

Haustierbesitz und psychosoziale Faktoren bei Erwachsenen im Alter von 40 Jahren und darüber.

Dissertation

zur Erlangung des akademischen Grades einer

Doktorin der Medizin (Dr. med.)

an der

Medizinischen Fakultät der Universität Hamburg

vorgelegt von

Pauline Hansen

aus

Karlsruhe

2024

Betreuer:in / Gutachter:in der Dissertation: Prof. Dr. André Hajek

Gutachter:in der Dissertation: Prof. Dr. Albert Nienhaus

Vorsitz der Prüfungskommission: Prof. Dr. Albert Nienhaus

Mitglied der Prüfungskommission: PD Dr. Marion Eisele

Mitglied der Prüfungskommission: PD Dr. Christian Brettschneider

Datum der mündlichen Prüfung: 09.07.2026

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1. Darstellung der Publikation

Einführung und aktueller Forschungsstand

Die psychische Gesundheit der Bevölkerung nimmt einen immer größer werdenden Stellenwert in unserer Gesellschaft ein. Eine relevante psychische Erkrankung ist die Depression. Etwa 3,8 % der Bevölkerung leiden unter Depressionen, darunter 5 % der Erwachsenen sowie 5,7 % der Erwachsenen über 60 Jahre. Weltweit sind schätzungsweise 280 Millionen Menschen von Depressionen betroffen. Die Weltgesundheitsorganisation (WHO) hebt hervor, dass diese psychische Krankheit in engem Zusammenhang mit der körperlichen Gesundheit steht. Viele Faktoren, die Depressionen begünstigen, wie beispielsweise Bewegungsmangel, sind auch bekannte Risikofaktoren für körperliche Krankheiten wie Herz-Kreislauf-Erkrankungen, Krebs, Diabetes und Atemwegserkrankungen (WHO, 2023). Auch in anderen Lebensbereichen wie in der Gemeinschaft, am Arbeitsplatz oder zu Hause können durch psychische Erkrankungen Schwierigkeiten verursacht werden. Die Behandlung und Vorbeugung von psychischen Krankheiten ist somit von entscheidender Bedeutung. Die Mehrheit der Betroffenen erhält jedoch keine Behandlung, da es an Ressourcen und Gesundheitsdienstleistern mangelt und psychische Störungen sozial stigmatisiert werden. Insbesondere in Ländern mit niedrigem und mittlerem Einkommen liegt der Anteil an Erkrankten ohne medizinische Versorgung bei über 75% (Evans-Lacko et al., 2018).

Aus diesem Grund sind Faktoren von Interesse, welche die psychische Gesundheit außerhalb der fachlichen Betreuung sowohl positiv als auch negativ beeinflussen.

Beispielsweise empfiehlt die WHO neben psychologischer Betreuung und Medikation auch Selbstfürsorge, um depressive Symptome besser zu bewältigen. Darunter fallen unter anderem der Kontakt zu Freunden und Familie sowie das regelmäßige Betreiben von Sport, auch wenn es sich nur um einen kurzen Spaziergang handelt (WHO, 2023). Außerdem empfiehlt die WHO, sich vor Augen zu führen, dass man nicht alleine ist oder mit jemandem zu reden, dem man vertraut. Auch das Beitreten in Selbsthilfegruppen oder die Teilnahme an Sportgruppen wird empfohlen. Wiederkehrend scheint die Empfehlung zu sein, sich in Gemeinschaft aufzuhalten und häufiges Alleinsein zu vermeiden.

Neben anderen Menschen können auch Tiere für ein Gefühl der Gemeinschaft und für seelische Unterstützung sorgen. Eine interaktive Kommunikation ist mit Tieren zwar nicht

möglich, eventuell ist es jedoch einfacher, einem Lebewesen die eigenen Sorgen und Ängste anzuvertrauen, wenn dies auf keinerlei Bewertung oder direktes Feedback stößt. Der Einfluss von Haustieren auf die körperliche Gesundheit konnte schon in einigen Studien gezeigt werden. Shibata et al. stellte in einer Studie fest, dass Hunde die körperliche Aktivität ihres Besitzers/ihrer Besitzerin fördern und Xin et al. zeigte, dass Haustiere Ängste, Müdigkeit, Schlaflosigkeit und übermäßiges Schlafen lindern können (Shibata et al., 2012, Xin et al., 2021). Da Haustiere offenbar einen positiven Einfluss auf diverse Gesundheitsprobleme ausüben, kann man annehmen, dass der Besitz von Haustieren neben der körperlichen auch die psychische Gesundheit beeinflusst. Diese medizinische Doktorarbeit befasst sich mit den Zusammenhängen zwischen Haustierhaltung und psychosozialen Faktoren wie depressiven Symptomen, Einsamkeit, sozialer Isolation und Lebenszufriedenheit. Der bisherige Forschungsstand zu diesem Thema basiert größtenteils auf heterogenen Querschnittsdaten, welche anfällig für Verzerrungen sind. Frühere Studien werfen beispielsweise die Frage auf, ob Personen Haustiere adoptieren, als Reaktion auf psychosoziale Herausforderungen, oder ob die Haustierhaltung selbst diese Faktoren positiv beziehungsweise negativ beeinflusst. Um die Richtung dieser Beziehung besser zu verstehen, wurde in dieser medizinischen Doktorarbeit ein longitudinaler Ansatz mit bevölkerungsrepräsentativen Daten verwendet. Das Verständnis dieser Zusammenhänge ist von entscheidender Bedeutung, da nachteilige psychosoziale Faktoren das Risiko für psychische und physische Erkrankungen erhöhen können, während positive Faktoren die Langlebigkeit und ein erfolgreiches Altern fördern können (Hansen et al., 2024).

Methodik

Die Daten dieser medizinischen Doktorarbeit stammen aus dem Deutschen Alterssurvey (DEAS). Dabei handelt es sich um eine national repräsentative Stichprobe der erwachsenen deutschen Bevölkerung im mittleren und höheren Alter. Der Survey wird aus Mitteln des BMFSFJ (Bundesministeriums für Familie, Senioren, Frauen und Jugend) gefördert. Der DEAS befasst sich mit einem breiten Spektrum an Themengebieten. Dazu gehören Fragen zu Arbeit und Ruhestand sowie Fragen zu sozialen Beziehungen in Familie, Partnerschaft und Freundschaft. Außerdem wird die gesellschaftliche Partizipation beispielsweise in Form von freiwilligem Engagement und Ehrenamt erfragt. Die wirtschaftliche Lage unter Einbeziehung von Einkommen, Vermögen, Alterssicherung

und Altersarmut gehört zu den Inhalten des DEAS. Im deutschen Alterssurvey werden auch Fragen zu spezifischeren Themengebieten gestellt. Dazu gehören beispielsweise Altersbilder und Altersdiskriminierung, Unterstützung und Pflege durch Angehörige sowie Digitalisierung und Technik.

Ein weiteres Themengebiet, welches vom Deutschen Alterssurvey abgebildet wird, ist die körperliche und psychische Gesundheit der Befragten, wobei neben Fragen nach chronischen Erkrankungen und der Inanspruchnahme des Gesundheitssystems auch die subjektive und psychische Gesundheit eine wichtige Rolle spielt (FDZ-DZA, 2022).

Dieses große Spektrum an Themengebieten ermöglicht die Beantwortung verschiedener Fragestellungen unter Einbeziehung von unter anderem gerontologischen, soziologischen, psychologischen und gesundheitlichen, aber auch ökonomischen Aspekten.

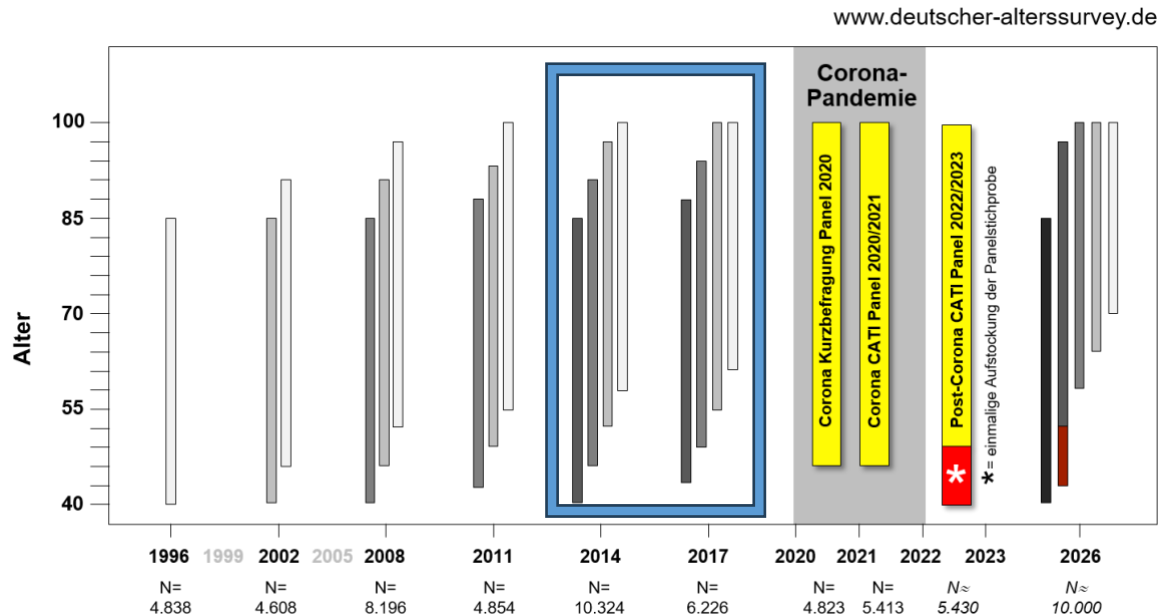
Beispielsweise können Fragen zu sozialer Ungleichheit oder sozialer Differenzierung erörtert werden. Außerdem ermöglicht dieser Survey die Gegenüberstellung individueller Entwicklungen, durch einen Beobachtungszeitraum von bis zu 24 Lebensjahren. (DZA, 2024a).

Bisher sind acht Wellen des DEAS vorhanden, beginnend im Jahr 1996 bis zur letzten Datenerhebung im Jahr 2023 (DZA, 2024b). Dabei wird grundsätzlich zwischen zwei verschiedenen Datenerhebungsmethoden unterschieden. Auf der einen Seite stehen Erhebungsjahre, in welchen Teilnehmer der vorherigen Wellen befragt wurden und zusätzlich eine neue Stichprobe von in Privathaushalten lebenden 40- bis 85-Jährigen gezogen wurde. Dazu gehören die Erhebungsjahre 1996, 2002, 2008 und 2014. Auf der anderen Seite stehen Erhebungsjahre, welche ausschließlich aus Wiederholungsstichproben bestanden. Dazu gehören die Erhebungsjahre 2011, 2017, 2020, 2021 und 2023. Zusammenfassend werden neue Basisstichproben alle sechs Jahre erhoben, während das DEAS-Panel seit 2008 alle drei Jahre erhoben wird. Es gab einige Abweichungen durch die Corona-Pandemie. Unter anderem wurde 2020 keine neue Basisstichprobe gezogen. Dies ist erst für die Befragung 2026 geplant ist.

In dieser medizinischen Doktorarbeit wurden die Erhebungswellen aus den Jahren 2014 und 2017 analysiert. Andere Wellen konnten nicht in die Datenerhebung einbezogen werden, da sie keine Daten bezüglich Haustierhaltung beinhalten. Zur Verdeutlichung der Zusammensetzung der Teilnehmer verschiedener Erhebungsjahre, insbesondere der in

dieser medizinischen Doktorarbeit relevanten Wellen aus den Jahren 2014 und 2017, ist eine Grafik aus dem Forschungsdatenzentrum des Deutschen Alterssurvey beigefügt.

