DIFFERENZIELLE ENTWICKLUNGSVERLÄUFE DES WOHLBEFINDENS IM KONTEXT KRITISCHER LEBENSEREIGNISSE

Eine Längsschnittbetrachtung von der Jugend bis ins hohe Alter unter Anwendung von Paneldatenanalysen

Dissertation

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Danksagung

Die vorliegende Dissertation entstand zwischen Anfang 2017 und Anfang 2022 nahezu vollständig am Institut für Soziologie der Martin-Luther-Universität Halle-Wittenberg, außer in den letzten wenigen Monaten ab Oktober 2021 am Seminar für Sozialwissenschaften der Universität Siegen.

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TEIL A

Rahmenpapier der kumulativen Dissertation

DIFFERENZIELLE ENTWICKLUNGSVERLÄUFE DES WOHLBEFINDENS IM KONTEXT KRITISCHER LEBENSEREIGNISSE

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Den Bestandteil der vorliegenden kumulativen Dissertation bilden vier englischsprachige Manuskripte. Zum Zeitpunkt der Dissertationseinreichung im April 2022 waren bereits drei davon in internationalen Fachzeitschriften mit Peer-Review-Verfahren veröffentlicht, ein viertes wurde eingereicht und befand sich unter Begutachtung im Peer-Review-Verfahren (Ersteinreichung im März 2022).

Das verfasste Rahmenpapier der kumulativen Dissertation (Teil A) dient einer theorie- und methodenübergreifenden Einordnung, Systematisierung, Diskussion und Reflexion der vier Einzelmanuskripte (Teil B)[1], die im Folgenden aufgelistet werden:

Manuskript 1: Rathmann, Katharina (*), Loter, Katharina (*), & Vockert, Theres (2020). Critical Events Throughout the Educational Career: The Effect of Grade Retention and Repetition on School-Aged Children's Well-Being. *International Journal of Environmental Research and Public Health*, 17 (11): 4012, https://doi.org/10.3390/ijerph17114012 (Impact Factor: 4.614, * Geteilte Erstautorenschaft).

Manuskript 2: Loter, Katharina, Arránz Becker, Oliver, Mikucka, Małgorzata, & Wolf, Christof (2019). Mental Health Dynamics Around Marital Dissolution. Moderating Effects of Parenthood and Children's Age. *Journal of Family Research*, 31 (2): 155-179, https://doi.org/10.3224/zff.v31i2.03 (IF: 1.000).

Manuskript 3: Loter, Katharina, Recksiedler, Claudia, Arránz Becker, Oliver, & Perrig-Chiello, Pasqualina. Personal Growth Following Marital Dissolution: Examining Gender and Reasons for Gray Divorce. Unveröffentlichtes Manuskript vom 03.03.2022, in Überarbeitung bei *Psychology and Aging*.

Manuskript 4: Recksiedler, Claudia, Loter, Katharina, Klaas, Hannah, Hollstein, Betina, & Perrig-Chiello, Pasqualina (2018). Social Dimensions of Personal Growth Following Widowhood: A Three-Wave Study. *Gerontology*, 64 (4): 344-360, https://doi.org/10.1159/000485916 (Impact Factor: 5.597).

[1] Manuskripte 1, 2 und 3 wurden in Erstautorenschaft (Manuskript 1 in geteilter Erstautorenschaft) verfasst ggf. veröffentlicht, Manuskript 4 wurde in Zweitautorenschaft veröffentlicht. Die Erlaubnis zur Weiterverwendung der einzelnen Manuskripte in der vorliegenden Dissertation sowie eine detaillierte Beschreibung der Eigenanteile liegen dem Dekanat der Philosophischen Fakultät I vor. Alle Manuskripte wurden einheitlich formatiert.

1 Einleitung

"People's greatest hopes and fears often center on the possible occurrence of rare but important life events" (Lucas 2007: 75)

Das Leben ist ein unvorhersehbares Abenteuer, begrenzt zeitlich im Schnitt auf rund 1000 Monate. So werden von Geburt an bis zum Tod mehrere Lebensphasen durchlaufen, die alle an eine unumkehrbare zeitliche Abfolge, und demnach bestimmte Altersgrenzen und -normen, gebunden sind (Mortimer & Moen 2016; Rudinger 2017). Als Gesamtbild ergibt sich für jedes Individuum eine Sequenz von sozialen Pfaden – ein ganz individueller Lebensverlauf – mit einem Geflecht aus multiplen sozialen Rollen und Beziehungen innerhalb von Familien, Netzwerken und Institutionen (Elder, Shanahan & Jennings 2015). Über den Lebensverlauf hinweg werden unzählige Entscheidungen getroffen, unvergessliche – glückliche und traurige Momente – erlebt, Erfolge gefeiert und Niederlagen erlitten. Das individuelle Verhalten wird dabei reflektiert und kontinuierlich – vom Wohlfühlbedürfnis geleitet – den Gegebenheiten entsprechend angepasst. Im Sinne des Lebensverlaufsansatzes sind hiermit dynamische soziale Trajektorien (als Resultat von Handlungen auf sozialen Pfaden, vgl. Elder, Shanahan & Jennings 2015) gemeint, die im Zeitverlauf punktuell – erwartet oder unerwartet – von etlichen Lebensereignissen und -übergängen „eingeschnitten" und so vervollständigt werden (Elder & O'Rand 1995).

Kritische Lebensereignisse, egal ob erfreulich oder leidvoll, verursachen Stress und setzen Mechanismen der Anpassung in Gang. Je nach individuell beigemessenem Bedeutungsgehalt kann ein Ereignis zum Wendepunkt werden und dadurch eine fundamentale Abweichung oder gar eine abrupte Unterbrechung der gegenwärtigen oder ursprünglich zu erwartenden sozialen Trajektorie hervorrufen (Bernardi, Huinink & Settersten 2019: 4, vgl. auch Abbott 1997). Die Bewertungsskala der sozialen Wiederanpassung von Holmes und Rahe (1967; aus dem Englischen: *Social Readjustment Rating Scale* oder *Holmes and Rahe Stress Scale*) erfasst die Verwitwung als das am stärksten lebensverändernde und mit dem größten Anpassungsaufwand verbundene Ereignis, gefolgt von Scheidung und Trennung, Inhaftierung sowie dem Tod eines nahen Familienmitglieds. Anpassungs- und Entwicklungsprozesse im Kontext einschneidender Lebensereignisse sind bereits länger Gegenstand der Forschung und spiegeln sich in einer Reihe von Begriffen wie Adaptation, Resilienz, Erholung, Wachstum, Belastung, Trauma oder Verletzbarkeit wider (u.a. Bonanno 2004; Cullati, Kriegel, Widmer 2018; Diener, Lucas & Scollon 2006; Infurna & Jayawickreme 2019; Luhmann et al. 2012; Mangelsdorf 2020; Tedeschi & Calhoun 1996, 2004). Im Zuge der andauernden Pandemie – besonders mit Blick auf die Gesundheit und das Wohlbefinden – gewinnt diese Thematik weiterhin zunehmend an gesellschaftspolitischer Relevanz. Lebensverläufe werden destabilisiert und destandardisiert, individuelle Anpassungspotenziale auf die Probe gestellt (Settersten et al. 2020). Die zeitlichen Entwicklungsverläufe rücken verstärkt in den Forschungsfokus, es wird von kurz-, mittel- und langfristigen Folgen gesprochen.

