significant role in attachment behaviour in later attachment relationships (Fraley, 2002). Griffin and Bartholomew (1994) identified and validated two fundamental attachment dimensions in adults: attachment anxiety, with high levels on the dimension reflecting a negative model of the self; and attachment avoidance, with high levels on the dimension reflecting a negative model of others. Secure attachment is characterized by low expressions on both dimensions. Attachment anxiety is characterized by dependence on others, preoccupation about relationships, and fears related to the attachment partner being unavailable or rejecting. In contrast, attachment avoidance is characterized by items that indicate avoidance of closeness and intimacy, denial of the importance of close relationships, and emphasis on the importance of interpersonal independence (Bartholomew & Horowitz, 1991; Griffin & Bartholomew, 1994).

Attachment theory is also a theory of emotion regulation (ER). Because attachment theories of ER emphasize the importance of emotional co-regulation by a sensitive attachment figure in helping the infant to develop effective self-regulation (Mikulincer, Shaver and Pereg, 2003) it is also assumed that negative experiences with attachment figures that disrupt effective co-regulation will result in specific dysfunctional ER patterns. Two classes of such negative experiences and the specific patterns of attachment and ER that result from them have been differentiated (Cassidy, 1994; Mikulincer, Shaver and Pereg, 2003). The first class of experiences involves inconsistent responsiveness to the infant's needs, overprotection, interference with the infants' attempts of independent exploration, and traumatic experiences during exploration, along with messages from the attachment figure that emphasize vulnerability and incompetence of the infant. These types of experiences are thought to result

in attachment anxiety which is characterized by a hyperactivating ER pattern. Hyperactivating ER comprises strategies that reflect the infant's self-perception as incompetent and dependent and also serve to elicit more attention from caregivers. Examples of hyperactivating ER strategies are self-blame, rumination, and catastrophization (Cassidy, 1994; Mikulincer & Shaver, 2003, 2016). The second class of experiences involves constant rebuffing, punishment or deflecting of an infant's attachment behaviors, neglect, and traumatic experiences during proximity-seeking attempts, along with the attachment figure conveying that overt expressions of neediness and vulnerability are unwelcome. These types of experiences are thought to result in attachment avoidance which is characterized by a deactivating ER pattern (see Mikulincer, Shaver, & Pereg, 2003). Deactivating ER comprises strategies that serve interpersonal distancing goals and the maintenance of an image of invulnerability, as proximity to caregivers is a non-viable option. A typical ER strategy that has been postulated to be prominent in individuals with high levels of attachment avoidance is blaming others.

In sum, it can be concluded that attachment anxiety and attachment avoidance are theoretically associated with distinct patterns of affect regulation: while individuals with high levels of attachment anxiety may feel overwhelmed and helpless in the face of threats and tend to exaggerate their incompetence and negative affect in order to increase the likelihood of attachment partners attending to them, individuals with high levels of attachment avoidance handle their affect by minimizing displays of vulnerability and by attributing negative events to others. Despite the novelty of the postulated attachment theories of ER there are already some studies that corroborate them. For example, there exists a handful of studies showing that adults with high levels of attachment anxiety indeed tend to amplify negative emotions, whereas individuals with high levels of attachment avoidance minimize expressions of affect and tend to blame others (see Shaver & Mikulincer, 2007; Gormley, 2005; Mikulincer & Shaver, 2003, 2005).

In regard to psychosis in general there is an accumulating body of evidence pointing to an accentuated use of dysfunctional ER strategies (Livingstone, Harper, & Gillanders, 2009; O'Driscoll, Laing, & Mason, 2014). Several studies that looked into ER in association with paranoia specifically, have found paranoia to be associated with hyperactivating strategies: for example, catastrophizing has been shown to be associated with paranoia (Westermann, Boden, Gross, & Lincoln, 2013), self-blaming prospectively predicted paranoia after one month (Westermann et al., 2013), and worry predicted the stability of paranoid delusions over the course of three months (Startup, Freeman, & Garety, 2007). Moreover, rumination preceded increases in persecutory delusions in an experience sampling study (Hartley, Haddock, Vasconcelos e Sa, Emsley, & Barrowclough, 2014) and a rumination induction increased paranoia in an experimental study (Martinelli, Cavanagh, & Dudley, 2013). There is also ample evidence that blaming others for negative events is associated with paranoid delusions (An et al., 2010; Janssen et al., 2006; Kinderman & Bentall, 1997; Martin & Penn, 2002; McKay, Langdon, & Coltheart, 2005; So, Tang, & Leung, 2015). As both hyperactivating and blaming others strategies are associated with paranoia, as are both attachment dimensions (attachment anxiety and attachment avoidance), it is plausible to assume that there are two pathways from attachment to paranoia: from attachment anxiety via hyperactivating ER, and from attachment avoidance via blaming others ER.

Consequently, in the present study we test the hypotheses that (1) Individuals with psychosis show significantly higher levels of attachment anxiety and avoidance, as well as more hyperactivating ER and more blaming others in comparison to healthy control participants; (2) both attachment anxiety and avoidance are associated with paranoid symptoms; and (3) the links between attachment anxiety and paranoia as well as attachment avoidance and paranoia are differentially mediated by hyperactivating ER (but not blaming others) and blaming others (but not hyperactivating ER), respectively. This type of investigation is relevant to detail our understanding of how paranoid states may emerge from

attachment patterns, which can provide a helpful basis for developing more individually tailored interventions for patients with paranoid delusions.

Method

Participants

Participants with psychosis (n = 60) and healthy controls (n = 40) were recruited for the study. Regarding the psychotic sample, we aimed at recruiting a broad spectrum of patients with regard to symptom severity and remission status. Thus, patients were recruited from both inpatient and outpatient treatment settings, and via advertisements in local newspapers and flyers in local hospitals. All participants were 18–65 years of age, able to provide informed consent, and sufficiently in command of the German language. Moreover, they had no neurological disorders or dementia. Participants with psychosis fulfilled diagnostic criteria of a psychotic episode according to the Mini International Neuropsychiatric Interview (MINI; Sheehan et al., 1998). The prevalence of schizophrenia spectrum diagnoses was as follows: 68.3% (n = 41) schizophrenia, 25% schizoaffective disorder (n = 15), 5% delusional disorder (n = 3), and 1.7% brief psychotic disorder (n = 1). Healthy controls (n = 40) had no clinically relevant Axis I disorder as verified by the MINI, and were not taking medication for any type of mental health problem. The demographic and clinical information for each group is provided in Table 1.

Design and Procedure

The study was part of a larger study that included several other samples and conducted experimental paradigms to investigate ER. The analyses for this study are based on the data assessed at baseline in the full samples of participants with a psychotic disorder (hereafter referred to as psychosis sample) and the healthy control sample.

Measures

Attachment. The Relationship Scales Questionnaire (RSQ; Bartholomew & Horowitz, 1991; Griffin & Bartholomew, 1994) is a composite measure for adult attachment

that comprises 30 statements regarding characteristic behaviour and attitudes of the respondent in meaningful, close relationships, which were drawn from Hazan and Shaver's 1987) attachment measure, Bartholomew and Horowitz's (1991) Relationship Questionnaire, and Collins and Read's (1990) Adult Attachment Scale. Two attachment factors can be derived from the scale: attachment anxiety that describes dependence on others, fears of rejection, and concerns of unavailability of attachment partners (e.g. item: 'I worry about having others not accept me') vs. attachment avoidance, that describes avoidance of intimacy, overt self-reliance and denial of the value of close relationships (e.g. item: 'I am uncomfortable having other people depend on me'). Items are rated on a 5-point Likert scale (1 = *not at all like me*, 5 = *very much like me*). In a German validation study (Steffanowski et al., 2001), two factors resembling the original dimensions of attachment anxiety (10 items) and attachment avoidance (7 items) could be replicated. Cronbach's alpha was .77 (attachment avoidance) and .81 (attachment anxiety) in the German validation study for the factor scales and .81 for both scales in our total sample. As expected for dimensions assumed to be independent, attachment anxiety and avoidance were only correlated weakly in the total sample (r (100) = .197, p = .049) and uncorrelated in the psychosis sample (r (100) = .044; p = .737).