Grafik 1. Stattgefundene und geplante Erhebungen des DEAS zwischen 1996 und 2026



Legende: Die Grafik zeigt die Zusammensetzung der jeweiligen Jahrgänge des Deutschen Alterssurveys. Durch den blauen Kasten hervorgehoben sind die Jahrgänge 2014 und 2017, welche für diese medizinische Doktorarbeit relevant sind.

Quelle: https://www.dza.de/fileadmin/dza/Dokumente/Deutscher_Alterssurvey/DEAS-Design_1996-2026.png

Vor der Teilnahme an der Datenerhebung gaben alle Personen ihre schriftliche Einwilligung. Eine ethische Genehmigung war für die DEAS-Studie nicht erforderlich, da die Kriterien für ein solches Votum nicht erfüllt wurden. Dies wurde vom wissenschaftlichen Beirat des Deutschen Alterssurveys vor jeder Welle bestätigt. Zur Erfassung psychosozialer Faktoren kamen validierte mehrstufige Skalen zum Einsatz. Diese Skalen wurden von DEAS aus Originalskalen umkodiert, nachzulesen in der Dokumentation der Variablen (FDZ-DZA, 2022). Im Allgemeinen wurden den Teilnehmern Aussagen vorgelegt und sie mussten einordnen, inwiefern sie sich mit diesen identifizieren können, also ob die Aussage für sie genau zutrifft, eher zutrifft, eher nicht zutrifft oder gar nicht zutrifft.

Einsamkeit wurde anhand einer gekürzten 6-Item-Skala von De Jong Gierveld (Gierveld und Tilburg, 2006) gemessen, welche ursprünglich aus 11 Elementen bestand (Gierveld

and Tilburg, 2006). Um ein Paar Beispiele zu nennen, wurden die Teilnehmer dazu befragt, ob sie Geborgenheit und Wärme vermissen oder ob sie eine wirklich enge Beziehung vermissen.

Soziale Isolation wurde anhand einer vier Items umfassenden abgewandelten Skala der ursprünglichen Bude und Lantermann Skala gemessen (Bude and Lantermann, 2006). Die Teilnehmer sollten dabei beispielsweise angeben, inwiefern es auf sie zutrifft, dass sie Angst hätten, den Anschluss zu verpassen oder sich gesellschaftlich überflüssig fühlen. Die Lebenszufriedenheit wurde mit einer abgewandelten Version der 1985 von Diener entwickelten Skala zur Lebenszufriedenheit (SWLS) gemessen. Die Skala umfasst fünf Items (Diener et al., 1985). Beispielsweise wurden die Teilnehmer befragt, ob sie zufrieden mit ihrem Leben seien oder ob sie etwas anders machen würden, wenn sie noch einmal leben würden.

Depressive Symptome wurden mit der 1977 von Radloff entwickelten Centre of Epidemiologic Studies Depression Scale (CES-D) gemessen. Diese Skala misst das Auftreten von depressiven Symptomen innerhalb der letzten Woche anhand von 15 Items, wobei zwei Items von DEAS umkodiert wurden (Radloff, 1977). Die Befragten mussten dabei einordnen, ob sie die Symptome selten (entspricht weniger als 1 Tag), manchmal (dies entspricht 1 bis 2 Tage), öfters (entspricht 3 bis 4 Tage) oder meistens (ab 5 Tage) empfunden haben. Zu den erfragten Symptomen gehörten unter anderem das Empfinden von Angst, die mangelnde Konzentrationsfähigkeit, das Gefühl von Traurigkeit und die schlechte Qualität des Schlafs (FDZ-DZA, 2022).

Die unabhängige Variable Haustierbesitz setzte sich zusammen aus den gemessenen Sprüngen in der Haustierhaltung. Dabei wurde sowohl der Erwerb als auch der Verlust eines Tieres zwischen den Erhebungsjahren 2014 und 2017 in die Berechnungen miteinbezogen. Im Deutschen Alterssurvey wurden die Teilnehmer gefragt, ob sie Haustiere hätten und falls dies der Fall war, wurde weiter differenziert zwischen dem Besitz von Hunden, Katzen und anderen Tieren. Die Anzahl der Tiere (ob es sich beispielsweise um einen oder mehrere Hunde handelte) spielte dabei keine Rolle. Eine detailliertere Darstellung der verschiedenen Befragungsinstrumente ist in der Variablendokumentation des Deutschen Alterssurveys nachzulesen (FDZ-DZA, 2022).

Für die Analyse wurden lineare Fixed Effects (FE) Regressionen verwendet. Diese Regressionen nutzen ausschließlich zeitlich variierende Größen als unabhängige Variablen

und es werden Veränderungen im Laufe der Zeit untersucht. Zeitkonstante Faktoren hingegen können zur Stratifizierung verwendet werden. Die Problematik unbeobachteter Heterogenität wird durch Verwendung von FE-Regressionen bedeutend abgemildert (Brüderl and Ludwig, 2015).

Unsere Analyse beinhaltet FE-Regressionen für eine Änderung im Haustierbesitz (beinhaltet Hunde, Katzen und/oder andere Haustiere), eine Änderung im Hundebesitz und eine Änderung im Besitz von Katzen als unabhängige Variable. Dabei wurden Sprünge von keinem Besitz in der ersten Befragung zu Besitz in der zweiten Befragung und andersherum in die Analysen einbezogen.

Bei der Sensitivitätsanalyse wurde der Katzen- und Hundebesitz nach Geschlecht und Altersgruppe stratifiziert. Für die Stratifizierung nach Alter wurde der Datensatz in Personen unter 65 Jahren und Personen über 65 Jahren unterteilt.

Als abhängige Variablen für alle Analysen dienten die psychosozialen Variablen: depressive Symptome, Einsamkeit, Lebenszufriedenheit und soziale Isolation.

Es wurden mehrere zeitlich variierende Kovariaten in unseren Regressionsanalysen berücksichtigt. Dazu gehören Alter, Familienstand, Haushaltseinkommen und Erwerbsstatus. Hinzukommend haben wir lebensstilbezogene Kovariaten wie Raucherstatus, Alkoholkonsum, das Ausmaß an körperlicher Aktivität sowie die Anzahl chronischer Erkrankungen berücksichtigt.

Ergebnisse

Die Ergebnisse der Regressionen dieser Studie zeigen (überwiegend) keinen signifikanten longitudinalen Zusammenhang zwischen Haustierhaltung im Allgemeinen und den untersuchten psychosozialen Faktoren. Bei bestimmten Untergruppen wurden jedoch psychosoziale Assoziationen im Zeitverlauf festgestellt, welche anders als erwartet, den Tierbesitz mit negativem psychosozialem Befinden assoziiert. Beispielsweise wird der Besitz von Katzen mit einem höheren Einsamkeitsniveau in der Gesamtstichprobe und bei Männern assoziiert, während er ausschließlich bei Männern auch mit höherer sozialer Isolation verbunden war. Bei Frauen wurde der Hundebesitz mit einer geringeren Lebenszufriedenheit in Verbindung gebracht.

Diese longitudinale Studie erweitert das Wissen über die Zusammenhänge zwischen Haustierhaltung und psychosozialen Faktoren, die bisher hauptsächlich auf Querschnittsstudien basierten. Die Ergebnisse zeigen, dass der Einfluss der

Haustierhaltung auf psychosoziale Variablen weniger ausgeprägt ist als zunächst angenommen, und dass die Richtung der Assoziation den erwarteten Ergebnissen entgegensteht (Hansen et al., 2024).

Diskussion und zukünftige Forschung

Um diese unerwarteten Ergebnisse der Regressionsanalysen besser verstehen zu können, ist es von entscheidender Bedeutung einflussnehmende Faktoren und mögliche Erklärungsmodelle für die Beziehung zwischen Haustierbesitz und psychosozialer Gesundheit zu erörtern:

In den bisherigen Studien, diese mit einbezogen, wurde nur die Beeinflussung der psychosozialen Faktoren durch das Vorhandensein von Haustieren untersucht. Gerade in unserer Studie zeigte sich, dass verallgemeinernde Aussagen oft schwierig zu treffen sind und kein statistisch signifikantes Niveau erreichen. Auf der anderen Seite konnten in Subgruppen statistisch signifikante Zusammenhänge festgestellt werden. Das zeigt, dass die Auswirkungen von Haustierbesitz auf die psychische Gesundheit weitaus vielschichtiger sind und nicht mit einer Ja- oder Nein-Frage nach dem Besitz zu beantworten ist. Beispielsweise scheinen sowohl das Geschlecht des Besitzers/der Besitzerin als auch die Art des Haustieres einen entscheidenden Einfluss auf die untersuchten Variablen zu haben. Tsapova zeigt in einer Studie, dass eine höhere Bindung zum Haustier mit geringerer Depressivität bei den Besitzern korreliert ($p=0,03$). Darüber hinaus könnte das Geschlecht des Besitzers und der Wert, der dem Haustier beigemessen wird, die Beziehung beeinflussen. Ebendiese Studie konnte zeigen, dass Frauen ihren Hunden tendenziell einen größeren Wert beimessen, was zu einer signifikant niedrigeren Depressionsrate bei Hundebesitzerinnen im Vergleich zu Frauen ohne Hund führte. Im Gegensatz dazu profitierte die Gesamtbevölkerung dieser Studie, einschließlich der Männer, nicht von der Hundehaltung hinsichtlich depressiver Symptome (Tsapova, 2017). Daraus lässt sich ableiten, dass die Haustierhaltung tatsächlich depressive Symptome verringern kann, wenn eine intensive Bindung zwischen Tier und Besitzer besteht, die durch eine hohe Wertschätzung des Haustiers gekennzeichnet ist.

Eine weitere mögliche Erklärung für einen fehlenden oder sogar unvorteilhaften Zusammenhang zwischen Haustierbesitz und psychosozialer Gesundheit könnte in der zusätzlichen Verantwortung und dem erhöhten Zeitaufwand liegen. Insbesondere Menschen mit einem stressigen Lebensstil, die nicht unter Einsamkeit leiden, könnten

Haustiere als eine ressourcenintensive Verpflichtung wahrnehmen. Die zusätzliche Verantwortung und der erhöhte Zeitaufwand für ein Haustier resultierten somit in einer mentalen und körperlichen Belastung. Zum Beispiel könnten Eltern einen Hund anschaffen, um ihre Kinder glücklich zu machen, obwohl sie selbst keine Vorliebe für Tiere haben. Dies führt dazu, dass die Eltern mit der Verantwortung für die Pflege des Haustiers belastet sind, ohne die Vorteile des Haustierbesitzes genießen zu können.

Um die Beziehung zu dem Haustier besser quantifizieren zu können, wären Variablen wie das emotionale Bindungsniveau zu dem Haustier sowie die Interaktionsfrequenz mit diesem von Interesse. Diese könnten in zukünftigen Studien erfasst werden und somit einen umfassenderen Einblick in Zusammenhänge zwischen Haustierbesitz und psychosozialen Faktoren ermöglichen.

Die Qualität der Beziehung zum Haustier scheint den Zusammenhang zwischen Haustierbesitz und psychosozialer Gesundheit wesentlich zu beeinflussen. Es existieren weitere bedeutende Einflussfaktoren, beispielsweise die Art des Haustieres. In dieser medizinischen Doktorarbeit beeinflusste die Art des Haustieres die Ergebnisse der Regressionsanalysen signifikant. Während die Wahl des Haustieres oft von persönlichen Präferenzen und Lebensumständen abhängt, zieht diese Entscheidung zahlreiche Konsequenzen mit sich. Um die Ergebnisse der Studie besser zu verstehen, bietet es sich an, sich auf die häufigsten und am besten erforschten Haustiere zu konzentrieren: Hunde und Katzen.