Die Lebensverlaufsforschung entwickelt sich in substanzieller und methodischer Hinsicht in immensem Tempo weiter (u.a. Brüderl, Kratz, Bauer 2019; Mayer 2009, Bernardi, Huinink & Settersten 2019; Piccarreta & Studer 2019 für neuere Entwicklungen). Die Möglichkeit der Erforschung zeitlicher Anpassungsdynamiken im Kontext kritischer Lebensereignisse ist in erster Linie an die Verfügbarkeit von ausreichend langen Panelbefragungen gebunden, und in Deutschland, beispielsweise, erst seit der Entstehung des Sozio-oekonomischen Panels im Jahr 1984 gegeben (Sozio-oekonomisches Panel (SOEP) 2021). Mayer (2009: 414) verwendet in Verbindung mit Längsschnittdatenquellen den Ausdruck „Goldstandard der quantitativen Sozialforschung", Elder, Shanahan und Jennings (2015: 1) sprechen von einer „gravierenden Expansion an Langzeit-Längsschnittstudien". Die vorliegende Dissertation schöpft aus der vorhandenen Paneldaten-Goldgrube. Die leitende Forschungsidee ist interdisziplinärer Natur, angesiedelt an der Schnittstelle zwischen analytisch-empirischer Sozial- und Gesundheitsforschung, und Entwicklungspsychologie. Im Zentrum der Arbeit stehen ereigniszentrierte Entwicklungsverläufe des Wohlbefindens.

Das Wohlbefinden ist ein facettenreiches Konstrukt. Es herrscht bislang kein Konsensus über seine einheitliche Definition, diese „sei der Wissenschaft irgendwie entgangen" (Eger & Maridal 2015: 46). Vorhandene Forschung zur Anpassung an kritische Lebensereignisse bedient sich primär an zwei „komplementären" (vgl. Luhmann et al. 2012; Ryff, Boylan & Kirsch 2021) Entwicklungsansätzen des Wohlbefindens: dem subjektiven Wohlbefinden (Diener 1984) und dem psychologischen Wohlbefinden (Ryff 1989). Subjektives Wohlbefinden wird aus dem hedonistischen Ansatz abgeleitet und entspricht der Gesamtreflexion des eigenen Lebens, einschließlich des Portfolios an Gefühlen und Emotionen (Diener 1984; Diener et al. 2017; Kahnemann, Diener & Schwarz 1999). Obwohl die Begriffe Glück (als positive Emotion) und Lebenszufriedenheit (als Gesamtreflexion) oft als Synonyme für das subjektive Wohlbefinden verwendet werden, ist diese Gleichsetzung eine Fehlannahme, denn per Definition ist das subjektive Wohlbefinden den anderen Termini ein Oberbegriff (vgl. Ryff, Boylan & Kirsch 2021). Im Kontrast zu subjektivem Wohlbefinden, korrespondiert das psychologische Wohlbefinden – passend zum Ansatz der Eudämonie (Ryan & Deci 2001) – mit einer selbstbestimmten, sinnhaften, gelungenen und auf persönliches Wachstum ausgerichteten Lebensführung (Ryff 1989; Ryff, Boylan & Kirsch 2021; Ryff & Singer 2008). Die im Obigen vorgenommene einführende Differenzierung nach hedonistischem und eudämonistischem Wohlbefinden wurde aus zweierlei Gründen direkt zu Beginn der vorliegenden Dissertation platziert. Erstens, um zu unterstreichen, dass die Arbeit von beiden Konzepten Gebrauch macht und diese voneinander klar abzugrenzen sind. Zweitens, um darauffolgend – im separaten Blick auf beide Konzepte – den Forschungsstand zu Entwicklungsverläufen des Wohlbefindens im Kontext kritischer Lebensereignisse beleuchten und dadurch bestehende Forschungslücken besser aufzeigen zu können. Beide Ansätze sind nicht nur unterschiedlichen Ursprungs, sondern auch verschiedenartig motiviert. Das hedonistische Bestreben ist auf Vergnügen, Genuss und Wohlfühlen ausgerichtet, das eudämonistische hingegen auf Authentizität, Entwicklung und Sinnhaftigkeit (LeFebvre & Huta 2021).

1.1 Theorie und Erkenntnisse längsschnittlicher Forschung

Der Bestand an Längsschnittstudien zu Entwicklungsverläufen des Wohlbefindens im Kontext kritischer Lebensereignisse wächst zwar kontinuierlich seit Mitte der 2000er Jahre, doch die derzeit vorhandene Evidenz ist trotzdem nicht allzu umfangreich. Die Rufe nach weiteren Längsschnittstudien auf diesem Forschungsgebiet werden nicht ohne Grund immer lauter (u.a. Jayawickreme et al. 2021a; Infurna & Jayawickreme 2019, Luhmann & Intesalino 2018; Ryff, Boylan & Kirsch 2021): Die längsschnittlichen Erkenntnisse tragen nicht nur zum besseren Verständnis zeitlicher Dynamiken des Wohlbefindens bei, sondern sind auch Grundlage für fundamentale Korrekturen und Ergänzungen (Diener, Lucas & Scollon 2006) zu den lange geltenden Prämissen der Wohlbefindensforschung – wie etwa der Annahme der hedonistischen Adaptation von Brickman und Campbell (1971).