Emotion regulation. The Cognitive Emotion Regulation Questionnaire (CERQ; Garnefski, Kraaij, & Spinhoven, 2001) measures different strategies of cognitive handling of distressing events, which can be categorized into functional vs. dysfunctional (Loch, Hiller, & Witthöft, 2011). The dysfunctional strategies comprise: *rumination* (e.g. 'I dwell upon the feelings the situation has evoked in me'), *self-blame* (e.g. 'I think that basically the cause must lie within myself), *catastrophizing* (e.g. 'I keep thinking about how terrible it is what I have experienced') as well as *other blame* (e.g. 'I think about the mistakes others have made in this matter'), and thus will be used to test the mediation hypothesis. The German version of the CERQ (Loch et al., 2011) comprises 27 items with 3 items per scale, rated on a 5-point

Likert scale ranging from 1 (*almost never*) to 5 (*almost always*). Internal consistencies of the subscales (Cronbach's alpha) for the German version of the CERQ have been shown to be within an acceptable range (.60 - .86). For the purpose of the present study, we computed a composite sum score to reflect *hyperactivating* ER by summing up the *rumination*, *self-blame*, and *catastrophizing* subscales. Cronbach's α was .78 for this composite scale. Cronbach's α for the *other blame* (hereafter referred to as blaming others) subscale that we used in our study was .93. Our hyperactivating ER subscale was only weakly correlated with the blaming others subscale in the total sample (r (100) = -.230; p = .021) and the subscales were uncorrelated in the psychosis sample (r (100) = -.029; p = .824).

Symptoms. To assess the symptom severity in the psychosis sample, we used the Positive and Negative Syndrome Scale (PANSS; Kay, Fiszbein, & Opler, 1987), a semi-structured interview measuring 30 symptoms associated with the psychosis spectrum, rated on a 7-point scale with detailed descriptive anchors for each rating point. The PANSS is subdivided into three major scales, addressing positive symptoms (7 items), negative symptoms (7 items), and global psychopathology (16 items). The PANSS was administered by two trained raters. To assess the severity of paranoid symptoms, we administered the Paranoia Checklist (Freeman et al., 2005). The Paranoia Checklist is a self-report scale that measures the frequency of various facets of paranoid ideation, including ideas of persecution (e.g. 'I need to be on my guard against others') and reference (e.g. 'There might be negative comments being circulated about me') in 18-items with a 5-point scaling (1= *rarely*, 2 = *once a month*, 3 = *once a week*, 4 = *several times a week*, 5 = *at least once a day*). The German version of the Paranoia Checklist has been shown to have good reliability and validity (Lincoln, Peter, Schäfer, & Moritz, 2009). Cronbach's α in our total sample was .96.

Statistical Analyses

All analyses were conducted with SPSS 22 (IBM Corp., 2013). (1) We used *t*-tests (and Chi-square to compare the sex distributions across the samples) to check for differences

in demographic variables, attachment related variables and ER between participants with a psychotic disorder and healthy controls. (2) To test the mediation hypotheses, we used the SPSS macro PROCESS by Hayes (see Hayes, 2013, Preacher & Hayes, 2004). In order to test for the specificity of mediators, we tested two separate mediation models: I) attachment anxiety predicting paranoia, mediated via both hyperactivating and blaming others ER strategies, and II) attachment avoidance predicting paranoia, again mediated via both hyperactivating and blaming others ER strategies. Simultaneous inclusion of both mediators in the predictor models constitutes a conservative approach of testing as this allows for the estimation of a controlled effect for each respective mediator on the outcome. Based on recommendations concerning estimation of indirect effects in single and multiple mediation models (Hayes, 2013) we used the bootstrap method to infer significance. We used 10.000 bootstrap samples, whereby significance was derived based on the bootstrapped, bias-corrected 95% confidence intervals constructed around the indirect effect estimate.

We tested the following four steps as recommended for mediation analyses (see Muller, Judd, & Yzerbyt, 2005): (1) there is a significant effect of the independent on the dependent variable ($c = X \rightarrow Y$; total effect). In our study, this would correspond to a significant effect of attachment anxiety on paranoia in model I) and attachment avoidance on paranoia in model II). (2) The independent variable has a significant effect on the mediator ($a = X \rightarrow M$). In our study, this would correspond to a significant effect from attachment anxiety on hyperactivating ER but not on blaming others ($X \nrightarrow M$), (model I) and attachment avoidance on blaming others but not on hyperactivating ER (model II). (3) The mediator has a significant effect on the dependent variable ($b = M \rightarrow Y$). In our study, this would correspond to a significant effect of hyperactivating ER or blaming others ER on paranoia. (4) The effect (c) of the independent on the dependent variable shrinks to non-significance (= full mediation) or is reduced (= partial mediation) upon inclusion of the mediator variable in the model. Accordingly, after including the mediators (hyperactivating ER and blaming others),

we would expect a non-significant or at least reduced direct effect of attachment anxiety on paranoia (model I) and a non-significant or at least reduced effect of attachment avoidance on paranoia (model II), in comparison to the total effect found in mediation step 1.

Results

Sample Characteristics

The mean PANSS positive syndrome score of the psychosis group was 15.4 (SD = 5.3), 12.0 (SD = 4.9) for the negative syndrome score and 30.5 (SD = 7.6) for the general psychopathology score. As can be seen in Table 1, participants in the psychosis vs. healthy control group did not differ significantly in age, sex, education or verbal IQ (all $p > .10$).

Hypothesis 1: Differences in Attachment and ER

As can be seen in Table 1, the psychosis group had higher scores than the healthy control group on all variables of interest, namely the attachment dimensions attachment anxiety and attachment avoidance as well as the hyperactivating and blaming others subscores of ER (all $p < .01$, see Table 1 for details).

Hypothesis 2.I: Mediation of the Association between Attachment Anxiety and Paranoia through Hyperactivating ER.

For a graphical depiction of the mediation analyses see figure 1. The first condition for mediation ($X \rightarrow Y$) was met, as indicated by a significant total effect from attachment anxiety on paranoia ($c = .467$, $SE = .172$, $t = 2.71$, $p = .009$). The second condition for mediation ($X \rightarrow M_1$) was also met as there was a significant effect from attachment anxiety on hyperactivating ER ($a_1 = .341$, $SE = .095$, $t = 3.57$, $p < .001$) whereas attachment anxiety did not predict blaming others ($X \nrightarrow M_2$), ($a_2 = .093$, $SE = .202$, $t = 0.46$, $p = .646$). The third condition for mediation ($M_1 \rightarrow X$) was also met, with hyperactivating ER predicting paranoia ($b_1 = .663$, $SE = .215$, $t = 3.09$, $p = .003$). Blaming others also predicted paranoia ($b_2 = .255$, $SE = .101$, $t = 2.52$, $p = .015$). Attachment anxiety indirectly influenced paranoid symptoms through its effect on hyperactivating ER ($ab_1 = .226$, $SE = .105$, *95% CI* [.060 .486]), but not

through its effect on blaming others (ab_2 = .024, *SE* = .058, *95% CI* [-.079 .163]), suggesting specificity of the path from attachment anxiety via hyperactivating ER to paranoia. The direct path in this model was no longer significant (c' = .217, *SE* = .172, t = 1.26, p = .213), indicating full mediation through hyperactivating ER.

Hypothesis 2.II: Mediation of the Association between Attachment Avoidance and Paranoia through Blaming Others.

The first condition for mediation ($X \rightarrow Y$) was met, as indicated by a significant total effect from attachment avoidance on paranoia (c = .429, *SE* = .183, t = 2.34, p = .023). The second condition for mediation ($X \rightarrow M_2$) regarding the hypothesized effect from attachment avoidance on blaming others was met at trend level (a_2 = .377, *SE* = .207, t = 1.82, p = .074), whereas attachment avoidance did not predict hyperactivating ER ($X \nrightarrow M_1$), (a_1 = -.035, *SE* = .111, t = -0.31, p = .755), indicating specificity. The third condition for mediation ($M_2 \rightarrow X$) was met, with blaming others predicting paranoia (b_2 = .212, *SE* = .100, t = 2.12, p = .040). Hyperactivating ER also predicted paranoia in this model (b_1 = .793, *SE* = .188, t = 4.22, p = <.001). However, attachment avoidance indirectly and significantly influenced paranoid symptoms only through its effect on blaming others (ab_2 = .080, *SE* = .060, *95% CI* [.000 .253]), but not by its effect on hyperactivating ER (ab_1 = -.028, *SE* = .099, *95% CI* [-.240 .156]), suggesting specificity of the path from attachment avoidance via blaming others ER to paranoia. The direct path in this model was still significant, but slightly reduced in size compared with the total effect (c' = .376, *SE* = .163, t = 2.31, p = .025), indicating partial mediation.