Die Bindung zwischen einem Hund und seinem Besitzer wird häufig als die Intensivste unter allen Haustieren betrachtet. Dies könnte Hunde zu einer geeigneten Wahl für einsame Menschen machen, die nach sozialer Interaktion suchen. Neben diesem subjektiven Aspekt der Hundehaltung gibt es auch einen objektiveren Unterschied. Hunde gelten generell als zeitaufwändiger im Vergleich zu Katzen. Dies liegt darin begründet, dass viele Hundebesitzer mehrfach am Tag mit ihrem Vierbeiner spazieren gehen, diesen erziehen und die Zeit, in welcher der Hund alleine zu Hause bleibt, meist begrenzt ist. Katzen sind vergleichsweise autark, beispielsweise durch die Nutzung einer Katzenklappe. Außerdem können auch sie in der Regel längere Zeit alleine bleiben.

Daraus lässt sich ableiten, dass für Menschen mit wenig freier Zeit, beispielsweise aufgrund voller Berufstätigkeit, ein Hund als zusätzliche Belastung wahrgenommen werden könnte.

Gleichzeitig konnten einige Studien zeigen, dass Hunde die körperliche Gesundheit ihrer Halter steigern. So fand frühere Forschung heraus, dass das Spaziergehen mit Hunden einen positiven Einfluss auf die allgemeine körperliche Aktivität hat, und dass Haustierbesitzer, insbesondere Hundebesitzer, in höherem Maße milden und moderaten Sport betreiben im Vergleich zu Menschen ohne Haustiere (Shibata et al., 2012, Friedmann et al., 2023). Friedmann et al. berichteten, dass die Haustierhaltung longitudinal mit positiven körperlichen Ergebnissen wie kardiovaskulärer Fitness, höherer Körperkraft und insgesamt besserer körperlicher Leistungsfähigkeit assoziiert war, verglichen mit Personen, die kein Haustier hatten (Friedmann et al., 2023).

Diese Unterschiede verdeutlichen, dass die Wahl des Haustiers nicht nur individuelle Vorlieben widerspiegelt, sondern auch unterschiedliche physische und psychosoziale Effekte mit sich bringen kann. Ein tieferes Verständnis dieser Dynamiken ist entscheidend, um die potenziellen Vorteile von Haustierhaltung gezielt zu nutzen.

Die medizinische Doktorarbeit zeigt, wie durch sorgfältige Methodenauswahl wertvolle Erkenntnisse gewonnen werden können.

Eine hervorzuhebende Stärke dieser medizinischen Doktorarbeit ist, dass es sich um eine Studie mit longitudinalem Studiendesign handelt. Außerdem wären die bevölkerungsrepräsentative Stichprobe sowie die Nutzung von FE-Regressionen hervorzuheben, neben den weiteren Stärken, welche in der Arbeit erläutert sind (Hansen et al., 2024).

Limitierend sind unter anderem diejenigen Faktoren, welche auch als weiterführende wissenschaftliche Fragestellungen von großer Bedeutung sind. In der medizinischen Doktorarbeit wurde das Vorhandensein von Haustieren mit einer Ja- oder Nein-Frage abgefragt. Wichtige Einflussfaktoren, wie die Bindung zu dem Haustier oder Gründe für die Anschaffung wurden hingegen nicht abgefragt. Außerdem ist es schwierig, aus den Ergebnissen eine Richtung der Kausalität abzuleiten. Da der Zusammenhang zwischen Haustierhaltung und psychosozialer Gesundheit sehr komplex ist, könnte man die Hypothese aufstellen, dass ungünstige psychosoziale Ergebnisse eine Folge der Heimtierhaltung sind. Gleichzeitig kann man die Hypothese aufstellen, dass die Anschaffung eines Haustiers eine Reaktion auf eine ungünstige psychosoziale Gesundheit ist. Die Korrelation zwischen Katzenbesitz und sozialer Isolation könnte zum Beispiel darauf zurückzuführen sein, dass Katzen zu einer stärkeren sozialen Isolation führen. Die

Korrelation kann jedoch auch darauf zurückzuführen sein, dass sich Personen eine Katze anschaffen, um eine aufkommende soziale Isolation abzufedern. Außerdem ist zu beachten, dass die R^2 -Werte eher niedrig waren.

Zusammenfassend lässt sich sagen, dass eine Verallgemeinerung des Zusammenhangs zwischen Haustierhaltung und Depression schwierig ist, da viele mögliche Einflussfaktoren berücksichtigt werden müssen. Diese Komplexität erklärt die heterogenen Ergebnisse, die in bisherigen Studien gefunden wurden.

Diese Studie bringt einen deutlichen Mehrwert zum bisherigen Forschungsstand des Themengebiets, unter anderem durch das longitudinale Studiendesign und die bevölkerungsrepräsentative Studienpopulation. Trotzdem ist die Forschung zu diesem Thema noch unzureichend.

Zukünftige Studien sollten experimentelle Ansätze verfolgen, die das emotionale Bindungsniveau zu dem Haustier sowie die Interaktionsfrequenz miteinbeziehen. Außerdem sollten die Motive für die Anschaffung eines Haustieres miterfasst werden, da dies wertvolle Einblicke in die Gründe für bestimmte Assoziationen bieten könnte. Für Kliniker könnte es interessant sein, die Charakteristika von Patienten zu untersuchen, um diejenigen zu identifizieren, die von der Anschaffung eines Tieres profitieren würden, und festzustellen, welcher Haustiertyp am besten zu ihrem Lebensstil passt. In diesem Kontext wären Studien mit bestimmten Populationsgruppen wie Kindern oder Menschen, welche in Pflegeeinrichtungen wohnhaft sind, interessant. Eventuell profitieren diese von Haustieren, im Vergleich zur Durchschnittsbevölkerung, da belastende Aspekte wie etwa die Finanzierung wegfallen.

Für zukünftige Forschungen sind deutlich mehr Studien mit longitudinalem Design erforderlich, um unsere Ergebnisse mit diesen Studien vergleichen zu können.

Article

Pet Ownership and Psychosocial Factors in Adults Aged 40 Years and Over: Results of a Large Nationally Representative Longitudinal Survey

Pauline Rebecca Hansen *, Hans-Helmut König  and André Hajek 

Department of Health Economics and Health Services Research, University Medical Center Hamburg-Eppendorf, Hamburg Center for Health Economics, Martinistraße 52, 20246 Hamburg, Germany

* Correspondence: paulinerhansen@web.de

Abstract: Thus far, few cross-sectional studies have investigated the association between pet ownership and psychosocial factors. As longitudinal studies on this topic are mostly lacking, this study aimed to analyze the association between pet ownership and psychosocial factors (in terms of depressive symptoms, loneliness, social isolation, and life satisfaction) using a longitudinal approach. The data used were taken from the German Ageing Survey (DEAS), a nationally representative sample of community-dwelling middle-aged and older adults ($n = 12,438$ observations). Two waves were used (year 2014 and year 2017). Validated multi-item scales were used to measure psychosocial factors. Linear fixed effects (FE) regressions were performed. In summary, only a few significant longitudinal associations were detected in regression analyses. No associations between general pet ownership and psychosocial factors were found. However, cat ownership was significantly longitudinally associated with increases in loneliness levels among the total sample and men. Cat ownership was also significantly longitudinally associated with increases in social isolation levels among men. Among women, dog ownership was significantly longitudinally associated with decreases in life satisfaction. This study reveals some associations between pet ownership and unfavorable psychosocial factors longitudinally. These associations were only significant for subgroups (cat vs. dog ownership and females vs. males).



Citation: Hansen, P.R.; König, H.-H.; Hajek, A. Pet Ownership and Psychosocial Factors in Adults Aged 40 Years and Over: Results of a Large Nationally Representative Longitudinal Survey. *Societies* **2024**, *14*, 132. <https://doi.org/10.3390/soc14080132>

Academic Editor: Lisa Jean Moore

Received: 4 April 2024

Revised: 7 June 2024

Accepted: 15 July 2024

Published: 23 July 2024



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Keywords: pet ownership; dog ownership; cat ownership; depressive symptoms; loneliness; social isolation; life satisfaction

1. Introduction

The ownership of animals started thousands of years ago and it has evolved immensely through time. For instance, the relationship between an owner and an animal completely changed considering the use of the animal. In former times, animals used to be a source of food, labor, force, or a way of transportation. Nowadays, this traditional use of animals has become more minor, especially in developed countries [1].

The word ownership implies having full responsibility for and rights over something or someone. Nowadays, this indicates that someone is responsible for the survival and well-being of the pet; commonly, this manifests without attaining the previously named ‘benefits’ from this possession. Ownership includes time-consuming caregiving tasks and the financial burden as well as a potential health hazard associated with transmitted diseases or allergic reactions [2,3]. The companion animal multisectoral interprofessional and interdisciplinary strategic think tank on zoonoses (CALLISTO) states that the responsible treatment of pets should be based on the fact that animals have intrinsic value and they are sentient beings dependent on humans to stay healthy and well. Therefore, the duty of responsible pet ownership includes not only the minimization of risks to other animals, humans, and the environment but also the provision of appropriate care for the animal [4].

Nonetheless, a nationally representative study found that almost half of German households (47%) have at least one pet. Cats are the number one pet, being present in 26% of German households, whereas 21% of German households include a dog [5].

It appears to be plausible that pet ownership is more than a potential burden of responsibility. Instead, living with a pet has many benefits. Pet ownership is a way of expressing one's personality by having exotic animals to show peculiarity or providing a home to poisonous snakes to show bravery and independence [1]. However, according to Scoresby et al., for most people, the benefit of being a pet owner lies in the relationship with the animal, as it is not only a companion but a family member and thus an essential part of everyday life for many [6]. Accordingly, the word ownership in this context no longer implies power and control over the other living beings; rather, it refers to a peaceful coexistence from which both sides benefit.

Multiple studies have shown that pets increase the physical health of their caregivers. For example, prior research found that dog walking has a positive influence on overall physical activity levels [7] and that mild and moderate exercise was higher in pet owners, especially dog owners, compared to individuals living without pets [8]. Friedmann et al. found that pet ownership was longitudinally associated with favorable physical outcomes such as cardiorespiratory fitness, lower body strength, and overall physical performance when compared to individuals not living with a pet [9].

Besides positive effects on physical health, multiple studies focused on the psychosocial benefits attained by pet ownership. Various studies investigated the effect pet ownership has on *depressive symptoms* within the caregiver. Although not statistically significant, Samar Kishor Chakma et al. found pet owners to be 41% less likely to be depressed compared to non-pet owners [10]. This contrasts with several cross-sectional studies as Mueller et al., Parslow et al., and Enmarker et al. found an association between pet ownership and more severe depressive symptoms [11–13].

Nevertheless, other studies found no significant association between pet ownership and depressive symptoms [8,14,15]. Another study found quite varying results depending on whether the pet was a dog or a cat. It found that cat ownership was significantly associated with higher depression scores compared to non-ownership even though dog ownership was not significantly associated with changes in the depression score [13]. All the previously mentioned studies investigating the association between pet ownership and depression had a cross-sectional study design. This makes it difficult to assess whether pet ownership was accountable for a change in the depression rate within the analyzed population or if depression led to the adoption of a pet animal or the decision not to adopt a pet. There are only a few longitudinal studies concerning this association. These found no difference between pet ownership and non-ownership regarding depression.