1.1.1 Entwicklungsverläufe des subjektiven Wohlbefindens

Das Konzept der hedonistischen Adaptation erinnert in seiner Ursprungsform an eine Abfolgekette an universellen, unvermeidlichen Anpassungsreaktionen des subjektiven Wohlbefindens auf emotional bedeutende Lebensereignisse (Brickman und Campbell 1971). Eine Anpassungsreaktion im Sinne der hedonistischen Adaptation dauert nicht lange. Nach einer kurzen Gewöhnungsphase mit Anstieg oder Rückgang des subjektiven Wohlbefindens, kehrt es immer wieder zu seinem neutralen Ausgangsniveau zurück (vgl. Frederick & Loewenstein 1999). Dies geschieht unabhängig von der Vorhersehbarkeit oder Wertigkeit des Lebensereignisses – eine frühere Annahme, die 1978 im Kontext eines Lotteriegewinns und einer Querschnittslähmung vorerst empirisch gestützt wurde (Brickman, Coates & Janoff-Bulman 1978; vgl. auch Luhmann et al. 2012). Knapp 40 Jahre später – auf Grundlage weiterer empirischer Arbeiten zu subjektivem Wohlbefinden – kamen Diener, Lucas und Scollon (2006) zu dem Schluss, dass das Grundkonzept der hedonistischen Adaptation zwar nach wie vor ein wichtiges Erklärungskonzept ist, aber einer wesentlichen Überarbeitung bedarf. Erstens gibt es keinen universellen Wohlfühlpegel, keinen universellen sogenannten Set-Point. Stattdessen verfügt jeder Mensch über multiple (je nach Aspekt und Untersuchungsmerkmal des subjektiven Wohlbefindens), zum großen Teil vererbbare und mit stabilen Persönlichkeitsmerkmalen korrelierte Set-Points (Lykken & Tellegen 1996; Lucas & Diener 2015; Roysamb, Nes & Vitterso 2014). Zweitens ist das neutrale Niveau des subjektiven Wohlbefindens in Wirklichkeit nicht neutral, sondern in der positiven Hälfte des unzufrieden – zufrieden Kontinuums angesiedelt und in Abwesenheit von kritischen Ereignissen altersbedingt U-förmig (Blanchflower 2021; Cummins 2010; Headey 2008; Diener et al. 2015). Es ist also normal über sich selbst positiv zu fühlen (Cummins 2010: 2). Drittens ist Adaptation keine unvermeidliche Anpassungsreaktion – eine durchaus entscheidende Erkenntnis gewonnen primär auf Basis längsschnittlicher Studien (Diener et al. 2017; Hudson, Lucas & Donnellan 2019; Luhmann & Intesalino 2018). Veränderungen der Lebensumstände infolge bestimmter Lebensereignisse können das Niveau des subjektiven Wohlbefindens somit nicht

nur kurz- oder mittelfristig, sondern auch nachhaltig verbessern oder verschlechtern (vgl. Anusic, Yap & Lucas 2014 für die Schweiz; Kettlewell et al. 2020 für Australien; Lucas 2007 für Deutschland und Großbritannien als ausgewählte Längsschnittstudien mit Schwerpunkt auf allgemeine Dynamiken des subjektiven Wohlbefindens im Kontext diverser Lebensereignisse). Tritt Letzteres ein, so lautet die gute Nachricht, dass Maßnahmen zur Steigerung des subjektiven Wohlbefindens getroffen oder, falls noch nicht vorhanden, neu entwickelt werden können. Maßgeblich ist dabei allerdings nicht nur die Kenntnis allgemeiner Dynamiken des subjektiven Wohlbefindens um ein bestimmtes Lebensereignis, sondern auch das Wissen, welche Personengruppen mit dessen Folgen am längsten und schwersten zu kämpfen haben, und dadurch potenziell auf externe Hilfe angewiesen sind. Denn es wurden, viertens, individuelle Unterschiede im Tempo und Ausmaß der Adaptation an ein und dasselbe Lebensereignis festgestellt, diese bleiben jedoch im soziodemografischen Kontext weitgehend unerforscht (Diener et al. 2017; Hudson, Lucas & Donnellan 2019; Luhmann & Intesalino 2018). Die vorliegende Dissertation nimmt sich dem Problem an und leistet in ihrem ersten Teil (Manuskripte 1 und 2) einen Beitrag zur Verringerung der existierenden Forschungslücke bei. Erforscht werden differenzielle Dynamiken des subjektiven Wohlbefindens im Kontext zwei in Deutschland häufig vorkommenden Lebensereignisse: der Rückversetzung und der nachfolgenden Klassenstufenwiederholung im Jugendalter (Manuskript 1) sowie ehelicher Trennung im mittleren Erwachsenenalter (Manuskript 2).

1.1.2 Entwicklungsverläufe des psychologischen Wohlbefindens

Ereigniszentrierte Entwicklungen des psychologischen Wohlbefindens unterliegen prinzipiell ähnlichen Anpassungsprozessen, allerdings nicht im Sinne der hedonistischen Adaptation (auch wenn das Wort Adaptation im Kontext des psychologischen Wohlbefindens nicht selten als Synonym für die Rückkehr zu einstiger „psychischer Funktionalität“ genutzt wird, vgl. Mangelsdorf 2020: 25). Im Gegensatz zu subjektivem Wohlbefinden handelt es sich bei psychologischem Wohlbefinden (nach Ryff) um sechs herausfordernde Aufgaben, die zwecks eines erfüllten Lebens zu meistern sind (Ryff, Boylan & Kirsch 2021): Selbstakzeptanz, positive Beziehungen zu anderen, Gestaltung der Umgebung im Einklang mit eigenen Bedürfnissen, Autonomie, Lebenssinn und persönliches Wachstum (vgl. Abb. 1 in Ryff & Singer 2008: 20). Ausgehend vom längerfristigen Charakter dieser Aufgaben ist es somit wenig überraschend, dass Trajektorien des psychologischen Wohlbefindens in Abwesenheit kritischer Ereignisse eine relativ hohe Stabilität aufweisen, mit Ausnahme des altersbedingten Rückgangs in den Teilkomponenten: persönliches Wachstum und Lebenssinn (Ryff, Radler & Friedman 2015; Springer, Pudrovska & Hauser 2011). Psychologisches Wohlbefinden lässt sich konzeptionell um weitere Aspekte wie Wertschätzung des Lebens, persönliche Stärke, neue Möglichkeiten oder spirituelle Veränderung ergänzen (Joseph & Hefferon 2013), die in der Literatur als Inventar des posttraumatischen Wachstums bekannt sind (vgl. Jayawickreme et al. 2021b; Tedeschi & Calhoun 1996, 2004). Ungeachtet dieses Facettenreichtums lassen sich vergleichsweise wenige Längsschnittstudien zu psychologischem Wohlbefinden im Kontext kritischer Lebensereignisse identifizieren (vgl. Mangelsdorf, Eid & Luhmann 2019). Die überwiegende