Discussion

First, we found that individuals with psychosis exhibited significantly more attachment anxiety and avoidance than healthy control participants, which adds to the accumulating evidence for high rates of insecure attachment in psychosis (e.g. Gumley et al., 2014). In addition, we found that individuals with psychosis reported higher levels of

hyperactivating (i.e. self-blame, rumination and catastrophization) and blaming others as strategies to regulate emotions in comparison to healthy controls, which corroborates previous findings of an accentuated use of dysfunctional ER strategies in psychosis (Livingstone et al., 2009; O'Driscoll et al., 2014). Second, we found that hyperactivating ER significantly and fully mediated the link between attachment anxiety and paranoia, whereas blaming others did not significantly mediate this association. In contrast, blaming others partially mediated the association between attachment avoidance and paranoia, whereas hyperactivating ER did not. This confirms our expectation that hyperactivating ER could be a specific translator between attachment anxiety and paranoia, whereas blaming others could be a specific translator between attachment avoidance and paranoia. These findings are in line with postulates derivable from attachment theories of ER (e.g. Mikulincer, Shaver & Pereg, 2003, Shaver & Mikulincer, 2007) and with the attachment models of psychosis, postulating ER and heightened stress sensitivity being a mediator between insecure attachment and psychotic symptoms (Read & Gumley, 2010; Harder, 2014).

Our findings could contribute to further elaboration of specific models of delusions. First, the finding that hyperactivating strategies mediate between attachment anxiety and paranoia corroborates models that propose an affective pathway to paranoia (Freeman & Garety, 2014; Freeman, Garety, Kuipers, Fowler, & Bebbington, 2002) and extends them on the level of vulnerability by indicating that this pathway could be particularly relevant to individuals with high levels of attachment anxiety. Second, the finding that blaming others specifically linked attachment avoidance to paranoia could provide the basis for an extension of the causal attribution model of persecutory delusions as proposed by Bentall, Kinderman and Kaney (1994). Essentially, this models states that delusions result from an extreme self-serving bias that manifests in external attributions for negative eventsInterestingly, in an update of the original model, Bentall et al. (2001) already speculated about the influence of attachment avoidance on external attribution biases. In attachment theory, it has similarly

been speculated that blaming others serves a self-defensive function and the regulation of emotion (see Mikulincer & Shaver, 2003, p. 67 f.). It could thus be speculated that attachment avoidance is a specific risk factor for the external attribution biases often found in patients with delusions (An et al., 2010; Diez-Alegría, Vázquez, Nieto-Moreno, Valiente, & Fuentenebro, 2006; Kinderman & Bentall, 1997; Martin & Penn, 2002; McKay et al., 2005; Moritz, Woodward, Burlon, Braus, & Andresen, 2007).

Our findings could also contribute to further development of psychological interventions for paranoid delusions by focusing on targeting attachment and targeting attachment-specific ER patterns.

Based on our findings we argue that for patients with high levels of attachment anxiety, an approach that promotes a stronger interpersonal independence from others and effective self-regulation (see Wallin, 2007) may be worthwhile. Patients with high levels of attachment avoidance could benefit from reducing overt self-reliance and display of invulnerability. Bringing these patients into contact with their attachment needs and therapeutically responding to them in a validating manner has been postulated as primary goal for establishing a basis for effective psychotherapy for individuals with high levels of attachment avoidance (see Wallin, 2007), and hence could also be considered for individually tailored psychological therapy for psychosis. In regard to targeting ER, one could begin by identifying the prevalent attachment-specific dysfunctional ER pattern in the individual patient and then select according interventions suited to reduce it.

Limitations

We used a cross-sectional design which precludes the possibility of drawing causal interpretations in our study. Although attachment theory explicitly postulates that attachment styles, that are predominantly acquired in childhood, influence subsequent attachment relationships via relatively stable internal working models (see Fraley, 2002), at this point it

is impossible to preclude the possibility of reverse causation (i.e. psychosis affecting the way people respond to attachment related questions). This is especially problematic given that negative life events occurring in adulthood can alter attachment representations (Waters, Hamilton, & Weinfield, 2000), and that the onset of psychosis can be considered as an adverse or even traumatic life event in itself (Mueser, Lu, Rosenberg, & Wolfe, 2010). Longitudinal research is thus needed to address these issues. Another limitation is that we used subscales of a cognitive emotion regulation questionnaire to measure strategies that are considered typical for individuals with high levels of attachment anxiety (self-blame, rumination, catastrophization) vs. avoidance (blaming others). A more attachment-specific and balanced measure (i.e. equal amount of items reflecting typically hyper- vs. deactivating strategies) would have been more appropriate. Moreover, there may be some heterogeneity of how researchers define and understand attachment-specific ER strategies. Thus, more methodological elaboration and clearer definition of terms are required to further pursue this promising line of research on attachment theories of emotion regulation in psychosis.

Conclusion

The study extends existing research on paranoid delusions and emotion regulation by applying an attachment perspective (Mikulincer & Shaver, 2012; Shaver & Mikulincer, 2007). From this perspective dysfunctional ER and paranoia are conceptualized as resulting from an individual's personal history of adverse experiences with attachment figures and amplification of negative affect or blaming others are seen as a way of coping with adverse interpersonal experiences that is likely to have been functional at some point. Although longitudinal studies are required to validly test the temporal associations between adversity, attachment and symptoms that follow from this theory, our study supports the theory's basic assumption that specific types of emotion regulation link insecure attachment to symptoms. It follows that attachment-based interventions for psychosis, which target the according ER patterns, could be a promising approach to reduce paranoid delusions.

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Table 1

Demographic data and differences in attachment and ER variables between individuals with psychosis vs. healthy controls

	Group		Statistics
Variable	Psychosis (n = 60)	Healthy control (n = 40)	
Age	40.2 (11.7)	40.0 (10.8)	$t(98) = 0.05$, $p = .957$
Sex (male/female) %	36.7/ 63.3	32.5/ 67.5	$X^2(1) = 0.18$, $p = .831$
Education (high/ middle/ low) %	65.0/ 21.7/ 13.3	72.5/ 22.5/ 5.0	$X^2(3) = 2.09$, $p = .522$
verbal IQ (MWT-B)	107.2 (12.9)	103.6 (12.5)	$t(98) = 1.36$, $p = .177$
Attachment anxiety	2.99 (0.75)	2.58 (0.73)	$t(98) = 2.67$, $p = .009$
Attachment avoidance	2.89 (0.71)	2.13 (0.63)	$t(98) = 5.41$, $p < .001$
Hyperactivating ER	2.64 (0.60)	2.01 (0.54)	$t(98) = 5.24$, $p <.001$
Blaming others	2.27 (1.16)	1.64 (0.73)	$t(97.7) = 3.35$, $p = .001$

Note. p-levels are indicated for two-tailed tests of significance, MWT-B = Multiple-Choice Vocabulary Intelligence Test.