Loneliness is another important psychosocial factor that might be influenced by pet ownership. Pikhartova et al. found in a cross-sectional study that female pet owners were significantly more likely to report loneliness at the time of data collection compared to female non-owners [16]. Longitudinally, reported loneliness throughout all waves as well as moving out of loneliness in between waves was positively associated with pet ownership in the last wave compared to when no loneliness was reported. The study used the short form of the Revised University of California, Los Angeles (UCLA), loneliness scale to assess loneliness. However, it is to be noted that the results of Pikhartova et al. were only significant for women [16]. Pikhartova et al. state that pet ownership may be a response to loneliness or serve as a protection for those who already recovered from loneliness [16].

Social isolation is a psychosocial variable closely linked to loneliness. However, social isolation does not necessarily lead to feelings of loneliness and loneliness may occur within people who are not socially isolated. Therefore, these variables must be taken into account separately.

Taniguchi et al. found in a cross-sectional study that current and past pet ownership was significantly associated with less social isolation [17]. These associations were observed for cat ownership as well as dog ownership.

However, there is literature indicating that the level of social isolation differs depending on the type of pet someone owns. Hajek and König found in a cross-sectional study of wave five of the DEAS study that dog owners without a partner were less socially isolated compared to individuals not living with a dog (and without a partner). However, there was no significant difference found in cat owners without a partner compared to non-owners without a partner [18]. They restricted their calculations to the subgroup of individuals aged 65 years and above who live without a partner. Yet, thus far, there is a complete lack of longitudinal studies examining the association between pet ownership and social isolation.

Life satisfaction is a psychosocial factor of increasingly acknowledged importance. According to a recent cross-sectional study, overall life satisfaction is higher in pet owners compared to non-owners. To be precise, Kim and Chun found that cat and dog ownership were positively associated with higher life satisfaction (with no significant difference between dog versus cat ownership). The study included 42,687 Seoul-based Koreans aged 15 years and older, using questions derived from the Personal Wellbeing Index-Adult (PWI-A) [19]. However, having both cats and dogs was associated with higher levels of life satisfaction compared to having either cats or dogs. Moreover, having only one cat or one dog was associated with more life satisfaction compared to having either multiple cats or multiple dogs [19].

In summary, the results of the few studies investigating the association between pet ownership and psychosocial factors are very heterogeneous. Moreover, previous research was mainly restricted by using cross-sectional data—which are prone to bias. However, the cross-sectional study design raises the question of whether individuals adopt a pet in order to cope with psychosocial challenges such as loneliness or increased depressive symptoms or if the adoption of a pet has a main effect on psychosocial factors [20]. Thus, it is difficult to clarify the directionality by using cross-sectional data.

In light of the restricted knowledge (particularly studies based on longitudinal data), our aim was to analyze the association between pet ownership and psychosocial factors using a longitudinal approach and based on representative data. Regarding psychosocial factors, we refer to depressive symptoms, loneliness, perceived social isolation, and life satisfaction. This topic is of great importance since adverse psychosocial factors can increase the risk of mental and somatic disorders [21]. Additionally, beneficial psychosocial factors can contribute to longevity and successful aging [22].

Pet ownership may contribute positively to the psychosocial health of the caregiver as the attachment theory suggests intense relationships lead to emotional benefits and therefore positively affect psychosocial factors. Even though the attachment theory by John Bowlby originally refers to the relationship a child experiences with their mother, the theory can also be applied to the relationships between individuals in later life and their pets.

Beck and Madresh found that the relationship structure with pets is similar to the one with humans. Moreover, the same study found that a higher sense of security was experienced in the human–pet relationship compared to the relationship with the pet-owner’s romantic partner [23]. This could be explained by the type of relationship a pet offers to its caregiver. The relationship is shaped by being uncomplicated and rewarding, which can lead to a consistent and relatively controllable sense of security. A secure relationship may buffer challenging life situations like a complex relationship with a partner or difficulties at work. The relationship could be especially significant for the elderly as a pet may help overcome spousal loss [24] and adapt to health deteriorations such as incident frailty [17].

In summary, in accordance with the attachment theory, this study hypothesizes that the acquisition of a pet is associated with beneficial psychosocial factors (i.e., decreases in depressive symptoms, lower loneliness levels, lower perceived social isolation levels, and higher life satisfaction).

2. Materials and Methods

2.1. Sample

The data used for this study come from the cross-sectional and longitudinal German Ageing Survey (“Deutscher Alterssurvey”, DEAS), funded by the Federal Ministry for Family Affairs, Senior Citizens, Women, and Youth. The studied population consists of community-dwelling individuals living in Germany, aged 40 years and over. This nationwide representative survey covers a broad thematic spectrum including health and psychosocial variables as well as living conditions. The data are collected through a computer-assisted-personal-interview (CAPI) as well as a written questionnaire, completed by each participant. So far, there are seven waves available, starting in 1996 up to the most recent data collection in 2020/2021. Further details regarding the DEAS study are provided by Klaus et al. [25].

For this current study, longitudinal data from waves five and six (year 2014 and year 2017) were included. Prior waves and wave seven were excluded due to the absence of data concerning pet ownership. Wave five includes participants of previous waves ($n = 4322$) with a response rate of 61% as well as a new base sample ($n = 6001$) with a response rate of 25%. In total, wave five includes 10,323 participants. In contrast, wave six only includes participants of previous waves, leading to $n = 6626$ participants with a response rate of 63%.

For this study, only participants who provided data on the needed variables (i.e., pet ownership, depressive symptoms, social isolation, loneliness, and life satisfaction) over time were included, which resulted in $n = 12,438$ observations (which equaled 8205 individuals) in the analytical sample. Please see the Section 2.1.4 for further details.

Prior to participation in the survey, all individuals gave written informed consent. No ethical approval was required for the DEAS study, as the criteria for such a vote were not fulfilled (e.g., physical examination of individuals, risk of discomfort to participants, etc.) This was confirmed by the scientific advisory board of the German Ageing Survey prior to each wave.

2.1.1. Dependent Variables

The scales described in the following were recoded by DEAS from the original scales, as described in the Documentation of Variables [26]. All modifications and recoding to the validated scales were taken over unedited from DEAS for use in this study.

Loneliness was measured using the shortened 6-item De Jong Gierveld loneliness scale (Gierveld and Tilburg, 2006) originating from the original 11-item version [27]. Three items were recoded. Participants were asked to rate each item with a score ranging from 1 “strongly agree” to 4 “strongly disagree”. Exemplary items included “I miss the pleasure of the company of others” and “I miss emotional security and warmth” [26]. By averaging the ratings of the (recoded) items, a score was developed (ranging from 1 to 4, with higher values reflecting higher loneliness levels). This tool has satisfactory psychometric properties [28]. In our study, Cronbach’s alpha was 0.82 (McDonald’s omega: 0.83) in wave five and Cronbach’s alpha was 0.83 (McDonald’s omega: 0.84) in wave six.

Perceived social isolation was assessed using a tool created by Bude and Lantermann [29]. It consists of four items, all of which were recoded by DEAS staff. Exemplary items included “I feel that I am left out” and “I feel excluded from society” [26]. Again, by averaging the ratings of the (recoded) items, a final score was computed (1 to 4, higher values indicating higher perceived social isolation). The scale resembles the mean of the values of the four items. Cronbach’s alpha was 0.88 (McDonald’s omega: 0.89) in wave five and Cronbach’s alpha was 0.87 (McDonald’s omega: 0.88) in wave six.

Life satisfaction was measured using the Satisfaction with Life Scale (SWLS) designed by Diener in 1985 [30]. The scale includes five items with possible ratings ranging from “strongly agree” (score 1) to “strongly disagree” (score 5). The scale—which ranges from 1 to 5—shows the mean of at least 3 ratings of the items, all items have been recoded by DEAS staff. Exemplary items are “I am satisfied with my life” and “So far I have gotten the most important things I want in life” [26]. A higher score represents higher life satisfaction.

Cronbach's alpha was 0.85 (McDonald's omega: 0.86) in wave five and Cronbach's alpha was 0.84 (McDonald's omega: 0.85) in wave six.

Depressive symptoms were measured with the Centre of Epidemiologic Studies Depression Scale (CES-D) created by Radloff in 1977 [31]. This scale measures the occurrence of depressive symptoms within the past week, using 15 items, 2 items were recoded. Possible ratings ranged from 1 = "rarely, or not at all" to 4 = "most of the time, or all of the time", being recoded to 0–3. Exemplary items included "I couldn't get myself to do anything" and "I felt depressed" [26]. By summing up the ratings, a final score was developed from 0 = no depressive symptoms to 45 = severe depressive symptoms. Cronbach's alpha was 0.86 (McDonald's omega: 0.87) in wave five and Cronbach's alpha was 0.86 (McDonald's omega 0.87) in wave six.

2.1.2. Independent Variable of Interest

Pet ownership was the key independent variable of this study. In order to quantify pet ownership, respondents were asked "do you have pets?" [no; yes]. If they answered with "yes", participants were further asked whether they owned (1) one or more cats, (2) one or more dogs, or (3) other pets than cats and dogs.

2.1.3. Covariates

In regression analysis, several time-varying socioeconomic covariates were adjusted for, including age, marital status (married and living together with spouse versus other (divorced; single; widowed; married and living separately from a spouse)), household income (measured as the overall net household income in Euro), and employment status (employed; retired; other: not employed).

Moreover, the analysis was adjusted for multiple lifestyle-related covariates: smoking behavior ("Yes, daily"; "Yes, occasionally"; "No, not anymore"; "I have never smoked"), alcohol intake ("daily"; "several times a week"; "once a week"; "one to three times a month"; "less often"; "never"), and the level of physical activity (six possible answers ranging from "daily" to "never").

Self-rated health (single-item measure: 1 = "very good"; 2 = "good"; 3 = "average"; 4 = "bad"; 5 = "very bad") and the number of self-reported illnesses (count score ranging from 0 to 11 chronic conditions: cardiac and circulatory disorders; bad circulation; joint, bone, spinal or back problems; respiratory problems, asthma, shortness of breath; stomach and intestinal problems; cancer; diabetes; gall bladder, liver or kidney problems; bladder problems; eye problems, vision impairment; ear problems, hearing problems) were considered as health-related covariates.

2.1.4. Statistical Analysis

For this longitudinal analysis, the change in pet ownership and its association with psychosocial variables was analyzed.

Our analytical strategy was as follows:

(1) The FE regressions were performed for a change in pet ownership, a change in dog ownership, and a change in cat ownership as the independent variable;

(2) In sensitivity analysis, cat and dog ownership was stratified by gender as well as age group (because the longitudinal association may vary depending on the age group and gender, as, for instance, Smolkovic et al. found that female owners are more attached to their pets [32]). The dependent variables for all analyses were the following psychosocial variables: depressive symptoms, loneliness, life satisfaction, and social isolation.

Change into pet ownership includes the transition between not living with any kind of pet in 2014 to living with a pet whether this is one or more dog/s, one or more cat/s., or other in 2017. Furthermore, it includes the transition between living with any kind of pet in 2014 to not living with a pet in 2017.

The same analyses were run for dog ownership. The transition into dog ownership was defined as individuals who did not live with any animals in wave five of data collection

and who lived with one or more dog/s but no other pets in wave six of data collection. Moreover, individuals who lived with one or more dog/s (but no other pet) and then lost it in between the waves were included.

The same analyses were run for cat ownership. The transition into cat ownership was defined as individuals who did not live with any animals in wave five of data collection and who lived with one or more cat/s but no other pets in wave six of data collection. Moreover, individuals who lived with one or more cat/s (but no other pet) and then lost it in between the waves were included.