Mehrheit dieser Studien richtet ihren Fokus auf lebensbedrohliche Ereignisse wie Naturkatastrophen, Gewalttaten, Unfälle oder Krebs- und Herz-Kreislauf-Erkrankungen, und untersucht in diesem Bezug primär Veränderungen der Selbstwertschätzung, positiver Beziehungen zu anderen, Spiritualität und des Lebenssinns. Manche Wohlbefindensaspekte aus dem Inventar des posttraumatischen Wachstums wurden im Längsschnitt kaum untersucht. Und auch einschneidende partnerschaftliche Ereignisse wie Verwitwung oder Trennung, die meist mit enormen Anpassungsleistungen oder Verlusten einhergehen, fanden bislang in Verbindung mit psychologischem Wohlbefinden im Längsschnitt (oder in Studien mit zwei Messzeitpunkten) selten Beachtung (vgl. Mangelsdorf, Eid & Luhmann 2019). Traumaassoziierte Terminologie wird vorrangig in der Resilienzforschung verwendet, wenngleich der Begriff Resilienz auch im Kontext latenter Gesamttrajektorien des subjektiven Wohlbefindens des Öfteren eingesetzt wird (Infurna & Jayawickreme 2019; Infurna & Luthar 2018; Mancini, Bonanno & Clark 2011). Folgende Fachbegriffe für Gesamttrajektorien oder Reaktionsmuster des Wohlbefindens im Kontext kritischer Lebensereignisse sind disziplinübergreifend im Gebrauch: Resilienz und Resistenz, posttraumatische Belastungsstörung (chronische oder verzögerte Verschlechterung), Erholung sowie posttraumatisches oder postekstatisches Wachstum (Verbesserung) (vgl. Bonanno 2004; Infurna & Jayawickreme 2019; Hobfoll et al. 2009; Mangelsdorf 2020; Roepke 2013). Bei einer resilienten Reaktion pendelt sich das Wohlbefinden – mit Ausnahme einer milden anfänglichen Anpassung (die bei Resistenz entfällt) – auf einem unverändert hohen, „gesunden“ Niveau ein (vgl. Infurna & Jayawickreme 2019: 156). Bei den anderen Reaktionen gerät es ungleichmäßig aus dem Gleichgewicht und bleibt im Nachgang entweder langfristig beeinträchtigt (posttraumatische Belastungsstörung) oder es kehrt zum Niveau vor dem Ereignis zurück (Erholung), oder verbessert sich über das Erholungsniveau hinaus (posttraumatisches Wachstum nach einem negativen Ereignis, postekstatisches Wachstum nach einem positiven Ereignis). Während posttraumatische Belastungsstörung als Reaktion bereits intensiv erforscht wurde, mangelt es an Längsschnittstudien zu den anderen drei Anpassungsreaktionen – insbesondere unter Beachtung diverser Aspekte des psychologischen Wohlbefindens (Infurna & Jayawickreme 2019; Jayawickreme et al. 2021a; Jayawickreme, Rivers & Rauthmann 2018; Mangelsdorf, Eid & Luhmann 2019). Das mag auch unter anderem daran liegen, dass die Konzepte des posttraumatischen und postekstatischen Wachstums entsprechend erst 1996 und 2013 vorgestellt wurden (vgl. Tedeschi & Calhoun 1996, 2004; Roepke 2013). Es bleibt ungewiss, ab welchem Zeitpunkt man von Resilienz oder Wachstum im Kontext kritischer Lebensereignisse sprechen kann (Infurna & Jayawickreme 2019). Erkenntnisse bisheriger Studien basieren meist auf kurzen Beobachtungszeiträumen von bis zu 18 Monaten nach dem Ereignis (Infurna & Jayawickreme 2019; Mangelsdorf, Eid & Luhmann 2019). Mangelsdorf, Eid und Luhmann (2019) erwarten allerdings, dass potenzielle Wachstumsprozesse erst zu einem späteren Zeitpunkt – nicht vor Ablauf des ersten Jahres nach dem Ereignis – einsetzen. Nicht nur das Timing an sich bleibt demnach unerforscht, sondern auch das Ausmaß interindividueller Unterschiede im zeitlichen Verlauf. Die vorliegende Dissertation wendet sich in ihrem zweiten Teil (Manuskripte 3 und 4) auch dieser Forschungslücke zu mit dem Ziel, Trajektorien des psychologischen Wohlbefindens und seiner Aspekte

aus dem Inventar des posttraumatischen Wachstums nach einer ehelicher Trennung (Manuskript 3) und Verwitwung (Manuskript 4) in der zweiten Lebenshälfte im Kontext der Schweiz zu ermitteln und dabei die Bedeutung soziodemografischer und sozialer Faktoren zu erforschen.

1.1.3 Theorie der Ressourcenerhaltung

Eine allgemeine Erklärung für die Entstehung differenzieller Entwicklungsverläufe des Wohlbefindens im Kontext kritischer Lebensereignisse liefert die Theorie der Ressourcenerhaltung von Hobfoll (1989; aus dem Englischen: *Conservation of Resources (COR) Theory*). Es handelt sich um ein „Stressmodell" (Hobfoll 1989: 516) – ein Nachfolgemodell zu dem transaktionalen Stressmodell (Lazarus & Folkman 1984) oder eine „moderne Alternative zu Lazarus" (Schwarzer 2000: 19) – welches im Hinblick auf die Bewältigung von Stress und Veränderungen des Wohlbefindens über den Lebensverlauf eine besondere Bedeutung den Ressourcenverlusten und -gewinnen beimisst. Zwar ist die Ressourcenkomponente bei beiden Stresstheorien vorhanden, das Stressmodell von Hobfoll legt jedoch mehr Wert zum einen auf objektive statt subjektive „Realität" (Buchwald & Hobfoll 2021: 78) inklusive sozialer und kultureller Lebensumstände, zum anderen auf einschneidende Lebensereignisse und traumatischen Stress statt Mikrostressoren des Alltags mit dem Ziel, eine Konfundierung von Stressursachen mit Stressreaktionen zu vermeiden (vgl. Buchwald & Hobfoll 2021; auch Hemming 2015). Stress entsteht nicht nur bei einem faktischen Ressourcenverlust, sondern auch bei der Gefahr eines Ressourcenverlustes oder aber beim Ausbleiben eines Ressourcengewinnes nach einer (wesentlichen) Investition in die Ressourcen (Hobfoll 1989). Die Ressourcenliste ist lang und reicht von Objektressourcen (z.B. ein Haus oder eine Wohnung, einhergehend mit dem sozioökonomischen Status) über persönliche Charakteristika (nach Antonovsky 1979 auch „Resistenzressourcen", z.B. Selbstwert oder Selbstwirksamkeit) bis hin zu Bedingungs- und Energieressourcen (z.B. gute Ehe, Stabilität der Familie, sozioökonomischer Status, Wissen, Zeit; vgl. Buchwald & Hobfoll 2021; Hobfoll 1989). Als eine Sonderkategorie der Ressourcen werden von Hobfoll (1989) soziale Unterstützung und soziale Beziehungen aufgelistet. Ihre Sonderstellung lässt sich darin begründen, dass sie zwar einerseits zur Beschaffung und Akkumulation weiterer Ressourcen verhelfen (vgl. das Konzept der Ressourcen-Karawanen; Hobfoll 2010), andererseits aber auch Nachteile in Form von Konflikten, Forderungen, Sorgen oder Aufdringlichkeiten mit sich bringen und im ungünstigen Fall zur Ressourcenverminderung führen können (Hobfoll 1989; siehe auch Lund et al. 2014). Bezogen auf die Entwicklung des eigenen Vorrats an Ressourcen über den Lebensverlauf zieht Hobfoll eine Analogie zu einer Sequenz von Pfaden, diese bezeichnet er als Karawanen-Pfade (Hobfoll 2010; 2014). Das Wort „Karawane" soll dabei verdeutlichen, dass die eigenen „Cluster von Ressourcen" (Buchwald & Hobfoll 2021: 81) ein Individuum durch die einzelnen Stationen im Leben wie eine – mal größere, mal kleinere – Karawane begleiten. In Abhängigkeit von Kontextbedingungen kann es auf jedem Karawanen-Pfad nicht nur zu Ressourcenverlusten und -gewinnen, sondern auch zu ganzen Spiralen von Ressourcenverlusten und -gewinnen kommen. Ressourcen sind ungleich verteilt, daher gefährden Verlustspiralen vor allem die Individuen, die über zu wenige Ressourcen verfügen, um einen Verlust zu kompensieren.