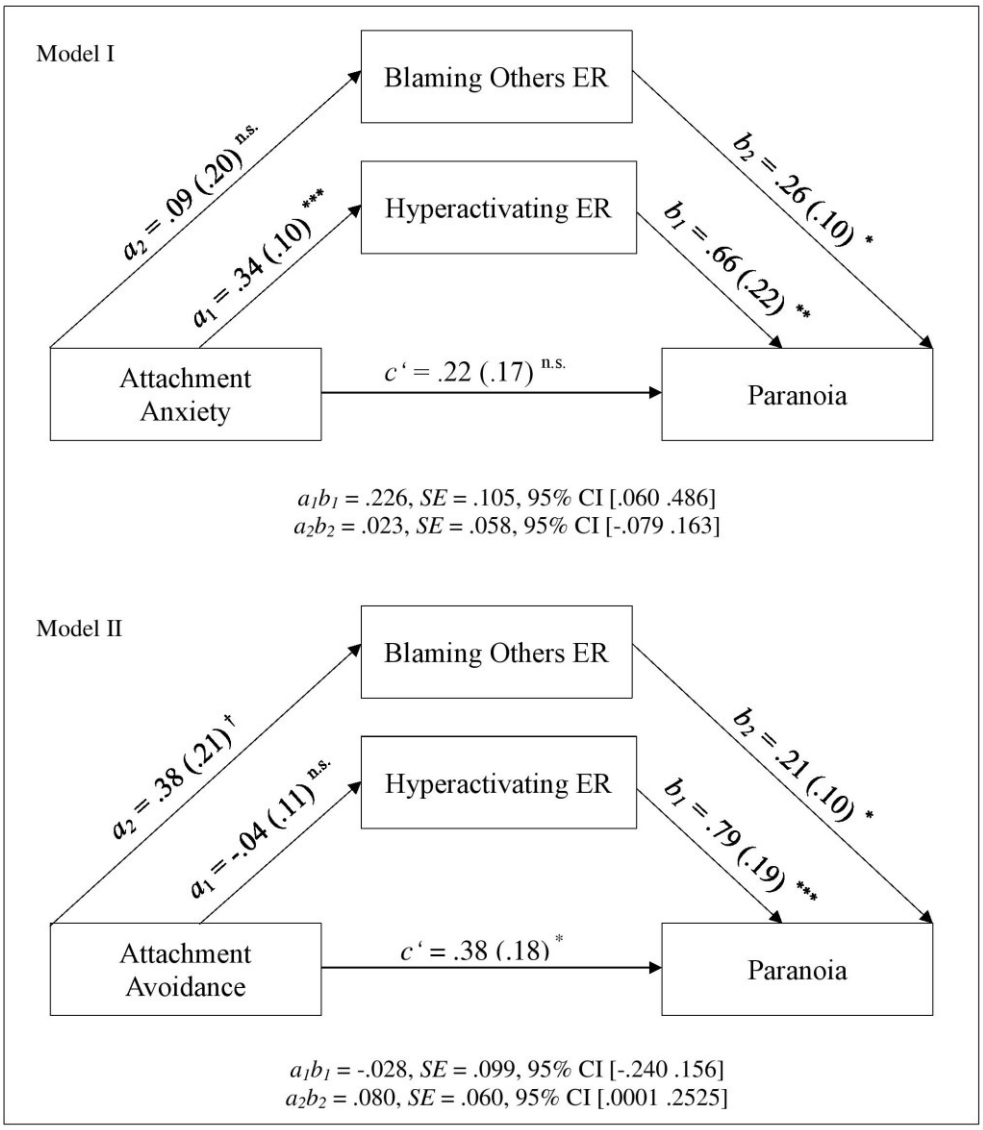

Figure 1. Mediation analyses of the association between attachment anxiety or attachment avoidance and paranoia via blaming others vs. hyperactivating ER strategies.

Note. n.s. = not significant, †p < .10, *p < .05, **p < .01, ***p < .001; ER = Emotion Regulation; *ab* = indirect effect; *SE* = standard error; CI = confidence interval. Unstandardized coefficients are reported with standard errors in brackets

Appendix C – Study 3

Ascone, L., Sundag, J., Schlier, B. and Lincoln, T. M. (2016). Feasibility and effects of a brief compassion-focused imagery intervention in psychotic patients with paranoid ideation: a randomized experimental pilot study. *Clinical Psychology & Psychotherapy*. doi:10.1002/cpp.2003.

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Feasibility and Effects of a Brief Compassion-Focused Imagery Intervention in Psychotic Patients with Paranoid Ideation: A Randomized Experimental Pilot Study

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Paranoia is characterized by a lack of perceived social safeness and associated negative affect. Low self-esteem, negative self-concepts and negative emotions have been shown to contribute to paranoid symptom formation. Thus, interventions focusing on affiliation and positive affect might be particularly helpful for patients with paranoia. The present study experimentally tested the effect of a one-session, brief compassion-focused imagery derived from Compassion-Focused Therapy (Gilbert, 2009) versus a control imagery condition in a repeated measures randomized design. A negative affective state was induced via *in-sensu* exposure to a recent distressful social situation in order to provide a minimum level of threat-related arousal to be down-regulated by the interventions thereafter. The sample consisted of psychotic patients with paranoid ideation ($N = 51$) who were randomly assigned to one of the experimental conditions. Effects on postulated causal mechanisms, i.e., self-relating (self-reassurance, self-compassion, self-criticism), and affect (self-reported affective states, skin conductance levels) as well as on state paranoia, were tested. Subjective benefit and appraisals of the intervention were explored. There were no specific intervention effects on negative self-relating, negative affect and skin-conductance or on paranoia. However, compassion-focused imagery had significant effects on self-reassurance and happiness. Explorative analyses revealed that the majority of the participants appraised the intervention in a positive manner, indicating good acceptance. The intervention showed an effect on some of the postulated mechanisms but not on others, which might have been because of its brevity. Further investigation of interventions targeting affiliation for people with paranoid experiences appears worthwhile. Copyright © 2016 John Wiley & Sons, Ltd.

Key Practitioner Message

- Affiliative imagery work is feasible and appraised positively in psychotic patients.
- Brief compassion focused imagery increased feelings of happiness and reassurance but did not improve negative self-relating, negative affect or paranoia.
- Further investigation is warranted to identify which patients benefit most from affiliative imagery.

Keywords: Affiliation, Compassion-Focused, Imagery, Emotions, Self-Relating, Paranoia

Paranoia is defined by an unfounded anticipation of threat and fear to be harmed by others. It is reasonable to assume that a perceived lack of social safeness and affiliation could be partly responsible for the symptoms. In line with this idea, research suggests that insecure attachment is specifically linked to paranoid symptoms (e.g., MacBeth, Schwannauer, & Gumley, 2008; Pickering, Simpson, & Bentall, 2008; Wickham, Sitko, & Bentall, 2015).

In addition, negative emotions, such as anxiety and depression, are prominent in paranoia, and studies have repeatedly provided evidence for their involvement in symptom formation and maintenance (e.g., Ben-Zeev, Ellington, Swendsen, & Granholm, 2011; Fowler et al., 2012; Kramer et al., 2014; Myin-Germeys & van Os, 2007). For instance, in a 1-week prospective experience sampling study, Thewissen and colleagues (2011) found evidence that increases in anxiety preceded increases in state paranoia. Furthermore, reductions in self-esteem observed in experimental studies and on a daily-life basis precede increases in paranoia, suggesting a causal role of self-esteem instability in paranoia (e.g., Kesting, Bredenpohl, Klenke, Westermann, & Lincoln, 2013; Thewissen et al., 2011). We argue that one way of targeting these causal pathways is to enhance affiliation

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and thereby stimulate a sense of social safeness, positive self-relating and affect, which in turn might reduce the predominant threat-responses.

Affiliation, characterized by warmth, compassion and agreeableness (see Depue & Morrone-Strupinsky, 2005, pp. 316–317 for an overview), has been proposed to have a strong impact on physical and psychological functioning and self-regulation (Cozolino, 2014). Furthermore, it has been linked to oxytocin releases and trophotropic processes (see Depue & Morrone-Strupinsky, 2005). In addition, affiliative behaviour has been proposed to increase heart rate variability, an indicator of successful emotion regulation (Porges, 2003; Williams et al., 2015). Moreover, feelings of social safeness have been shown to be associated with lower psychopathology and vulnerability (Kelly, Zuroff, Leybman, & Gilbert, 2012).

Compassion Focused Therapy (CFT; Gilbert, 2009) was derived from neuro-scientific findings on affiliation and focuses on the stimulation of affiliative (self-) relating and affect. Imagery techniques are applied as an intuitive way of access to the so called neuronal *soothing system* which is assumed to counterbalance or even dampen the predominant threat response, such as (self-) criticism and negative affective states that occur within what Gilbert describes as neuronal *threat system* (Gilbert, 2009). The potential of CFT for psychosis has already been demonstrated in a feasibility randomized controlled trial by Braehler and colleagues (2013). However, to our knowledge, the effect of interventions specifically targeting affiliative processes in paranoia has only been investigated in a case series study by Mayhew and Gilbert (2008) and an experimental study by Lincoln, Hohenhaus and Hartmann (2013). Mayhew and Gilbert (2008) report overall decreases in paranoia after a 12-session *Compassionate Mind Training* in three participants with a diagnosis of schizophrenia. Lincoln and colleagues (2013) experimentally investigated the impact of compassion-focused (CF) imagery on state paranoia in a healthy sample. In this trial, negative emotions were induced using an *in-sensu*-like exposure procedure to a socially threatening situation. This was followed by a CF imagery exercise that conveyed affiliative feelings versus control imagery (neutral description of a chair). The results indicated stronger reductions of state paranoia mediated by decreases in negative affect in the CF relative to the control imagery group.

In the present study, we tested the effect of the same intervention in a sample of participants with psychotic disorders and slightly extended the design as follows: for one, as we were interested in the physiological responses to the imagery, we added an assessment of skin conductance levels as indicator of threat-related sympathetic arousal. Also, we assessed constructs closely related to compassion as a proxy for the affiliative processes we aimed to influence. Finally, we assessed subjective benefit and appraisal of the imagery as indicators of feasibility and acceptability in the patient sample. We expected that the CF intervention significantly increases self-reassurance, self-compassion and happiness. Furthermore, we hypothesized that the CF intervention significantly decreases self-criticism, negative affective states (i.e., shame, depression, anxiety and anger), and psychophysiological arousal (skin conductance levels). We also hypothesized that the CF intervention decreases state paranoid ideation. Finally, we explored whether or not participants perceived the CF intervention positively and as more beneficial than the control condition.