Furthermore, the analyses concerning dog and cat ownership were stratified by gender and age to determine whether the relationship was specific for any of these groups. The gender of the respondent was ascertained in the DEAS study as part of the CAPI. The interviewer selected a female or male according to the name of the participant. In the case of uncertainties, the respondent was asked to state the gender [33,34]. For the stratification by age, the dataset was divided into individuals being younger than 65 years versus individuals being 65 years and above.

Linear fixed effects (FE) regressions were used to examine the associations of interest over time. FE regressions solely exploit changes within individuals over time (e.g., changes in pet ownership within an individual from wave five to wave six or changes in depressive symptoms within an individual from wave five to wave six). This also means that only such time-varying can be used as independent variables (such as self-rated health, which can change within individuals over time). However, time-constant factors such as gender or country of origin can be used to stratify the FE regression models. It should be noted that the exclusive focus on within variations is not a shortcoming of the FE approach. It merely reflects the reality that a specific segment of the population experiences changes in these factors. Further details regarding the FE approach can be found here [35,36].

Linear FE is specifically useful because it allows the identification of an average treatment effect on the treated under quite weak assumptions compared to pooled linear models and random effects (RE) models. More precisely, FE models allow for a systematic association between time-constant factors (both, observed, and unobserved) and explanatory variables, whereas pooled linear models or RE would produce inconsistent estimates in such a case [37,38]. The statistical significance was set with $p < 0.05$. In order to perform all analyses, Stata/MP 17.0 (StataCorp, College Station, TX, USA) was used.

3. Results

3.1. Sample Description

Sample characteristics are shown in Table 1. In our analytical sample, 12,438 observations were included. In the analytical sample, the average age was 65.4 years (SD: 11.0 years) and 50.3% were female. Furthermore, the average loneliness score was 1.8 (SD: 0.5). The average social isolation score was 1.6 (SD: 0.6). Moreover, the average life satisfaction score was 3.8 (SD: 0.7). Additionally, the average depressive symptoms score was 6.6 (SD: 5.9). Further details are provided in Table 1.

With regard to intraindividual transitions in pet ownership from wave five to wave six, in total, 270 participants lived with a pet in 2014 but did not live with a pet anymore in 2017. Moreover, 158 individuals did not live with a pet yet in 2014 but lived with a pet in 2017. Specifically, there were 60 individuals who lived with a dog (and no other pets) in 2014 but did not live with a dog (or other pets) in 2017. Additionally, 48 individuals did not live with a dog (or another pet) in 2014 but lived with a dog (and no other pet) in 2017. There were 106 individuals who lived with a cat (and no other pets) in 2014 who did not live with a cat (or other pets) in 2017 and 57 cat owners (who did not live with other pets) in 2017 who did not live with a cat (or other pets) in 2014. A table representing these changes in pet ownership can be found in Appendix A as Table A1.

Table 1. Sample characteristics for the analytical sample (pooled over both waves, n = 12,438).

Variables	N (%) Mean (SD)
Life satisfaction: Mean (SD)	3.8 (0.7)
Social isolation: Mean (SD)	1.6 (0.6)
Loneliness: Mean (SD)	1.8 (0.5)
Depressive symptoms: Mean (SD)	6.6 (5.9)
Count score: chronic illnesses: Mean (SD)	2.6 (1.9)
Smoking behavior (1–4): N (%)	
1. I smoke daily	1694 (13.0)
2. I smoke occasionally	488 (3.8)
3. I used to smoke, but not anymore	4855 (37.4)
4. I have never smoked	5958 (45.8)
Level of physical activity (1–6): N (%)	
1. Daily	1116 (8.6)
2. Several times a week	3601 (27.7)
3. Once a week	2396 (18.4)
4. Between 1–3 times per month	877 (6.7)
5. Less often	1477 (11.4)
6. Never	3528 (27.1)
Alcohol intake (1–6): N (%)	
1. Daily	1609 (12.4)
2. Several times a week	3215 (24.7)
3. Once a week	2055 (15.8)
4. Between 1–3 times per month	1592 (12.3)
5. Less often	3060 (23.5)
6. Never	1464 (11.3)
Self-rated health (1–5): Mean (SD)	2.5 (0.8)
Age: Mean (SD)	65.4 (11.0)
Employment status (1–3): N (%)	
1. Working	4544 (35.0)
2. Retired	7425 (57.1)
3. Other: Not employed	1026 (7.9)
Marital status: N (%)	
1. Married (civil union), living together	9087 (69.9)
2. Married (civil union), living separately	191 (1.5)
3. Divorced, (civil union annulled)	1296 (10.0)
4. Widowed	1539 (11.8)
5. Single	882 (6.8)
Gender: N (%)	
1. Male	6454 (49.7)
2. Female	6541 (50.3)
Education: N (%)	
1. low (ISCED 0–2)	731 (5.6)
2. medium (ISCED 3–4)	6592 (50.7)
3. high (ISCED 5–6)	5670 (43.6)

Notes: loneliness (score from 1–4 with higher values reflecting higher loneliness score); social isolation (score from 1–4 with higher values reflecting higher perceived social isolation); life satisfaction (score ranging from 1–5 with higher values representing higher life satisfaction); depressive symptoms (score ranging from 0–45 with higher values indicating more depressive symptoms).

Regression Analysis

Multiple linear FE regressions were performed after adjusting for time-varying covariates including participants' age, marital status, household income, employment status, smoking behavior, alcohol intake, level of physical activity, self-rated health, and the number of self-reported illnesses. The Within R^2 is reported in the regression tables reported in this study. The Within R^2 refers to how much of the variation in the outcomes within individuals is captured by our model. Regarding the following results, the direction of change includes a change from no animal to animal as well as animal to no animal, thus not differentiating whether the change in ownership has occurred through loss or acquisition.

Firstly, regression analysis was performed, with changes in pet ownership being the key time-varying independent variable; results are shown in Table 2. Therefore, the scores of psychosocial variables' measures were compared in individuals before and after they had a change in pet ownership. There was no significant longitudinal association detected between changes in pet ownership and changes in psychosocial outcomes (see Table 2).

Table 2. Pet ownership—results of linear FE regression analysis.

Independent Variables	Depressive Symptoms	Loneliness	Social Isolation	Life Satisfaction
Transition in pet ownership: From not living with pet/s to living with pet/s and vice versa	−0.42	0.03	0.03	−0.04
	(0.30)	(0.02)	(0.03)	(0.03)
Covariates	✓	✓	✓	✓
Observations	12,438	12,332	12,326	12,363
R ²	0.07	0.01	0.01	0.02
Number of individuals	8205	8162	8144	8179

Notes: unstandardized beta-coefficients are displayed; Robust standard errors in parentheses. ✓ = regressions were performed after adjusting for time-varying covariates. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, + $p < 0.10$.

The transition into pet ownership includes individuals who had no pets in one data collection point but one or more pet/s in the other data collection point. Covariates include participants' age, marital status, household income, employment status, smoking behavior, alcohol intake, level of physical activity, self-rated health, and the number of self-reported illnesses.

Further regression analyses were run for changes in dog ownership separately. The results are presented in Table 3. No significant longitudinal associations could be found in this analysis.

Table 3. Dog ownership—results of linear FE regression analysis. (Individuals living with other pets besides dogs excluded).

Independent Variables	Depressive Symptoms	Loneliness	Social Isolation	Life Satisfaction
Transition in dog ownership: From not living with dog/s to living with dog/s and vice versa	−0.72	0.01	0.04	−0.09 +
	(0.67)	(0.04)	(0.06)	(0.05)
Covariates	✓	✓	✓	✓
Observations	10,211	10,122	10,102	10,146
R ²	0.08	0.01	0.01	0.02
Number of individuals	6861	6822	6806	6839

Notes: unstandardized beta-coefficients are displayed; Robust standard errors in parentheses. ✓ = regressions were performed after adjusting for time-varying covariates. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, + $p < 0.10$. Transition into dog ownership includes individuals who had no dog/s in one data collection point but one or more dog/s in the other data collection point, excluding individuals who lived with other pets than dogs; Covariates include participants' age, marital status, household income, employment status, smoking behavior, alcohol intake, the level of physical activity, self-rated health, and the number of self-reported illnesses.

However, when the studied group was stratified by gender (see Appendix A, Table A2) there was a significant longitudinal association between having a dog and decreases in life satisfaction for women ($\beta = -0.15$, $p < 0.05$).

The analysis was also run stratified by age group. Results are displayed in the Appendix A, Table A3. There were no significant associations found.

The same regression analyses were performed for cat ownership. The results are displayed in Table 4.

Table 4. Cat ownership—results of linear FE regression analysis. (Individuals living with other pets besides cats are excluded).

Independent Variables	Depressive Symptoms	Loneliness	Social Isolation	Life Satisfaction
Transition in cat ownership: From not owning cat/s to owning cat/s and vice versa	−0.04 (0.50)	0.10 ** (0.03)	0.08 + (0.05)	−0.07 (0.05)
Covariates	✓	✓	✓	✓
Observations	10,773	10,671	10,657	10,709
R ²	0.07	0.02	0.01	0.02
Number of individuals	7192	7147	7129	7167

Notes: unstandardized beta-coefficients are displayed; Robust standard errors in parentheses. ✓ = regressions were performed after adjusting for time-varying covariates. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, + $p < 0.10$.

The transition into cat ownership includes individuals who had no cat/s in one data collection point but one or more cat/s in the other data collection point, excluding individuals who lived with other pets than cats. Covariates include participants' age, marital status, household income, employment status, smoking behavior, alcohol intake, level of physical activity, self-rated health, and the number of self-reported illnesses. There was a longitudinal association between cat ownership and higher levels of loneliness in the total sample ($\beta = 0.10$, $p < 0.01$).

The analysis was also stratified by gender and age group as shown in Appendix A, Tables A4 and A5. Cat ownership was significantly associated with higher levels of loneliness ($\beta = 0.12$, $p < 0.05$) and higher levels of social isolation ($\beta = 0.13$, $p < 0.05$) for men.

Concerning the stratification by age group, there was no significant longitudinal association found.

In summary, there were few significant associations found and some were only significant for subgroups (e.g., stratified by age or gender).

Results of more linear FE regression analyses can be found in Appendix A (in these analyses, the change in dog ownership includes individuals who own pets other than dogs or have a change in pet ownership besides the necessary change in dog ownership. In the same way, the change in cat ownership includes individuals who own other pets than cats or have a change in pet ownership besides the necessary change in cat ownership).

4. Discussion

4.1. Main Findings

The purpose of this study was to investigate the longitudinal association between pet ownership and psychosocial factors (in terms of depressive symptoms, loneliness, social isolation, and life satisfaction). To this end, longitudinal data were used and linear FE regressions were applied.

FE regressions revealed no significant longitudinal association between any kind of pet ownership over time and changes in depressive symptoms. Cat ownership was significantly associated with higher levels of loneliness among the total sample and men longitudinally. Beyond that, cat ownership was significantly associated with higher levels of social isolation among men. Among women, dog ownership was significantly associated with lower life satisfaction. Our longitudinal study markedly extends the current knowledge regarding the association between pet ownership and psychosocial factors mainly based on cross-sectional studies.

4.2. Possible Explanations and Previous Research

4.2.1. Pet Ownership

There are two studies investigating the longitudinal association between pet ownership over time and changes in depressive symptoms. Batty et al. included 8785 participants with a mean age of 67 and Albright et al. included 1000 older adults with a mean age of 73 [39,40]. Neither study found an association between pet ownership and depressive symptoms. Batty et al. used the CES-D (which was used in our study as well) and Albright et al. used the GDS-15, a well-known tool to quantify depressive symptoms among older adults. Accordingly, the results of longitudinal studies are in line with our results, as we found no association between depressive symptoms and a change in pet ownership as well.