Bei den Gewinnspiralen verhält es sich genau andersherum: Individuen mit vielen Ressourcen haben eine höhere Chance weitere Ressourcen zu generieren und dadurch in eine Gewinnspirale zu geraten. Die Theorie der Ressourcenerhaltung wird durch drei Prinzipien geleitet (Buchwald & Hobfoll 2021). Da Ressourcenverluste – insbesondere von Schlüsselressourcen (z.B. Selbstwert) – die Entwicklung und den Erhalt von Resilienz beeinträchtigen können, sind sie bedeutungsschwerer als Ressourcengewinne (Prinzip 1). Deshalb sind Lebensveränderungen, die einen Verlust entscheidender Ressourcen mit sich bringen, am meisten bedrückend und prekär (Grandey & Cropanzano 1999). Um Ressourcenverlusten vorbeugen, sich von eingetretenen Ressourcenverlusten erholen oder neue Ressourcen gewinnen zu können, bedarf es grundsätzlich zwingend eines Einsatzes von weiteren Ressourcen (Prinzip 2). Kommt es zu Lebensphasen, in denen Ressourcenverluste die Ressourcengewinne überwiegen, fangen allein marginale Ressourcengewinne an – die unter günstigeren Umständen wahrscheinlich kaum Beachtung gefunden hätten – eine fundamentale Rolle für das Wohlbefinden zu spielen (Prinzip 3). Buchwald und Hobfoll (2021: 84) sprechen von einer „paradoxen Zunahme“ der Wirkung von Ressourcengewinnen bei Traumata. Diese werden in solchen Situationen „zum Rettungsanker für Überleben, Rehabilitation und Genesung“ (Buchwald & Hobfoll 2021: 84).

Die Theorie der Ressourcenerhaltung dient in der vorliegenden Dissertation als Rahmen für die Verdeutlichung des Spektrums an möglichen Entwicklungsverläufen des Wohlbefindens vor dem Hintergrund der Ressourcenverfügbarkeit. Alle in der Arbeit betrachteten kritischen Lebensereignisse gehen mit einem (anfänglichen) Ressourcenverlust einher. Im Falle einer Klassenstufenwiederholung (Manuskript 1) werden die betroffenen Schulkinder mit der Verlängerung der schulischen Laufbahn (Verlust eines Schuljahres), dem Verlust der gewohnten Klassenumgebung und den damit verbundenen Peer-Interaktionen und Stabilität sowie nicht selten auch mit der Beeinträchtigung des Selbstwerts und Zugehörigkeitsbedürfnisses konfrontiert (Goos, Pipa & Peixoto 2021; Martin 2011). Im Falle einer Trennung, Scheidung und Verwitwung (Manuskripte 2 bis 4) wird – oftmals bereits antizipatorisch (in Abhängigkeit von der Vorhersehbarkeit des Ereignisses) – eine ganze Ressourcenverlustspirale in Gang gesetzt. Das Ende einer langen, romantischen Beziehung führt nicht nur den Verlust eines (ehemals) geliebten Menschen herbei, sondern auch den Verlust einer umfassenden Reihe von Ressourcen, die von beiden Seiten in die Beziehung investiert wurden und zum Erhalt guten Befindens verhalfen (vgl. Soons, Liefbroer & Kalmijn 2009). Getrennte, Geschiedene und Verwitwete erleben auf Paarebene den Wegfall gemeinsamer Alltagsroutinen und Aktivitäten, der Intimität und der täglichen, vertrauten Gesellschaft. Es droht zudem der Verlust gemeinsamer sozialer Kontakte (Terhell, Broese van Groenou & van Tilburg 2004) sowie im Alter eine potenzielle Abnahme sozialer Partizipation; Letzteres je nach Verfügbarkeit von weiteren Ressourcen wie soziale Beziehungen, Einkommen und Bildung (Lim-Soh 2021; Utz et al. 2002). Bei Trennung und Scheidung kommt die Problematik der Vermögensaufteilung und bei Vorhandensein gemeinsamer (minderjähriger) Kinder auch der Sorgerechtsverfügung hinzu. Zudem sind sowohl eine Kontaktreduzierung zu eigenen Kindern (oder Enkelkindern; Jaapens & Van Bavel 2019), als auch, primär für Frauen, finanzielle Einbußen denkbar (Huss & Pollmann-Schult 2020).

Der Umgang mit kritischen Lebensereignissen variiert zwischen den Individuen erheblich in Abhängigkeit von verfügbaren Ressourcen und soziodemografischen Faktoren wie das Geschlecht (u.a. Arránz Becker 2015; Huss & Pollmann-Schult 2020; Infurna et al. 2016; Perrig-Chiello & Knöpfli 2019). Mehrere Studien berichten von geschlechtsspezifischen Unterschieden in Bewältigung von Stress: Im Vergleich zu Männern greifen Frauen häufiger auf soziale Unterstützung zurück, neigen zur Nutzung maladaptiver Copingstrategien und machen sich tendenziell mehr Sorgen (Hampel & Petermann 2005; Seiffge-Krenke 2015 für das Jugendalter; Infurna et al. 2016; Perrig-Chiello & Knöpfli 2019). Trotzdem gelten Frauen als das resilientere Geschlecht – insbesondere in Krisenzeiten (Zarulli et al. 2018) – und das, obwohl sie im Erwachsenenalter über weniger materielle Ressourcen verfügen als Männer (siehe *gender-pay-gap*). In institutionalisierten Partnerschaften profitieren Frauen zwar von den materiellen Ressourcen des Partners, sind aber beim Vorliegen eigener Berufstätigkeit und Elternschaft stärker als Männer von der Doppelbelastung wegen ihrer tragenden Rolle in der Kindererziehung betroffen (vgl. Soons, Liefbroer & Kalmijn 2009). Der sozioökomische Status ist von enormer Wichtigkeit für die Bewältigung kritischer Lebensereignisse. Ein niedriger sozioökonomischer Status geht nicht nur mit wenigen Ressourcen – zum Beispiel schlechter Gesundheit (Arránz Becker & Loter 2021), schwächeren sozialen Netzwerken oder weniger sozialer Unterstützung (Melchiorre et al. 2013) – einher, sondern auch mit weniger positiven Erlebnissen im Alltag und öfterem Stressempfinden (Buchwald & Hobfoll 2021). Dabei tragen gute Netzwerkbeziehungen und Unterstützung der Herkunftsfamilie und Freunde, gerade im Kontext kritischer Lebensereignisse und über alle Lebensphasen hinweg, zur Steigerung des Wohlbefindens bei (vgl. Buchwald & Hobfoll 2021; Perrig-Chiello & Knöpfli 2019). Die moderierende Rolle von Ressourcen und soziodemografischen Faktoren für Entwicklungsverläufe des Wohlbefindens ist in der vorliegenden Dissertation zentral und ein wichtiges Bindeglied zwischen allen Manuskripten.