METHOD

Sample Selection and Recruitment

The study was approved by the local ethics committee. Inclusion criteria were a current psychotic disorder diagnosis and present or past episode(s) of paranoid delusions. Other inclusion criteria were age 18 to 65 and proficiency of the German language. Exclusion criteria were acute suicidality, organic brain disorders and severe cognitive impairment. For the major part of the sample, which was an inpatient sample at psychiatric wards specialized in the treatment of psychotic disorders, we relied on case file diagnoses according to the International Classification of Diseases (ICD-10; World Health Organization, 1992). These were derived by experienced clinicians trained in the application of the Manual for the Assessment and Documentation of Psychopathology (Guy, Ban, & AMDP, 1982). For the outpatient subsample we used diagnoses based on the Structured Clinical Interview for DSM-IV (First, Spitzer, Gibbon, & Williams, 1996) that were derived in the context of a concurrent study at our research unit. The clinicians at the respective sites were instructed to recruit patients who fulfilled the general inclusion criteria, and they provided contact information or directly made appointments for the study with potential candidates. These patients were then contacted by the experimenters at the respective psychiatric ward. Outpatients were recruited at our research unit where we re-contacted and invited potentially suitable candidates who were taking part in other ongoing studies to participate. In order to secure a minimal level of paranoid ideation in this sample only those participants were approached that exhibited a score of 3 or above on the P6 suspiciousness/persecution item of the Positive and Negative Syndrome Scale (Kay, Fiszbein, & Opler, 1987), assessed in the context of the concurrent study. All sessions took place in a quiet room, either in the hospital or in our research unit.

Participants

In total, 56 patients were asked to participate, of which three declined. Two participants quit participation before

the intervention: one patient terminated the study because of lack of confidence in the experimenter, the other participant quit because of an emerging paranoid interpretation of the test situation. Both were offered immediate assistance. The final sample ($N = 51$) consisted of 36 inpatients and 15 outpatients. All but four participants currently received medical treatment, 42 participants received antipsychotics specifically. Diagnoses included paranoid schizophrenia ($n = 34$), schizophrenia non-specified ($n = 5$) and schizoaffective disorder ($n = 4$). Five participants had other diagnoses from the schizophrenia spectrum, two participants exhibited drug induced paranoid delusions and one participant was diagnosed with bipolar affective disorder with psychotic symptoms. In- and out-patient samples did not differ significantly in pre-test paranoia scores [t (49) = 0.56, $p = 0.581$].

Design and Procedure

We conducted the experiment as repeated measures randomized controlled design, comparing the effects of a CF versus control (CC) imagery condition on self-relating, different affective states and paranoid ideation (for an overview of the study design and procedure see Figure 1). At the beginning of the experimental session, participants were told that the focus of the study was on coping with negative emotions by applying imagery exercises. After the informed consent, a psychophysiological data recording bracelet was installed at the participants' non-dominant hand and subsequently recorded skin conductance levels throughout the experiment. The baseline assessment (A-1) included items addressing affective valence and arousal and socio-demographic information. This was followed by a 3-min psychophysiological calm-breathing-baseline. Participants were instructed to fixate a stable point in the room and breathe in and out, paying attention to their breath and to get into a calm, regular breathing rhythm. The rationale for this was to equalize arousal amongst participants prior to the emotion induction. The focus on breath was implemented to distract from possible intrusive thoughts or even hallucinations during the physiological baseline. Next, negative emotions were induced

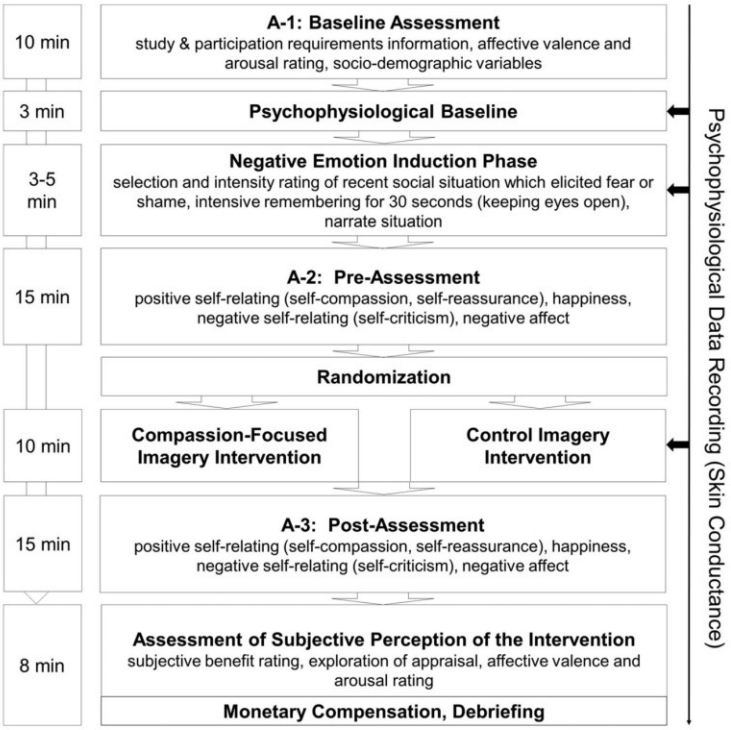

Figure 1. Overview of the study design. **Note.** Black arrow symbols (Psychophysiological Data Recording) indicate where physiological recording segments have been extracted for analysis purposes

by asking participants to recall and briefly dwell on a recent social situation that the participants remembered to be somewhat or moderately distressing and to have triggered feelings of either fear or shame. This was done in order to mimic everyday-life stressors that we assumed will activate threat-related responses, in terms of arousal, negative affect and paranoia that could be 'down-regulated' by the interventions thereafter. Afterwards, a composite questionnaire assessing positive ways of self-relating and happiness, negative ways of self-relating and negative affect was completed by the participants (A-2). Thereafter they were randomly assigned to the CF versus CC imagery condition. They were instructed to find a comfortable position and rest for a brief moment, close their eyes, and the experimenter read out the imagery text. After a brief 'wake-up phase' the second composite questionnaire (A-3) was handed out. In order to reduce memory effects, the items were presented in different order than in the composite questionnaire presented at A-2. The experiment ended with an assessment of perceived subjective benefit from the imagery followed by asking participants about their appraisal of the imagery. Affective valence and arousal were re-assessed. At the end, participants received full study information and a monetary compensation (€10).

Randomization

Randomization was realized using an approach similar to the fishbowl without replacement strategy (see Drew, Hardman, & Hosp, 2007, pp. 87 f.). In order to secure at least roughly equivalent sample sizes, participants were randomized to conditions in blocks of 20. In order to do this, stacks of 20 testing material sets were randomly mixed. Before testing the respective participant, one set of material was drawn from the stack by the experimenter. The material for both conditions was indistinguishable from the outside as the CF materials differed from the CC condition materials only in the part concerning the intervention. Consequently, the experimenter was blind to group assignment until the point of delivering the imagery intervention.

Interventions

Negative Emotion Induction

This part of the experiment was introduced by stating '*In the following exercise I would like you to remember a socially distressing situation. The situation should have made you feel threatened (afraid), or ashamed (embarrassed). You should be able to recall the situation in a vivid and detailed manner, so it would be good if you could choose a recent situation. Please do not select a highly distressing (traumatic) situation. Do you have a situation in mind? As how distressing would you rate it?*' (rating: 1 = *a little distressing*; 10 = *severely distressing*). This was followed by instructing participants to 'go back' into the situation and reactivate it in their memory. Thereafter, the experimenter asked the participants to narrate the situation.

CF vs. Control Imagery

Participants in the CF intervention were guided to create an image conveying warmth and compassion to them. The instruction text was derived from Gilbert (2010a, pp. 187–189) and from online material (http://www.compassionatemind.co.uk/11.html), freely translated into German and slightly modified by a native speaker. The resulting text was as follows:

'*I would now like to practice something with you. You are going to create an image. Please close your eyes. You won't have to tell me about it. It is supposed to be your private image. The image should convey compassion for you, it should care for you, and want you to feel good and be without worry. The image may be a person but it can also be something else, such as a creature, an animal or a sun. It may be best to take the image that first pops into your mind. Do you have an image like that? Please close your eyes and picture it. It has the following attributes: It is wise. It knows you and knows what you've been through. It is deeply committed to you it wants to care for you so that you feel good and experience joy. It conveys warmth. You can even feel the warmth. It is completely accepting. It never judges you. It understands your difficulties and accepts you as you are. Observe your mental image carefully and take in this image for a moment. Your image is wise, accepting and deeply committed to you. Now be with your image and picture it well, so that you can come back to it any time. Ok, now please open your eyes again*'.