In agreement with our result, Rijken and van Beek found no cross-sectional association between pet ownership and loneliness within a study group consisting of community-dwelling elderly people suffering from chronic illness or disability in a cross-sectional study design with $n = 1410$ and age ≥ 65 [41]. Enmarker et al. also did not find an association between pet ownership and loneliness within their cross-sectional study with 12,093 individuals and a mean age of 75 [13].

The result of our study concerning general pet ownership and life satisfaction aligns with a study by Fraser et al., $n = 13,347$, measuring life satisfaction using two items adapted from Diener, Emmons, Larsen, and Griffin's (1985) Satisfaction with Life Scale [42]. It also conforms with a study by Le Roux and Wright, $n = 3329$, using a 5-item satisfaction with life scale [43]. Both studies found no association between pet ownership and life satisfaction. It should be noted that these studies are restricted by using cross-sectional data.

More precisely, given the differences in sample sizes, the tools used to measure psychosocial variables, and the fact that most studies had a cross-sectional design, the differences in the findings seem plausible. While in the introduction the attachment theory was cited as an explanation for a beneficial relationship, it must be said that cohabitating a pet does not equal a strong attachment to the pet. This might serve as an explanation for finding no significant longitudinal associations between changes in pet ownership and psychosocial factors.

4.2.2. Dog Ownership

Our study found no longitudinal association between dog ownership and depressive symptoms. This result is in line with a study by Enmarker et al. with cross-sectional design using the HAD-S (Hospital Anxiety and Depression Scale), a multiple-item depression scale [13].

Our study found that living with a dog was associated with lower life satisfaction among women. The results of existing studies concerning the relationship between dog ownership and life satisfaction are rather contradictory. A recent study with $n = 42,687$ found dog ownership to be associated with higher life satisfaction [19]. Precisely, single dog ownership was associated with higher life satisfaction when compared to living with multiple dogs or no pets. Meanwhile, a New Zealand study with $n = 13,347$ [42] and a South African study with $n = 3329$ [43] found no association with life satisfaction.

Next to key study design differences (all three studies have a cross-sectional design) and different scales being used to assess life satisfaction, differences in cultural backgrounds may contribute to contradictory results. This could be the case since cultural aspects may influence the role of a dog in a family constellation as well as the perceived responsibility for the dog.

The longitudinal association found in our study could be explained by the stress of regularly walking the dog, the increased responsibilities, and the caregiving burden as the pet becomes old or sick [44]. Dog owners may also be limited in activities that involve leaving the house for a longer period of time such as a vacation or even seeing a doctor. For instance, a woman in an interview stated that she does not want to go to the hospital to get her eyesight fixed since she does not want to leave her dog at home by itself [44]. Alternatively, people may turn to their pets to buffer stress and psychological problems

instead of seeing a mental health professional [6]. Additionally, it should be noted that quality of life is not interchangeable with happiness. Happiness corresponds mostly to the subjective part of quality of life whereas the broader term ‘quality of life’ includes subjective as well as objective aspects [45].

These aspects could explain the correlation between dog ownership and lower life satisfaction and, accordingly, show that the relationship quality may be of great importance for the association. Thus, future qualitative studies are clearly needed.

4.2.3. Cat Ownership

In our study, cat ownership was associated with higher levels of loneliness among the total sample and men in particular, as well as higher levels of social isolation scores among men. This extends prior knowledge, which found that cat owners tended to be more disabled and socially isolated than dog owners based on a qualitative design [44]. In this qualitative study, an elderly woman stated that her cat Missy keeps her up to things [...] but if anything happened to her cat she might as well put herself in a nursing home. One may conclude that in an institutionalized setting for people of older age, this woman would be less socially isolated. However, there is conflicting evidence. For example, Hajek and König found no significant difference between cat owners and individuals who did not live with a cat in terms of social isolation [18]. It should be noted that this former cross-sectional study is restricted to individuals without a partner.

Branson et al. as well as Rijken and van Beek found no correlation between cat ownership and loneliness. Branson et al. used the 20-item Revised-UCLA loneliness scale to measure loneliness and Rijken and van Beek used six items of the same scale [41,46]. Differences in results seem plausible as both studies have a cross-sectional design and used a different scale to measure loneliness (our study used the De Jong Gierveld loneliness scale).

Cat ownership is associated with higher loneliness scores and higher social isolation scores (for men) in our study. Wells and Rodi found that caring for a pet may inhibit social interaction as individuals do not want to leave their pet behind, which prevents them from leaving the house in order to socially interact [44]. It may be the case that cat ownership does not enable people to socially interact with others and, as the relationship with a cat may not be very intimate, it contributes to higher loneliness levels. This is supported by Smolkovic et al. who investigated pet attachment using the 15-item Owner–Pet Relationship Scale (OPRS). In this study, female owners were significantly more attached to their pets when compared to male owners; also, cat owners were less attached to their pets when compared to dog owners [32].

5. Conclusions and Future Research

The results of this longitudinal study found the effect of pet ownership on psychosocial variables to be less prominent than initially expected. Also, the direction of association stands in contrast to the hypothesized results as this current study partly found changes to pet ownership to be associated with less favorable psychosocial outcomes. However, it should be noted that such associations were mainly found for certain subgroups (e.g., changes to cat ownership and increases in loneliness; changes to dog ownership and decreases in life satisfaction among women), whereas no associations were found for general pet ownership. Thus, one may conclude that some pets may not be beneficial for certain groups of people. Wells and Rodi found that healthy individuals with good social networks benefit most from pets [44]. This may indicate that individuals who are already prone to psychosocial problems as they have chronic diseases or a dysfunctional social network could be adversely affected by pet ownership.

In conclusion, the results of this longitudinal study call the signs of associations found between pet ownership and psychosocial factors in prior cross-sectional studies into question. The benefits of pet ownership such as companionship, more physical activity through dog ownership, and an increased sense of responsibility may be buffered by the downsides of pet ownership such as the caregiving burden, increased liability, or costs in

time and money. Depending on the characteristics of the pet and its caregiver as well as the relationship between the two, the positive and negative aspects of pet ownership may keep them in balance and thus have no effect on psychosocial factors. Alternatively, as shown in this study, pet ownership may even have a negative effect on certain subgroups.

Nevertheless, positive effects may dominate for individuals who are less affected by the negative aspects of pet ownership. This could be uncovered by restricting the study group to children or interventional strategies such as having pet animals in facility homes or as therapy animals. Through that approach, fewer problems exist with the caregiving burden and responsibility due to staff support [44]. Consequently, the change in pet ownership could be associated with favorable psychosocial outcomes as pet ownership has the potential to boost autonomy, self-esteem, and self-concept in children [47].

With regard to future research, many more studies with longitudinal design are needed in order to confirm our current findings. Additionally, it is important to compare our results to longitudinal studies conducted during the COVID-19 pandemic as these circumstances may affect the effect pet ownership has on psychosocial variables [48]. Moreover, future research should focus on attachment toward the pet, gender characteristics, and differences in the type of pet ownership. In addition, longitudinal research on study groups consisting of children or people in facility homes is necessary. Furthermore, qualitative studies clarifying the motivation to acquire a pet might reveal the reasons for certain associations.

6. Strengths and Limitations

Our longitudinal study adds to the few studies investigating the association between a change in pet ownership and psychosocial variables using a longitudinal approach. This assists in gaining further insights into the directionality. The data for our research come from a large representative sample of people in midlife and older adulthood (DEAS) [25]. Psychosocial outcome measures were quantified using valid and widely used scales and the independent variable pet ownership was further divided into dog and cat ownership. Furthermore, the included sensitivity analysis divided the studied group by gender and age. The study also considered a wide array of covariates. Additionally, using fixed-effects regressions assists in reducing the challenge of unobserved heterogeneity.

One limitation is that the samples focused on community-dwelling individuals and thus excluded individuals living in facility homes. Moreover, due to the modest response rate, a small selection bias exists [25]. Furthermore, the missing data on the number of owned pets as well as death and new acquisition of a pet in between data collection points could lead to undetected psychological findings. For example, a loss or acquisition of a pet in a multi-pet household could stay unobserved.

Additionally, the study's results are based on only two time points of measurement, whereas more points of evaluation could have led to different results. For instance, the health condition of the pet could have changed between 2014 and 2017, leading to an increase in veterinary costs and a time-consuming care burden, thus causing stress for the caregiver. Moreover, some variables such as attachment toward pets, personality traits of owners, and the original motivation to acquire the pet were not taken into consideration—and should be examined in future studies. Furthermore, even though we have considered a wide array of covariates, there are more factors that may influence our results. For instance, children of pet guardians may leave the household in order to go to university, which could result in their parents feeling more lonely and socially isolated.

Author Contributions: Conceptualization, P.R.H., H.-H.K. and A.H.; methodology, P.R.H. and A.H.; software, P.R.H.; validation, P.R.H. and A.H.; formal analysis, P.R.H.; investigation, P.R.H.; resources, H.-H.K.; data curation, P.R.H.; writing—original draft preparation, P.R.H.; writing—review and editing, H.-H.K. and A.H.; visualization, P.R.H., H.-H.K. and A.H.; supervision, A.H.; project administration, P.R.H.; All authors have read and agreed to the published version of the manuscript.

Funding: We acknowledge financial support from the Open Access Publication Fund of UKE—Universitätsklinikum Hamburg-Eppendorf.

Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki. Ethical review and approval were not applicable.

Informed Consent Statement: Patient consent was not applicable.

Data Availability Statement: The data used in this study are third-party data. The anonymized data sets of the DEAS (1996, 2002, 2008, 2011, 2014, 2017, 2020, 2020/2021) are available for secondary analysis. The data has been made available to scientists at universities and research institutes exclusively for scientific purposes. The use of data is subject to written data protection agreements. Microdata of the German Ageing Survey (DEAS) is available free of charge to scientific researchers for non-profitable purposes. The FDZ-DZA provides access and support to scholars interested in using DEAS for their research. However, for reasons of data protection, signing a data distribution contract is required before data can be obtained. Please see for further information (data distribution contract): <https://www.dza.de/en/research/fdz/access-to-data/application> (accessed on 3 April 2024).

Conflicts of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as potential conflicts of interest.

Appendix A

Results of Further Regression Analyses

Further linear FE regression analyses were performed for a change in dog ownership, being defined as follows. Individuals who had a change in dog ownership between 2014 and 2017, including individuals who owned other pets besides dogs. Therefore, the included individuals may have a change in cat and/or other pet ownership next to the necessary change in dog ownership. There was no significant longitudinal correlation found for any of the dependent variables. This analysis was also run stratified by gender. There was no significant longitudinal association found for any of the genders. The analysis was also run stratified by age group. The dataset was divided into individuals being younger than 65 years versus individuals being 65 years and above. There was a significant longitudinal association found for social isolation in individuals aged younger than 65. Higher values in social isolation meaning more social isolation were significantly associated with dog ownership ($\beta = 0.12, p < 0.05$). Results are displayed in Tables A6–A8.

Moreover, regression analyses were performed for change in cat ownership being defined in the same way: individuals who had a change in cat ownership in between data collection points including individuals who owned other pets and who may even have had a change in pet ownership additionally to the necessary change in cat ownership. The result of the regression analysis conducted a significance for loneliness, indicating that individuals are lonelier when owning a cat compared to when they did not own a cat ($\beta = 0.07, p < 0.05$). There was no significant correlation concerning the other variables of interest. The same analysis was then performed, stratified by gender and stratified by age group. Cat ownership was significantly correlated with more social exclusion for men ($\beta = 0.12, p < 0.05$). There was no correlation for individuals stratified by age. The results are displayed in Tables A9–A11.