1.2 Systematisierung der vorhandenen Befundlage

Basierend auf theoretischen Ausführungen kann im Folgenden eine abschließende Systematisierung existierender längsschnittlicher Evidenz zu differenziellen Entwicklungsverläufen des subjektiven und psychologischen Wohlbefindens nach Lebensereignis vorgenommen werden. Zur besseren Schilderung bedarf es an dieser Stelle einer Unterteilung des subjektiven Wohlbefindens in zwei weitere distinkte Komponenten: der kognitiv-evaluativen Komponente (kognitives, kontemplatives Urteil als Ausdruck der allgemeinen Lebenszufriedenheit oder bereichsspezifischen Zufriedenheiten) sowie der affektiven Komponente (positiver und negativer Affekt; vorübergehende Emotionen wie Glücksgefühle, Freude, Angst, Zorn, depressive Verstimmung) (u.a. Diener 1984; Diener et al. 2017; Eger & Maridal 2015). Bei einer Mehrheit von Lebensereignissen verhalten sich die beiden Komponenten im Zeitverlauf durchaus ähnlich (z.B. bei Trennung oder Verwitwung), im Falle einer Schwangerschaft und Geburt eines Kindes gehen sie aber merklich auseinander: mit einem starken Anstieg der kognitiv-evaluativen Komponente und einem vergleichsweise milden Rückgang der affektiven Komponente (Kettlewell et al. 2020). Da

die vorliegende Dissertation ausschließlich im deutschen und schweizerischen Kontext verankert ist, finden empirische Befunde zu Deutschland und der Schweiz im Folgenden eine besondere Beachtung.

1.2.1 Ereignis der Rückversetzung und anschließender Klassenstufenwiederholung

Bezogen auf das Ereignis der Rückversetzung und anschließender Klassenstufenwiederholung herrscht im Allgemeinen Knappheit an längsschnittlicher Evidenz zu Entwicklungsverläufen des Wohlbefindens. Eine neuere Metaanalyse von Goos, Pipa und Peixoto (2021) identifizierte für den Zeitraum von Januar 2000 bis Oktober 2019 insgesamt 84 quantitative Studien in anspruchsvollen (quasi-)experimentellen Designs zur generellen Wirksamkeit der Ereignisses (Manuskript 1 wurde im Juni 2020 veröffentlicht). Davon durchliefen 64 Studien ein Peer-Review-Verfahren, 46 Studien verwendeten Propensity Score Matching (PSM) als Analysemethode und nur 22 Studien untersuchten (breit aufgefasste) psychosoziale Funktionalität (u.a. schulisches Selbstkonzept, Beziehungen mit Peers, Verhalten im Klassenraum und schulisches Wohlbefinden). Die Metaanalyse berücksichtigte sämtliche vorschulischen und schulischen Etappen: Kindergarten (14 Studien), Primarstufe (51 Studien) sowie Sekundarstufe (28 Studien). Für Deutschland existierten genau drei peer-begutachtete Studien (Ehmke et al. 2010; 2017; Kretschmann et al. 2019), für die Schweiz gar keine. Alle drei Studien betrachteten Sekundarstufe, nutzten PSM als Analysemethode (Ehmke et al. (2010; 2017) mit zwei Messzeitpunkten) und untersuchten Outcomes wie schulisches Selbstkonzept und schulische Fachinteressen (vorrangig in Mathematik und Deutsch) sowie Lern- und Leistungsmotivation, jedoch ohne eine weitere Differenzierung vorzunehmen. Somit war Manuskript 1 zum Zeitpunkt der Veröffentlichung die erste Längsschnittstudie zu differenziellen Entwicklungsverläufen der kognitiv-evaluativen Komponente des subjektiven Wohlbefindens (konkret: allgemeiner Lebens- und Schulzufriedenheit) um das Ereignis der Rückversetzung und anschließender Klassenstufenwiederholung in der Sekundarstufe des deutschen Schulsystems. Die Differenzierung wurde nach Geschlecht und besuchter Schulform vorgenommen. Im Jahr 2021 folgte eine weitere Veröffentlichung, diesmal mit Schwerpunktlegung auf differenzielle Verläufe des multidimensionalen Wohlbefindens (Vockert & Loter et al. 2021).

1.2.2 Ereignis der ehelichen Trennung und Scheidung

Ausgehend vom allgemeinen Entwicklungsverlauf des subjektiven Wohlbefindens lässt sich mit Blick auf die eheliche Trennung zunächst ein moderater Rückgang des subjektiven Wohlbefindens schon vor dem Ereignis beobachten, gefolgt von einem Tiefpunkt im Trennungsjahr, einer leichten Verbesserung im Scheidungsjahr und einer darauffolgenden Adaptationsphase mit einer Dauer von drei bis zu vier Jahren (Kettlewell et al. 2020; Lucas 2007). Der Befund trifft für beide Komponenten des subjektiven Wohlbefindens zu, für die kognitiv-evaluative Komponente zeigen sich jedoch nach dem Ereignis im Zeitverlauf signifikant niedrigere Werte (Kettlewell et al. 2020). Es ist an dieser Stelle anzumerken, dass der Trennungs- und Scheidungseffekt sich nur in wenigen Studien distinkt voneinander trennen lassen. Die Gründe dafür sind verschieden und reichen von Datenverfügbarkeit bis hin zu Recall-Bias.

Die Metaanalyse von Luhmann et al. (2012) erfasste allesamt 12 Längsschnittstudien zu subjektivem Wohlbefinden um das Ereignis der ehelichen Trennung und Scheidung, darunter die „Pionierstudie" von Doherty, Su und Needle (1989) mit Betrachtung geschlechtsspezifischer Effekte (als einzige Studie mit differenziellem Blick auf subjektives und psychologisches Wohlbefinden). In den darauffolgenden Jahren entwickelte sich das Forschungsgebiet rasant weiter, die meisten Studien widmeten sich aber vorwiegend einem Vergleich mehrerer Lebensereignisse untereinander (Anusic, Yap & Lucas 2014; Kettlewell et al. 2020; Jayawickreme et al. 2021a für psychologisches Wohlbefinden und persönliche Wachstumsprozesse; Lucas 2007 als ausgewählte Studien) oder analytischen Fortschritten (u.a. van Scheppingen & Leopold 2020) und selten Moderatoreffekten. Die differenzielle Sichtweise wurde im Trennungs- und Scheidungskontext – bislang in wenigen Panelstudien (mit Fixed-Effects-Regressionen als Analysemethode) – primär für die Erforschung der Unterschiede nach Geschlecht oder Elternschaft vorgenommen (u.a. Cavapozzi, Fiore & Passini 2020 im internationalen Vergleich; Huss & Pollmann-Schult 2020; Leopold 2018; Leopold & Kalmijn 2016 für Deutschland; Tosi & van den Broek 2020 für Depressivität in Großbritannien). Manuskript 2 (veröffentlicht im September 2019) gehört zu diesen wenigen Studien, verwendet aber als Outcome nicht die evaluativ-kognitive, sondern die affektive Komponente des subjektiven Wohlbefindens (mentale gesundheitsbezogene Lebensqualität; vgl. dazu Kettlewell et al. 2020). Aus der Arbeitsgruppe um Luhmann kommt ebenfalls eine weitere Metaanalyse zu Wachstumsprozessen und psychologischem Wohlbefinden in Längsschnittstudien, die bis Ende 2014 erschienen sind (Mangelsdorf, Eid & Luhmann 2018). Auch diese Metaanalyse weist auf einen enormen Mangel an Längsschnittstudien hin, mit Ausnahme weniger Studien zum Einfluss elterlicher Scheidung auf das Wohlbefinden der Kinder. Manuskript 3 ergänzt diese Forschungslücke (unter Begutachtung); die Studie untersucht Verläufe des posttraumatischen persönlichen Wachstums nach Geschlecht und Trennungsgrund in der Schweiz.