For the CC image we composed a parallel text describing a chair with the same structure and similar word number. We selected the words to be as neutral as possible (e.g., '*[…] Now focus on the shape of the chair and its contours*' etc.). The experimenters (L.A. and B.S.) practiced both texts until they were able to read them out in a comparable calm and warm manner.

MEASURES

Main Outcomes Measures

Self-Criticism and Self-Reassurance

The Forms of Self-Criticism and Reassurance Scale (FSCRS; Gilbert, Clarke, Hempel, Miles, & Irons, 2004) reflects two types of relating to oneself: self-criticism versus self-reassurance. Self-criticism is subdivided into feelings of inadequacy (*Inadequate Self* subscale; IS) and self-hatred (*Hated Self* subscale; HS). Self-reassurance is defined as a warm and forgiving manner of self-relating (*Reassured Self* subscale; RS). For the present study, two items from

each subscale were selected, guided by our expectations on which items would be change-sensitive over a brief period. The items were translated into German by a native speaker. Instructions were state adapted, and the scaling was changed to an 11-point format (0 = *not applicable*, 10 = *completely applicable*). The items were for self-criticism: '*I have a sense of disgust with myself*'; '*I don't like being me*' (HS); '*I remember and dwell on my failings*'; '*There is a part of me that feels I'm not good enough*' (IS). For RS the items were: '*I find it easy to like myself*'; '*I can feel lovable and acceptable*'. The resulting self-criticism and self-reassurance measures had good reliability (Cronbach's $\alpha = 0.80$ and 0.86).

Self-Compassion

The Self-Compassion Scale (SCS; Neff, 2003) measures a basic attitude of being forgiving and kind versus judgmental and cold towards oneself in moments of failure. It includes three subscales constituting compassionate (*self-kindness*, *common humanity*, and *mindfulness*) and three subscales constituting negative (*isolation*, *over-identification* and *self-judgment*) self-relating. We adopted one item from each of the positive subscales following the same rationale for item selection as for the FSCRS. Items were '*I try to see my failings as part of the human condition*' (subscale *common humanity*), '*When I'm feeling down I try to approach my feelings with curiosity and openness*' (subscale *mindfulness*) and '*I'm tolerant of my own flaws and inadequacies*' (subscale *self-kindness*). The items were state adapted, and scaling was changed to an 11-point Likert-scale format (0 = *not applicable*, 10 = *completely applicable*). Our resulting scale had an acceptable internal consistency (Cronbach's $\alpha = 0.65$).

Negative and Positive Affect

Stemmler, Heldmann, Pauls and Scherer (2001) developed self-report items addressing affective states by using a few adjectives tagged to unipolar intensity rating scales which characterize each state (0 = *not applicable*, 10 = *completely applicable*). The adjectives are for fear: frightened, timid, afraid and scared; anger: angry, annoyed, mad and sore; shame: embarrassed, ridiculed, ashamed and foolish; sadness: sad, depressed, miserable and dejected; and happiness: happy, gay, cheerful and delighted. Internal consistencies of the scale range from 0.81 to 0.94 (Stemmler et al., 2001).

Skin Conductance Levels

To assess levels of psychophysiological arousal, we used the *Q sensor 2.0* (affectiva ®, 2012) skin conductance recording bracelet. For the analyses we extracted mean values from recording segments at baseline, emotion induction and intervention phase (see Figure 1 for details). As there are typically large interindividual differences in the range of electrodermal activity, we used a range correction for all individual SCL mean values (Boucsein, 2012).

Paranoia

The 18-item Paranoia Checklist (Freeman et al., 2005) measures various facets of paranoid ideation. In experimental contexts, state adapted forms of the German version of the Paranoia Checklist have been established with good reliability (Cronbach's alpha ≥ 0.86; Lincoln et al., 2009). In the present study, we used a state adapted version in an 11-point Likert scale format (0 = *not applicable*, 10 = *completely applicable*).

Exploratory Variables

Appraisal and Perceived Subjective Benefit of Imagery Intervention

Participants were asked to indicate on a visual analogue scale how much they felt to have benefitted from the intervention (ranging from 0 = '*not at all*' to 11 = '*very much*'). In addition, participants were asked to report how they perceived the imagery. The experimenter noted the answers and a rater blind to group allocation assigned them to one out of three categories (*positive, neutral, negative*).

Additional Control Variables

Affective Valence and Arousal (Self-Report)

To control for potential baseline differences in affective valence and arousal and to make sure that participants did not leave the intervention more distressed than they entered it, we used the Self-Assessment Manikin (Bradley & Lang, 1994) which is a non-verbal, pictorial rating scale of affective valence and arousal in a 9-point scale format.

Quality of the imagery created during the CF versus CC intervention was assessed by asking participants to indicate the vividness and clarity of the created imagery (on an 11-point scale ranging from 0 = *no imagery at all* to 10 = *object was clear and vivid, nearly as in normal vision*) directly after the application of the CF versus CC intervention.

Strategy of Data Analysis

We used SPSS version 22.0 for all data analyses. First, we checked for baseline differences in any of the variables of interest between the CF and CC group. The effect of the emotion induction was tested by comparing the baseline skin conductance levels to those during the emotion induction in the total sample (manipulation check). To test the differential effect of the intervention on positive self-relating (i.e., self-compassion, self-reassurance) and

happiness as well as on negative self-relating (i.e. self-criticism) and negative affect, we used repeated measures MANOVAs to calculate group (CF versus CC) × time (pre-post intervention) effects. The use of MANOVA was justified by the fact that all of the dependent variables were at least weakly inter-correlated ($r \geq 0.30$). We used repeated measures ANOVAs to test the differential impact of the interventions on skin conductance levels and on paranoia. To summarize the intervention effects, we additionally calculated pre-test–post-test-control effect sizes for all variables of interest, including 95% confidence intervals (see Lipsey & Wilson, 2001). These effects are based on mean gain scores, pre and post standard deviations and pre-post correlations. To analyse acceptability of the intervention *t* and X^2-tests were applied to compare perceived subjective benefit ratings and the distribution of positive versus negative/neutral comments of patients on the CF versus CC condition.

RESULTS

Baseline Differences and Manipulation Check

As can be seen in Table 1, there were no significant baseline differences in sociodemographic variables, arousal or affective valence between the CF and CC conditions ($p \geq 0.05$).

As expected, there was a significant effect of the emotion induction [F (1, 45) = 18.61, $p < 0.001$, $\eta^2_{partial} = 0.293$] indicating overall increases in skin conductance. After the emotion induction there were no significant differences between the conditions in any of the variables of interest except for self-criticism (see Table 1).

Hypothesis I: Effect of Intervention on Positive Self-Relating and Happiness

The omnibus test for the intervention effect on positive self-relating and happiness indicated a significant multivariate group × time interaction effect [F (3, 47) = 3.76, $p = 0.017$, $\eta^2_{partial} = 0.193$]. For self-reassurance, univariate post-hoc tests indicated a significant time × group interaction effect [F (1, 49) = 4.25, $p = 0.045$, $\eta^2_{partial} = 0.080$]. For self-compassion there was no significant group × time interaction [F (1, 49) = 2.25, $p = 0.140$, $\eta^2_{partial} = 0.044$]. For happiness, the group × time interaction effect was also significant [F (1, 49) = 10.26, $p = 0.002$, $\eta^2_{partial} = 0.173$]. In sum, the results show greater increases in self-reassurance and happiness in CF relative to CC, but no differential intervention effect on self-compassion.