In summary, there were few significant associations found. However, these associations were not consistent across all analyses. The associations differed between cat and dog ownership and most were only significant for subgroups (i.e., stratified by age group or gender).

Table A1. Loss and acquisition of pets between 2014 and 2017.

	Loss of Pet	Acquisition of Pet
Pet ownership	270	158
Dog ownership	60	48
Cat ownership	106	57

Table A2. Dog ownership—results of linear FE regression analysis stratified by gender. (Individuals owning other pets besides dogs excluded).

Gender	Male	Male	Male	Male	Female	Female	Female	Female
Independent Variable	Depressive Symptoms	Loneliness	Social Isolation	Life Satisfaction	Depressive Symptoms	Loneliness	Social Isolation	Life Satisfaction
Transition in dog ownership: From not owning dog/s to owning dog/s and vice versa	−0.44	−0.06	−0.04	−0.01	−0.91	0.06	0.10	−0.15 *
	(1.11)	(0.06)	(0.11)	(0.08)	(0.85)	(0.06)	(0.06)	(0.07)
Covariates	✓	✓	✓	✓	✓	✓	✓	✓
Observations	5166	5127	5114	5139	5045	4995	4988	5007
R ²	0.08	0.02	0.03	0.03	0.09	0.02	0.02	0.03
Number of individuals	3478	3465	3451	3467	3383	3357	3355	3372

Notes: unstandardized beta-coefficients are displayed; Robust standard errors are in parentheses. ✓ = regressions were performed after adjusting for time-varying covariates. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, + $p < 0.10$. Transition into dog ownership includes individuals who had no dog/s in one data collection point but one or more dog/s in the other data collection point, excluding individuals who owned other pets than dogs. Covariates include participants' age, marital status, household income, employment status, smoking behavior, alcohol intake, level of physical activity, self-rated health, and the number of self-reported illnesses.

Table A3. Dog ownership—results of linear FE regression analysis stratified by age group. (Individuals owning other pets besides dogs excluded).

Age	<65	<65	<65	<65	≥65	≥65	≥65	≥65
Independent Variable	Depressive Symptoms	Loneliness	Social Isolation	Life Satisfaction	Depressive Symptoms	Loneliness	Social Isolation	Life Satisfaction
Transition in dog ownership: From not owning dog/s to owning dog/s and vice versa	0.03	0.05	0.12 +	−0.13 +	−1.37	−0.03	−0.02	−0.05
	(0.90)	(0.05)	(0.07)	(0.07)	(0.99)	(0.07)	(0.10)	(0.09)
Covariates	✓	✓	✓	✓	✓	✓	✓	✓
Observations	4284	4256	4258	4263	5927	5866	5844	5883
R ²	0.10	0.03	0.04	0.04	0.08	0.02	0.02	0.03
Number of individuals	3082	3067	3062	3073	4112	4082	4069	4092

Notes: unstandardized beta-coefficients are displayed; Robust standard errors are in parentheses. ✓ = regressions were performed after adjusting for time-varying covariates. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, + $p < 0.10$. Transition into dog ownership includes individuals who had no dog/s in one data collection point but one or more dog/s in the other data collection point, excluding individuals who owned other pets than dogs. Covariates include participants' age, marital status, household income, employment status, smoking behavior, alcohol intake, level of physical activity, self-rated health, and the number of self-reported illnesses.

Table A4. Cat ownership—results of linear FE regression analysis stratified by gender. (Individuals owning other pets besides cats excluded).

Gender	Male	Male	Male	Male	Female	Female	Female	Female
Independent Variable	Depressive Symptoms	Loneliness	Social Isolation	Life Satisfaction	Depressive Symptoms	Loneliness	Social Isolation	Life Satisfaction
Transition in cat ownership: From not owning cat/s to owning cat/s and vice versa	−0.40	0.12 *	0.13 *	−0.04	0.23	0.08 +	0.04	−0.11
	(0.69)	(0.05)	(0.06)	(0.08)	(0.74)	(0.05)	(0.06)	(0.07)
Covariates	✓	✓	✓	✓	✓	✓	✓	✓
Observations	5376	5327	5320	5351	5397	5344	5337	5358
R ²	0.06	0.02	0.03	0.03	0.09	0.02	0.02	0.04
Number of individuals	3589	3572	3559	3578	3603	3575	3570	3589

Notes: unstandardized beta-coefficients are displayed; Robust standard errors are in parentheses. ✓ = regressions were performed after adjusting for time-varying covariates. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, + $p < 0.10$. Transition into cat ownership includes individuals who had no cat/s in one data collection point but one or more cat/s in the other data collection point, excluding individuals who owned other pets than cats. Covariates include participants' age, marital status, household income, employment status, smoking behavior, alcohol intake, level of physical activity, self-rated health, and the number of self-reported illnesses.

Table A5. Cat ownership—results of linear FE regression analysis stratified by age group. (Individuals owning other pets besides cats are excluded).

Age	<65	<65	<65	<65	≥65	≥65	≥65	≥65
Independent Variable	Depressive Symptoms	Loneliness	Social Isolation	Life Satisfaction	Depressive Symptoms	Loneliness	Social Isolation	Life Satisfaction
Transition in cat ownership: From not owning cat/s to owning cat/s and vice versa	−0.62	0.05	0.09	−0.02	0.59	0.09 +	0.10	−0.14 +
	(0.92)	(0.05)	(0.07)	(0.08)	(0.63)	(0.05)	(0.06)	(0.08)
Covariates	✓	✓	✓	✓	✓	✓	✓	✓
Observations	4557	4519	4527	4539	6216	6152	6130	6170
R ²	0.09	0.03	0.04	0.04	0.07	0.02	0.02	0.03
Number of individuals	3265	3242	3241	3258	4293	4263	4247	4269

Notes: unstandardized beta-coefficients are displayed; Robust standard errors are in parentheses. ✓ = regressions were performed after adjusting for time-varying covariates. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, + $p < 0.10$. Transition into cat ownership includes individuals who had no cat/s in one data collection point but one or more cat/s in the other data collection point, excluding individuals who owned other pets than cats. Covariates include participants' age, marital status, household income, employment status, smoking behavior, alcohol intake, level of physical activity, self-rated health, and the number of self-reported illnesses.

Table A6. Dog ownership—results of linear FE regression analysis. (Individuals owning other pets besides dogs included).

Independent Variables	Depressive Symptoms	Loneliness	Social Isolation	Life Satisfaction
Transition in dog ownership: From not owning dog/s to owning dog/s and vice versa	−0.38 (0.59)	−0.01 (0.04)	0.05 (0.05)	−0.06 (0.05)
Covariates	✓	✓	✓	✓
Observations	10,749	10,657	10,636	10,680
R ²	0.08	0.01	0.01	0.02
Number of individuals	7200	7160	7143	7176

Notes: unstandardized beta-coefficients are displayed. Robust standard errors are in parentheses. ✓ = regressions were performed after adjusting for time-varying covariates. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, + $p < 0.10$. Transition into dog ownership includes individuals who had no dog/s in one data collection point but one or more dog/s in the other data collection point, including individuals who own other pets than dogs or have a change in pet ownership besides the necessary change in dog ownership. Covariates include participants' age, marital status, household income, employment status, smoking behavior, alcohol intake, level of physical activity, self-rated health, and the number of self-reported illnesses.

Table A7. Dog ownership—results of linear FE regression analysis stratified by gender. (Individuals owning other pets besides dogs included).

Gender	Male	Male	Male	Male	Female	Female	Female	Female
Independent Variable	Depressive Symptoms	Loneliness	Social Isolation	Life Satisfaction	Depressive Symptoms	Loneliness	Social Isolation	Life Satisfaction
Transition in dog ownership: From not owning dog/s to owning dog/s and vice versa	−0.13 (0.92)	−0.10 (0.06)	−0.00 (0.10)	−0.01 (0.08)	−0.51 (0.78)	0.06 (0.05)	0.10 + (0.06)	−0.10 (0.06)
Covariates	✓	✓	✓	✓	✓	✓	✓	✓
Observations	5412	5372	5357	5382	5337	5285	5279	5298
R ²	0.08	0.02	0.03	0.02	0.09	0.02	0.02	0.02
Number of individuals	3631	3618	3602	3619	3569	3542	3541	3557

Notes: unstandardized beta-coefficients are displayed. Robust standard errors are in parentheses. ✓ = regressions were performed after adjusting for time-varying covariates. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, + $p < 0.10$. Transition into dog ownership includes individuals who had no dog/s in one data collection point but one or more dog/s in the other data collection point, including individuals who own other pets than dogs or have a change in pet ownership besides the necessary change in dog ownership. Covariates include participants' age, marital status, household income, employment status, smoking behavior, alcohol intake, level of physical activity, self-rated health, and the number of self-reported illnesses.

Table A8. Dog ownership—results of linear FE regression analysis stratified by age group. (Individuals owning other pets besides dogs included).

Age	<65	<65	<65	<65	≥65	≥65	≥65	≥65
Independent Variable	Depressive Symptoms	Loneliness	Social Isolation	Life Satisfaction	Depressive Symptoms	Loneliness	Social Isolation	Life Satisfaction
Transition in dog ownership: From not owning dog/s to owning dog/s and vice versa	0.01	0.01	0.12 *	−0.08	−0.66	−0.05	−0.02	−0.05
	(0.79)	(0.05)	(0.06)	(0.07)	(0.91)	(0.07)	(0.09)	(0.08)
Covariates	✓	✓	✓	✓	✓	✓	✓	✓
Observations	4668	4639	4639	4647	6081	6018	5997	6033
R ²	0.09	0.03	0.04	0.04	0.08	0.02	0.02	0.03
Number of individuals	3338	3322	3316	3329	4212	4182	4169	4190

Notes: unstandardized beta-coefficients are displayed. Robust standard errors are in parentheses. ✓ = regressions were performed after adjusting for time-varying covariates. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, + $p < 0.10$. Transition into dog ownership includes individuals who had no dog/s in one data collection point but one or more dog/s in the other data collection point, including individuals who own other pets than dogs or have a change in pet ownership besides the necessary change in dog ownership. Covariates include participants' age, marital status, household income, employment status, smoking behavior, alcohol intake, level of physical activity, self-rated health, and the number of self-reported illnesses.

Table A9. Cat ownership—results of linear FE regression analysis. (Individuals owning other pets besides cats included).

Independent Variables	Depressive Symptoms	Loneliness	Social Isolation	Life Satisfaction
Transition in cat ownership: From not owning cat/s to owning cat/s and vice versa	−0.03	0.07 *	0.06	−0.04
	(0.46)	(0.03)	(0.04)	(0.05)
Covariates	✓	✓	✓	✓
Observations	11,407	11,303	11,285	11,339
R ²	0.07	0.01	0.01	0.02
Number of individuals	7578	7535	7513	7552

Notes: unstandardized beta-coefficients are displayed. Robust standard errors are in parentheses. ✓ = regressions were performed after adjusting for time-varying covariates. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, + $p < 0.10$. Transition into cat ownership includes individuals who had no cat/s in one data collection point but one or more cat/s in the other data collection point, including individuals who own other pets than cats or have a change in pet ownership besides the necessary change in cat ownership. Covariates include participants' age, marital status, household income, employment status, smoking behavior, alcohol intake, level of physical activity, self-rated health, and the number of self-reported illnesses.

Table A10. Cat ownership—results of linear FE regression analysis stratified by gender. (Individuals owning other pets besides cats included).