1.2.3 Ereignis der Verwitwung

Für das Ereignis der Verwitwung lässt sich ein ähnlicher globaler Entwicklungsverlauf des subjektiven Wohlbefindens wie für die eheliche Trennung und Scheidung feststellen, mit dem stärksten Rückgang des Wohlbefindens im ersten halben Jahr nach dem Ereignis. Der antizipatorische Effekt ist ebenfalls vorhanden, denn – gerade im (hohen) Alter – ist das Ereignis öfter teilweise vorhersehbar (vgl. Anusic, Yap & Lucas 2014; Infurna et al. 2016; Kettlewell et al. 2020). Infurna und Luthar (2017) ermittelten latente Gesamttrajektorien des subjektiven Wohlbefindens für einen Beobachtungszeitraum von zehn Jahren um eine Verwitwung (jeweils fünf Jahre vor und nach dem Ereignis) für Australien und stellten fest, dass der Anteil an resilienten Verwitweten stark je nach Merkmal des subjektiven Wohlbefindens variiert: von 66% für die allgemeine Lebenszufriedenheit, 37% für den generellen Gesundheitszustand bis hin zu 26% für den positiven und 19% negativen Affekt. Für den negativen Affekt (v.a. Traurigkeit, Müdigkeit, Nervosität und Sorgen) und den generellen Gesundheitszustand als einzige Merkmale wurde zudem für je 32% und 63% der Verwitweten eine chronische Belastung ermittelt. Die restlichen Muster

waren Muster der Erholung. Dieselben AutorInnen (Infurna & Luthar 2016) führten eine vergleichbare Analyse auch mit den deutschen SOEP-Daten für die Lebenszufriedenheit durch: Der Anteil resilienter Gesamttrajektorien lag im Verwitwungskontext bei 47% (dieser deckt sich mit der Studie von Bennett et al. 2020 für die Schweiz) und war sogar entsprechend höher als im Scheidungskontext (36%). Die Verwitwung scheint im Längsschnitt besser erforscht als Trennung und Scheidung. Die Metaanalysen um Luhmann (Luhmann et al. 2012; Mangelsdorf, Eid & Luhmann 2018) identifizierten 49 Studien zu subjektivem Wohlbefinden (darunter Studien mit zwei Erhebungswellen) und lediglich drei Studien zu psychologischem Wohlbefinden (Carr 2004 zu persönlichem Wachstum und Selbstwert; Kim et al. 2011 zu persönlicher Stärke und Bedeutungsfindung; Pratt, Walker & Wood 1992 für multiple Outcomes). Trotz der höheren Anzahl an Studien zur Entwicklung des Wohlbefindens im Kontext der Verwitwung wurden moderierende Einflüsse selten untersucht. Die bislang in wenigen Studien berücksichtigten Moderatoren waren das Geschlecht (u.a. Burns, Browning & Kendig 2015; Carr 2004; Streeter 2020), Belastung wegen Pflege (u.a. Gerlich & Wolbring 2021 als eine der wenigen Studien für Deutschland; Li 2005), Gesundheit des bzw. der EhepartnerIn (u.a. Sasson & Umberson 2014), Vorhersehbarkeit des Ereignisses (u.a. Siflinger 2017) oder soziale Unterstützung und Beziehungen (u.a. Sullivan & Infurna 2020). Manuskript 4 wurde im Dezember 2017 veröffentlicht und setzt am letzten genannten Merkmal an. Es ist die erste Längsschnittstudie für differenzielle Verläufe des posttraumatischen persönlichen Wachstums in Abhängigkeit von sozialer Einbettung und Unterstützung in der Schweiz.

1.3 Forschungsfragen und Beitrag der Dissertation

Der essenzielle Stellenwert des Wohlbefindens bleibt aus der Individual- und Gesellschaftsperspektive unstrittig. Gutes subjektives und psychologisches Befinden ist nicht nur mit Lebensfreude assoziiert, sondern verringert auch das Risiko für Herz-Kreislauferkrankungen und die Abnahme physischer und kognitiver Funktionen im Alter (vgl. Steptoe 2019). Stabilisierung und Stärkung des Wohlbefindens soll im Vordergrund präventiver Maßnahmen stehen, denn es spielt eine protektive Rolle sowohl für die Gesundheitsaufrechterhaltung und -förderung als auch die Langlebigkeit (Ryff, Boylan & Kirsch 2021).

Die vorliegende Dissertation untersucht im Längsschnitt differenzielle Entwicklungsverläufe des subjektiven und psychologischen Wohlbefindens im Falle dreier Ereignisse mit traumatisierendem Potenzial. Die vorhandenen Forschungslücken wurden in aller Ausführlichkeit in vorherigen Kapiteln aufgezeigt. Die Arbeit verfolgt die Absicht in vielerlei Hinsicht zu einer wesentlichen Verminderung dieser Lücken beizutragen. Der Hauptaugenmerk liegt auf der Beantwortung zweier übergeordneter Forschungsfragen. Erstens, welchen Reaktionsmustern unterliegt das subjektive und psychologische Wohlbefinden im Kontext ausgewählter kritischer Lebensereignisse? Und welche zeitlichen Tendenzen lassen sich dabei erkennen: kurz-, mittel-, langfristige, oder auch antizipatorische (sofern die Daten solche Art von Analysen zulassen)? Zweitens, welche Unterschiede und Gemeinsamkeiten kommen in einer differenziellen Betrachtung unter Einbeziehung moderierender Faktoren zum Vorschein? Welche