Hypothesis II: Intervention Effect on Negative Self-Relating and Negative Affect

The omnibus test for the intervention effect on self-criticism and negative affect revealed a significant effect for time [F (2, 48) = 27.39, $p < 0.001$, $\eta^2_{partial} = 0.533$] but no group × time interaction [F (2, 48) = 0.30, $p = 0.742$,

Table 1. Mean scores of main study variables at different assessment points in the compassion-focused versus control imagery experimental condition

	A-1 (Baseline)		A-2 (Emotion Induction)		A-3 (Intervention)	
	CF	NC	CF	NC	CF	NC
Sample characteristics						
Age	40.2 (12.9)	36.2 (10.1)	—	—	—	—
Sex (male/female)	17/9	19/6	—	—	—	—
Years of education (school)	11.3 (1.4)	11.3 (1.5)	—	—	—	—
No. of psychotic episodes	5.5 (5.0)	4.6 (3.0)	—	—	—	—
Control variables						
Arousal[a]	4.58 (2.04)	3.96 (1.95)	—	—	3.23 (1.75)	3.20 (1.83)
Affective valence[a]	4.35 (1.88)	4.12 (1.54)	—	—	2.92 (1.79)	3.28 (1.77)
Imagery quality[b]	—	—	—	—	8.31 (1.85)	7.52 (2.42)
Outcomes						
Self-reassurance[b]	—	—	4.50 (2.43)	5.68 (2.59)	5.59 (2.38)	5.82 (2.75)
Self-compassion[b]	—	—	6.00 (2.03)	6.19 (2.35)	6.51 (2.20)	6.09 (2.15)
Happiness[b]	—	—	2.38 (2.39)	2.56 (3.04)	5.42 (3.01)*	3.40 (2.63)
Self-criticism[b]	—	—	4.88 (2.34)*	3.34 (2.25)	4.34 (2.54)	3.09 (2.52)
Negative affect[b]	—	—	3.89 (2.25)	3.90 (2.63)	2.13 (2.27)	1.85 (1.74)
Scl[1]	0.39 (0.25)	0.41 (0.29)	0.49 (0.25)	0.60 (0.22)	0.49 (0.28)	0.58 (0.23)
Paranoia[b]	—	—	4.26 (2.33)	3.35 (2.04)	4.00 (2.70)	2.90 (2.20)

Note: * $p < 0.05$, two-tailed t-test, denoting significant group differences at the according assessment point. [a] 9-point Likert scale ranging from 1 (= *extremely pleasant*) to 9 (= *extremely unpleasant*) for affective valence and 1 (= *extremely calm*) to 9 (= *extremely aroused*) for arousal, [b] 11-point Likert scale ranging from 0 (= *not applicable*) to 10 (= *completely applicable*), [1] skin conductance levels; range corrected values (see methods section for details).

$\eta^2_{partial} = 0.012$]. Exploratory analyses with post-hoc univariate ANOVAs showed a significant time effect for negative affect [F (1, 49) = 49.12, $p < 0.001$, $\eta^2_{partial} = 0.501$]. The results indicate decreases in negative affect over time independent of group allocation (see Table 1).

Hypothesis III: Effect of Intervention on Skin Conductance Levels

For skin conductance levels, there was no group × time effect [F (1, 45) = 0.106, $p = 0.746$, $\eta^2_{partial} = .002$]. Thus, the intervention had no specific effect on sympathetic arousal.

Hypothesis IV: Effect of Intervention on Paranoia

There was no group × time effect [F (1, 49) = 0.40, $p = 0.532$, $\eta^2_{partial} = 0.008$]. However, further inspection revealed that there was a significant main effect for time [F (1, 49) = 6.12, $p = 0.017$, $\eta^2_{partial} = 0.111$]. Thus, there were overall decreases in paranoid ideation independent of group allocation (see Table 1).

Summary of Intervention Effects

For an overview of the intervention effects see Figure 2. In sum, pre-post control effect sizes were only significant for happiness (medium to large effect) and self-reassurance (small to medium effect). None of the other effects were significant (i.e., skin conductance [scl], self-criticism, negative affect, paranoid ideation, self-compassion).

Subjective Benefit and Appraisal of the Intervention

There was a non-significant trend towards individuals in the CF group ($M = 8.5$; $SD = 2.1$) reporting higher perceived benefit from the intervention than individuals in the CC group ($M = 7.4$; $SD = 2.5$), [t (49) = 1.74, $p = 0.087$, $d = 0.49$]. Concerning verbal reactions to the intervention, results of the omnibus test indicated significant differences between the groups [X^2 (3, 51) = 10.88, $p = 0.012$]. Post-hoc analyses revealed significantly more positive [X^2 (1, 51) = 7.32, $p < 0.01$] comments on CF (see Figure 3). There were significantly more negative reactions in CC relative to CF [X^2 (1, 51) = 5.03, $p = 0.025$]. There was no significant difference concerning neutral verbal reactions [X^2 (1, 51) = 0.07, $p = 0.789$]. One example of a positive reaction to the CF intervention is that a participant indicated that he felt '*openness, love and connectedness*'. An example for a negative reaction is that a participant felt the affiliation conveyed by the CF intervention reminded her of her boyfriend who was always kind to her and she felt '*ashamed*' about her own '*inadequacy*'.

Additional Analyses

The quality of imagery created during the intervention did not differ significantly between groups [t (49) = 1.31,

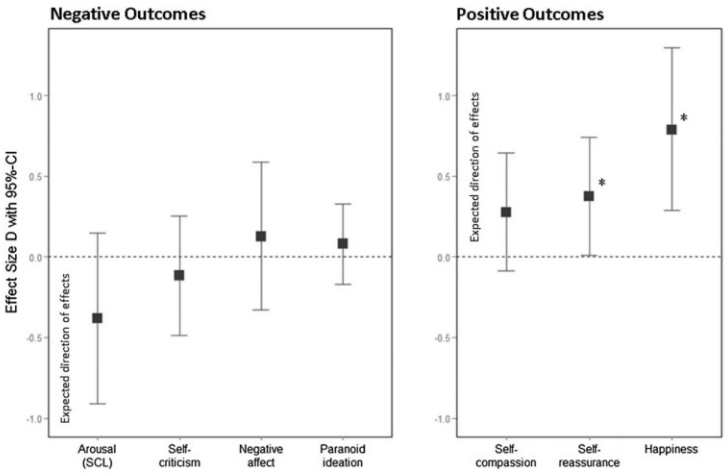

Figure 2. Pre-post controlled effects based on mean gain scores, pre and post SDs and pre-post correlations with 95% confidence intervals for 'negative outcomes' and 'positive outcomes'. **Note.** *$p < 0.05$

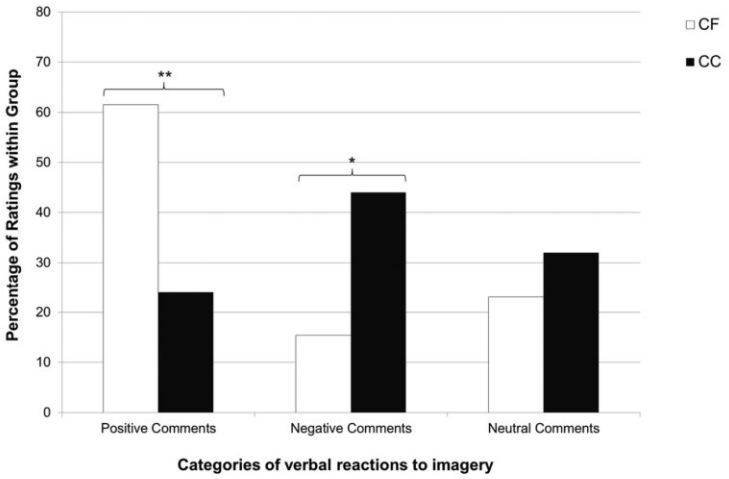

Figure 3. Valence of patient comments on the subjective perception of the compassion-focused versus control imagery. **Note.** $^{*}p < 0.05$, $^{**}p < 0.01$

$p = 0.196$], and the mean scores indicated medium to high quality (see Table 1).

DISCUSSION

In line with our first hypothesis, we found a significant overall effect of the CF imagery intervention on positive ways of self-relating and positive affect (i.e., self-reassurance and happiness). This is encouraging because it shows that previous research in healthy participants finding that even brief interventions promoting affiliation have an effect on positive self-relating and mood (e.g., Hutcherson, Seppala, & Gross, 2008) can be extended to people with psychotic symptoms. Nevertheless, future studies could benefit from distinguishing 'soothing' positive affect and positive affect in the sense of drive and excitement, and use according assessments (e.g., the Social Safeness and Pleasure Scale, Gilbert et al., 2009).