Gender	Male	Male	Male	Male	Female	Female	Female	Female
Independent Variable	Depressive Symptoms	Loneliness	Social Isolation	Life Satisfaction	Depressive Symptoms	Loneliness	Social Isolation	Life Satisfaction
Transition in cat ownership: From not owning cat/s to owning cat/s and vice versa	−0.65	0.08	0.12 *	−0.01	0.48	0.07	0.01	−0.07
	(0.62)	(0.05)	(0.06)	(0.07)	(0.67)	(0.04)	(0.06)	(0.06)
Covariates	✓	✓	✓	✓	✓	✓	✓	✓
Observations	5665	5615	5604	5638	5742	5688	5681	5701
R ²	0.07	0.02	0.03	0.02	0.09	0.02	0.01	0.04
Number of individuals	3761	3745	3728	3750	3817	3790	3785	3802

Notes: unstandardized beta-coefficients are displayed. Robust standard errors are in parentheses. ✓ = regressions were performed after adjusting for time-varying covariates. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, + $p < 0.10$. Transition into cat ownership includes individuals who had no cat/s in one data collection point but one or more cat/s in the other data collection point, including individuals who own other pets than cats or have a change in pet ownership besides the necessary change in cat ownership. Covariates include participants' age, marital status, household income, employment status, smoking behavior, alcohol intake, level of physical activity, self-rated health, and the number of self-reported illnesses.

Table A11. Cat ownership—results of linear FE regression analysis stratified by age group. (Individuals owning other pets besides cats included).

Age	<65	<65	<65	<65	≥65	≥65	≥65	≥65
Independent Variable	Depressive Symptoms	Loneliness	Social Isolation	Life Satisfaction	Depressive Symptoms	Loneliness	Social Isolation	Life Satisfaction
Transition in cat ownership: From not owning cat/s to owning cat/s and vice versa	−0.47	0.02	0.09	0.03	0.39	0.06	0.06	−0.11
	(0.80)	(0.05)	(0.06)	(0.07)	(0.60)	(0.05)	(0.06)	(0.07)
Covariates	✓	✓	✓	✓	✓	✓	✓	✓
Observations	4990	4951	4957	4972	6417	6352	6328	6367
R ²	0.09	0.03	0.04	0.04	0.07	0.02	0.02	0.03
Number of individuals	3553	3529	3527	3546	4414	4387	4368	4389

Notes: unstandardized beta-coefficients are displayed. Robust standard errors are in parentheses. ✓ = regressions were performed after adjusting for time-varying covariates. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, + $p < 0.10$. Transition into cat ownership includes individuals who had no cat/s in one data collection point but one or more cat/s in the other data collection point, including individuals who own other pets than cats or have a change in pet ownership besides the necessary change in cat ownership. Covariates include participants' age, marital status, household income, employment status, smoking behavior, alcohol intake, level of physical activity, self-rated health, and the number of self-reported illnesses.

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3. Zusammenfassung

Die vorliegende medizinische Doktorarbeit hatte das Ziel, die Wechselwirkungen zwischen Haustierhaltung und verschiedenen psychosozialen Aspekten – darunter depressive Symptome, Einsamkeit, soziale Isolation und Lebenszufriedenheit – über einen längeren Zeitraum zu analysieren.

Die verwendeten Daten stammen aus einer landesweit repräsentativen Erhebung, dem Deutschen Alterssurvey (DEAS). Dieser befragt in Deutschland lebende Erwachsene im Alter zwischen 40 und 85 Jahren zu einem breiten Spektrum an Themen. Die Analyse basiert auf zwei Wellen der Datenerhebung aus den Jahren 2014 und 2017. Zur Erfassung der psychosozialen Faktoren kamen validierte mehrstufige Skalen zum Einsatz. Es wurden sowohl der Erwerb als auch der Verlust von Haustieren berücksichtigt. Die statistische Auswertung erfolgte mittels linearer Regressionen mit fixed effects (FE).

Die Ergebnisse der Regressionsanalysen zeigten insgesamt nur wenige signifikante Längsschnittassoziationen. Zwischen dem Sprung im allgemeinen Haustierbesitz (beinhaltet sowohl Katzen, Hunde als auch andere Haustiere) und den untersuchten psychosozialen Faktoren (bezogen auf Männer und Frauen), konnten keine signifikanten Zusammenhänge festgestellt werden. Dennoch ergab die Analyse, dass der Besitz einer Katze/mehrerer Katzen signifikant mit einem Anstieg der Einsamkeit in der Gesamtstichprobe ($\beta=0.10$, $p<.01$) sowie bei Männern ($\beta=0.12$, $p<.05$) korrelierte. Zudem zeigte sich, dass der Besitz einer Katze/mehrerer Katzen auch signifikant mit einer Zunahme der sozialen Isolation bei Männern assoziiert war ($\beta=0.13$, $p<.05$). Bei Frauen hingegen war der Besitz eines Hundes/mehrerer Hunde über den Zeitraum hinweg signifikant mit einer Abnahme der Lebenszufriedenheit assoziiert ($\beta=-0.15$, $p<.05$).

Diese Erkenntnisse sind entgegengesetzt zu der erwarteten Richtung der Assoziation. Um die zugrundeliegenden Ursachen für den Zusammenhang zwischen dem Besitz von Haustieren und ungünstigen psychosozialen Faktoren über einen längeren Zeitraum hinweg besser zu verstehen, wäre es sinnvoll, dass sich die Forschung in Zukunft intensiver mit geschlechtsspezifischen Merkmalen, den Unterschieden in der Art des Haustierbesitzes und den zugrundeliegenden Mechanismen auseinandersetzt.

Summary

The aim of this medical doctoral thesis was to analyze the interactions between pet ownership and various psychosocial aspects - including depressive symptoms, loneliness, social isolation and life satisfaction - over a longer period of time.

The data used comes from a nationally representative survey, the German Ageing Survey (DEAS). It surveys adults aged between 40 and 85 living in Germany on a wide range of topics. The analysis of this thesis is based on two waves of data collection from 2014 and 2017. Psychosocial factors were measured using validated multi-item scales. Both the acquisition and loss of pets were considered. The statistical analysis was carried out using linear regressions with fixed effects (FE).

Overall, the results of the regression analyses showed only a few significant longitudinal associations. No significant correlations were found between a change in general pet ownership (including cats, dogs and other pets) and the psychosocial factors investigated (including men and women). Nevertheless, the analysis showed that owning a cat/multiple cats was significantly longitudinally associated with an increase in loneliness in the overall sample ($\beta=0.10$, $p<.01$) as well as in men ($\beta=0.12$, $p<.05$). In addition, it was found that owning a cat/multiple cats was also significantly longitudinally associated with an increase in social isolation in men ($\beta=0.13$, $p<.05$). For women, however, owning a dog/multiple dogs was significantly associated with a decrease in life satisfaction over a period of time ($\beta=-0.15$, $p<.05$).

These findings are opposite to the expected direction of the association. To better understand the underlying causes of the association between pet ownership and unfavorable psychosocial factors over time, it would be useful for future research to look more closely at gender characteristics, differences in pet ownership and underlying mechanisms.

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5. Erklärung des Eigenanteils

Die vorliegende Dissertation stellt das Ergebnis meiner eigenständigen wissenschaftlichen Arbeit (unter Betreuung von Prof. Hajek) dar.

Die Projektskizze habe ich selbstständig verfasst und die Literaturrecherche eigenhändig durchgeführt. Die empirischen Daten für diese Arbeit stammen aus der fünften und sechsten Welle des Deutschen Alterssurveys (DEAS) aus den Jahren 2014 und 2017. Auch die Datenaufbereitung (z. B. Konvertierung von „wide“ ins „long“-Format) habe ich eigenständig übernommen. Zur Untersuchung der Zusammenhänge zwischen Tierbesitz und psychosozialen Outcomes habe ich multiple lineare FE Regressionsanalysen verwendet (symmetrisch und asymmetrisch). Die Auswahl der statistischen Verfahren, die Datenaufbereitung, die Analyse sowie die Interpretation der Ergebnisse lagen in meiner Verantwortung, wobei ich von meinem Doktorvater, Prof. Hajek, begleitet wurde. Für die Bearbeitung der Informationen kam das Programm „Stata“ zum Einsatz, welches ich ebenfalls selbstständig genutzt habe. Die Stata-Syntax habe ich selbst erstellt.

Unter Anleitung meines Doktorvaters habe ich alle Inhalte sowie die Erstellung der Publikationsarbeit eigenverantwortlich geplant und realisiert. Alle erforderlichen Überarbeitungen, einschließlich zusätzlicher Berechnungen nach der Einreichung, habe ich eigenständig durchgeführt.

6. Eidesstattliche Versicherung

Ich versichere ausdrücklich, dass ich die Arbeit selbständig und ohne fremde Hilfe, insbesondere ohne entgeltliche Hilfe von Vermittlungs- und Beratungsdiensten, verfasst, andere als die von mir angegebenen Quellen und Hilfsmittel nicht benutzt und die aus den benutzten Werken wörtlich oder inhaltlich entnommenen Stellen einzeln nach Ausgabe (Auflage und Jahr des Erscheinens), Band und Seite des benutzten Werkes kenntlich gemacht habe. Das gilt insbesondere auch für alle Informationen aus Internetquellen.

Soweit beim Verfassen der Dissertation KI-basierte Tools („Chatbots“) verwendet wurden, versichere ich ausdrücklich, den daraus generierten Anteil deutlich kenntlich gemacht zu haben. Die „Stellungnahme des Präsidiums der Deutschen Forschungsgemeinschaft (DFG) zum Einfluss generativer Modelle für die Text- und Bilderstellung auf die Wissenschaften und das Förderhandeln der DFG“ aus September 2023 wurde dabei beachtet.

Ferner versichere ich, dass ich die Dissertation bisher nicht einem Fachvertreter an einer anderen Hochschule zur Überprüfung vorgelegt oder mich anderweitig um Zulassung zur Promotion beworben habe.

Ich erkläre mich damit einverstanden, dass meine Dissertation vom Dekanat der Medizinischen Fakultät mit einer gängigen Software zur Erkennung von Plagiaten überprüft werden kann.

13.07.2026

Datum

A handwritten signature in black ink, appearing to be 'P. H.', with a long horizontal stroke extending to the right.

Unterschrift

7. Danksagung

An dieser Stelle möchte ich allen Personen danken, die mich bei der Anfertigung meiner Doktorarbeit unterstützt haben.

Ich möchte mich bei Univ.-Prof. Dr. med. Hans-Helmut König, Direktor des Instituts für Gesundheitsökonomie und Versorgungsforschung am Universitätsklinikum Eppendorf, bedanken, der mir die Möglichkeit gegeben hat, diese Arbeit unter seiner Leitung durchzuführen.

Mein besonderer Dank gilt Prof. Dr. phil. André Hajek für die ausgezeichnete Betreuung und Unterstützung bei der Durchführung meiner gesamten Doktorarbeit. Auch für seine große Hilfsbereitschaft, die mühevollen Arbeit des Korrekturlesens und die zahlreichen Ratschläge, möchte ich mich herzlich bedanken.

Meinen Eltern und meiner Schwester möchte ich für die Durchsicht meiner Doktorarbeit danken. Außerdem möchte ich Ihnen meinen Dank aussprechen, für all die Geduld und guten Zusprüche, welche sie mir während meines Studiums entgegengebracht haben. Ohne ihre uneingeschränkte, liebevolle und vielseitige Unterstützung, wäre diese Arbeit so nicht möglich gewesen.

Auch meinen Freunden, welche mit produktiven Gesprächen und lieben Worten immer für mich da waren, möchte ich danken.