Second, there was no significant effect of the intervention on negative self-relating. A reason for this could be that self-criticism may be particularly resistant to change as it can be deeply rooted in an individuals' behavioural repertoire (see Gilbert & Procter, 2006). Consequently, changes in self-criticism are likely to take longer than was accounted for in our study and need more intense interventions. This assumption is further corroborated by the fact that our approach to reduce self-criticism was indirect (i.e., it was expected that self-soothing enhancement would reduce how convinced participants were about their self-critical thoughts). Probably self-criticism may have changed as a consequence of a more substantial (and persisting) change in self-soothing. Negative affect dropped substantially in both groups from pre-to-post, which made it difficult to discern specific effects of both the CF and the CC intervention from a simple time effect. Possibly, the control intervention was also effective in that it might have shifted attention away from unpleasant internal events (e.g., negative thoughts and feelings).

Similarly, we did not find a significant intervention effect on skin conductance levels. Possibly, this was because of lack of practice that resulted in participants needing considerable effort to create the imagery. This might have prevented relaxation. An assessment of heart rate variability (HRV) might have shed further light on the psychophysiological processes involved as it has been linked to the calming effects of social engagement (see Porges, 2011).

In contrast to our expectations and to the findings from a pilot study in a healthy sample (Lincoln et al., 2013), we found no significant effect of the CF intervention on paranoia. Achieving clinically meaningful decreases in paranoia as a result of a specific intervention might simply need more time and intensified training. Also, the number of psychotic episodes reported by our sample indicates a certain degree of chronicity of negative self-related thoughts and paranoia levels. This type of chronicity is also likely to have reduced the likelihood of achieving an immediate short-term change in negative self-criticism or paranoia levels. Furthermore, changes in paranoia might depend more on changes in negative self-relating than on changes in affiliation. This is corroborated by the fact that the few studies that disentangle positive and negative self-evaluations find that positive self-evaluations are less likely to be impaired in patient populations (Kesting &

Lincoln, 2013). Interestingly, however, paranoia levels dropped significantly over time in both groups, similar to the time effect for negative affect. Besides possible regression to the mean or social desirability, it is also possible that the calm-breathing baseline prior to both conditions, and the soft tone and warmth of voice matched in both imagery interventions could have contributed to a reduction in negative affect and paranoia in both conditions.

The pattern of results in our study are similar to the reported outcomes of a recent early intervention randomized controlled trial by Freeman and colleagues (2014). This study investigated the specific effects of a six-week CBT intervention aiming at the improvement of self-relating in a sample of patients with persistent paranoid delusions. As in the present study, the intervention had no significant effects on negative self-relating or paranoia levels whereas significant post-treatment effects were observed for positive beliefs about the self and well-being. However these effects were not persistent. One can speculate that when 'positive processes' are targeted, significantly longer interventions might be necessary to change paranoia, and it could be particularly important to improve negative self-relating. However, to identify the most powerful causal mechanisms, longitudinal designs that assess both positive and negative self-relating and affect and more complex statistical analyses (e.g., mediation, cross-lagged panel or similar) are necessary.

In our exploratory analyses, we found that working directly with emotions and affiliative imagery in participants with paranoid symptomatology was generally appraised positively. Nonetheless, we documented adverse reactions such as increases in shame. Previous studies indicate that attachment insecurity and self-criticism might interfere with achieving a positive mental and physiological state by means of compassionate imagery (e.g., Rockliff, Gilbert, McEwan, Lightman, & Glover, 2008). Consequently, we argue that future studies should also assess variables that might moderate the reaction to affiliative imagery, such as attachment insecurity levels. Therapeutic sensitivity to these factors might be essential to support such patients in 'paving the way' to compassion.

Our results on acceptance of the imagery should be interpreted in the light of the selection criteria: within the inpatient sample clinicians preselected and approached potential participants, which might have biassed the selection towards the less severely disturbed. Also, two patients with high levels of mistrust quit the study prematurely. Furthermore, as the exact recruitment procedure was not documented, we do not know how many and which patients declined or refused to take part in the study. Nevertheless, our results contradict the strongly held belief among many clinicians that experience-based imagery is contra-indicated in psychosis as we found no indication of deterioration (indicated by affective valence and arousal) through the experiment.

Some general limitations need consideration. First, although studies in north European countries suggest that case register schizophrenia diagnoses based on ICD-10 (World Health Organization, 1992) are valid (e.g., Uggerby, Østergaard, Røge, Correll, & Nielsen, 2013), we acknowledge the limitation of not having applied standardized diagnostic interviews for all participants which deters us from gaining a full and more reliable picture of their clinical profile. Second, for economic reasons we based our manipulation check of the negative emotion induction solely on an objective physical stress marker (skin conductance levels). A baseline assessment of subjective emotional distress would have been beneficial to get a full picture of the emotional changes that were achieved by the induction. Third, the block-wise randomization procedure was chosen to arrive at roughly equivalent sample sizes. We acknowledge that the downside of this way of proceeding is that as there is no replacement, the type of the next draw (CF versus CC) can be, to a certain extent, inferred by the experimenter for the final participants within each block. However, as the dependent variables were all self-report ones, this disadvantage is unlikely to have had a relevant impact on the findings. Fourth, the period between the pre and post assessments was brief. Future interventions should prolong the intervention, apply a longer delay between assessment intervals or vary the scaling (e.g., visual analogue scales). In addition, some constructs might be more robust (e.g., self-criticism) than others (e.g., affect) and intervention duration and intensity required for change may vary accordingly. Finally, one could argue that any positive imagery could have had a beneficial effect, especially on happiness, which was not controlled for by our control condition. Although it seems unlikely that positive imagery as such would have produced increases in self-reassurance, a stricter control condition could rule out this possibility with more certainty.

To sum up, the significant intervention effects on positive affect and self-relating as well as positive appraisal and trend-level effect for perceived subjective benefit promoted by the CF intervention speak for further pursuing the research on affiliative imagery for patients with psychosis. In doing so, the robustness of self-criticism, in particular, needs to be taken into account. Possibly, this could be achieved by psycho-educative inputs prior to the intervention and discussing problems that occur while generating the imagery combined with repeated exercise. Meanwhile, brief CF imagery could be used as a helpful add-on intervention that patients with paranoia could use to increase feelings of happiness and feel more reassured.

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7. Publications (until December 2016)

Ascone, L., Jaya, E. S., & Lincoln, T.M. (2016). The effect of unfavourable and favourable social comparisons on paranoid ideation: an experimental study. *Journal of Behavior Therapy and Experimental Psychiatry*. doi:10.1016/j.jbtep.2016.08.002.

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Publications Under Review

Ascone, L., Sundag, J., & Lincoln, T.M. (under review). Differential pathways from insecure attachment to paranoia: the mediating role of hyperactivating emotion regulation vs. blaming others.

Sundag, J., **Ascone, L.**, & Lincoln, T.M. (under review). Early maladaptive schemas predict paranoid symptom increases in response to a social stressor. A quasi-experimental study comparing patients with persecutory delusions and healthy participants.

Publications in Preparation

Ascone, L., Schlier, B. & Lincoln, T.M. (in preparation). The longitudinal association of facets of self-compassion and paranoia.

Schlier, B., **Ascone, L.**, & Lincoln, T.M. (in preparation). Loving kindness meditation ameliorates paranoia. An ambulatory assessment study of a self-guided intervention in a community sample.

Jaya, E.S., **Ascone, L.**, Lincoln, T.M. (in preparation). A longitudinal mediation analysis of the effect of dysfunctional self-related schema on psychotic symptoms via negative affect.

8. Conference Contributions and Symposia (Selection)

Ascone, L., Sundag, J., & Lincoln, T.M. (2014). Effektivität und Machbarkeit einer Mitgefühlsbasierten Imaginationsübung bei Patienten mit Paranoidem Wahn. Oral presentation at *32. Symposium der Fachgruppe Klinische Psychologie und Psychotherapie der DGPs*, Braunschweig, Germany.

Ascone, L., Sundag, J., Schlier, B., & Lincoln (2015). Feasibility and effects of a brief compassion-focused imagery intervention in psychotic patients with paranoid ideation: a randomized experimental study. Poster contribution at the *5th European Conference of Schizophrenia Research*, Berlin, Germany.

Ascone, L., Sundag, J., & Lincoln, T.M. (2016). Die anderen sind schuld! Der Zusammenhang zwischen unsicherer Bindung, Externalisieren negativer Ereignisse und Paranoia. Poster contribution at *34. Symposium der Fachgruppe Klinische Psychologie und Psychotherapie der DGPs*, Bielefeld, Germany.

Ascone, L. (2016). Ist Mitgefühl hilfreich für die klinische Praxis? Theoretische Grundlagen, Forschungsstand bei verschiedenen Psychopathologien und Ausblick. Oral presentation at *Migrationstagung Düren - Mitgefühl in der interkulturellen Begegnung*, Düren, Germany.