Rolle spielen in Abhängigkeit vom Timing die Soziodemografie oder verfügbare Ressourcen? Kann von geschlechts-, schulform-, familienstruktur- oder netzwerkspezifischen Patterns gesprochen werden? Die differenzielle Betrachtung ist in der vorliegenden Dissertation zentral und wird in den einzelnen Studien nach Geschlecht (Manuskripte 1 bis 3), besuchter Schulform (Manuskript 1), Kinderlosigkeit und Phasen der Elternschaft (Manuskript 2), Trennungs- und Scheidungsgründen (Manuskript 3) sowie sozialer Einbettung und Arten sozialer Unterstützung (Manuskript 4) vorgenommen. Sie erlaubt zudem tiefere Einblicke in die Bedeutung „signifikanter Anderer“ über den Lebensverlauf (Elder, Shanahan & Jennings 2015) und in die Anpassung an neue soziale Rollen: als KlassenwiederholerIn in einer neuen Klasse an verschiedenen weiterführenden Schulformen (Manuskript 1), als alleinerziehende/r Mutter oder Vater mit Kindern unterschiedlichen Alters oder geschiedene/r Alleinstehende/r (Manuskript 2), als betrogene/r versus nicht betrogene/r Geschiedene/r im Alter 45+ (Manuskript 3), und als ältere verwitwete Person nach einer langen Ehe mit starker versus schwacher sozialer Unterstützung und Einbettung (Manuskript 4). In der vorliegenden Dissertation geht es nicht um eine systematische Erforschung der Determinanten des Wohlbefindens. Mithilfe der differenziellen und längsschnittlichen Betrachtung soll im Endergebnis eine umfassende Erkenntnissammlung entstehen mit dem Zweck, Entwicklungschancen und Vulnerabilitäten im Kontext kritischer Lebensereignisse im Zeitverlauf zu erkennen und daraus Handlungspotenziale erarbeiten zu können. Die folgende Skizze (**Abbildung 1**) soll den Gesamtbeitrag der vorliegenden Dissertation mithilfe beispielhafter Entwicklungsverläufe des Wohlbefindens illustrieren:

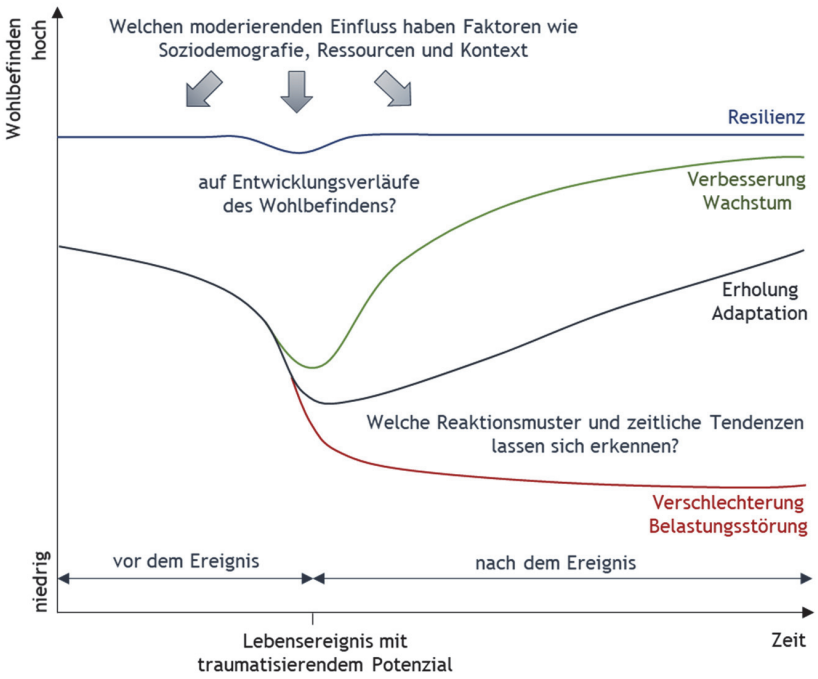

Abbildung 1: Beitrag der vorliegenden Dissertation

1.4 Reflexion des methodischen Vorgehens

Die vorliegende Dissertation profitiert von der breiten Verfügbarkeit sekundärer Paneldatenquellen. Die Datengrundlage bilden drei Panelbefragungen: das Nationale Bildungspanel NEPS, Startkohorte 3 (Blossfeld & Roßbach 2019; Manuskript 1), das Sozio-oekonomische Panel (SOEP 2021; Manuskript 2) und die LIVES-Befragung „Partnerschaft in der zweiten Lebenshälfte – Herausforderungen, Verluste und Gewinne", Stichproben der Geschiedenen und der Verwitweten (Perrig-Chiello & Margelisch 2015; Margelisch & Perrig-Chiello 2016; Manuskripte 3 und 4). Als Hauptanalyseverfahren werden Fixed-Effects-Regressionen (Manuskripte 1 und 2) und Wachstumskurven (Manuskripte 3 und 4) angewandt.

1.4.1 Datenverfügbarkeit, Outcomevariablen und Stichproben

Das Nationale Bildungspanel NEPS und das Sozio-oekonomische Panel SOEP sind Panelbefragungen mit einer langjährigen Tradition – NEPS hat 2020 das 10. Jubiläum gefeiert, SOEP wird demnächst 40 und ist die längste Panelbefragung Deutschlands. Die LIVES-Panelbefragung wurde im Zeitraum von 2012 bis 2016 in zweijährigen Abständen durchgeführt und umfasst final drei Befragungswellen. Die Anzahl vorhandener Befragungswellen gleicht allerdings – insbesondere bei langen Panelbefragungen – nicht immer der Anzahl an Messwiederholungen des Untersuchungsmerkmals. Gemeint sind damit nicht nur Antwort- oder Stichprobenausfälle, sondern auch der Verzicht auf ganze Fragebatterien in einzelnen Wellen. Manuskript 1 verwendet als Outcomevariablen die allgemeine Lebens- und Schulzufriedenheit (kognitiv-evaluative Komponente des subjektiven Wohlbefindens). Die Fragen lauteten entsprechend: „Wie zufrieden sind Sie gegenwärtig, alles in allem, mit Ihrem Leben?" und „Wie zufrieden sind Sie mit Ihrer schulischen Situation?". Die Items wurden auf einer 10er Skala jede Welle erhoben (Cantril 1965), somit lagen bis zum Zeitpunkt der Veröffentlichung höchst neun Messungen vor. Manuskript 2 erforscht die mentale gesundheitsbezogene Lebensqualität mittels des SF-12 Erhebungsinstruments (affektive Komponente des subjektiven Wohlbefindens). Im Gegensatz zur Lebenszufriedenheit, die seit 1984 jährlich erhoben wird, wurden die SF-12-Items erst 2002 in den Fragenkatalog aufgenommen und alle zwei Jahre erhoben (Nübling, Andersen & Mühlbacher 2006). Zum Zeitpunkt der Publikation waren dementsprechend acht Messungen vorhanden (trotz eines deutlich längeren Panels als in der NEPS-Studie). Die gesundheitsbezogene Lebensqualität wurde als Gesundheitsgesamtscore im Rahmen einer Hauptkomponentenanalyse extrahiert (reskaliert von 0 „sehr schlechte mentale Verfassung bis 100 „sehr gute mentale Verfassung"). Die zugrundeliegenden Subskalen waren: mentale Gesundheit, Vitalität, emotionale Rollenfunktion und soziale Funktionsfähigkeit. Manuskripte 3 und 4 schöpfen aus den – weder bei NEPS noch SOEP erhobenen – Items des Inventars des posttraumatischen persönlichen Wachstums (psychologisches Wohlbefinden; vgl. Cann et al. 2010 aus dem Englischen: *Posttraumatic Growth Inventory* (*PTGI*); Maercker & Langner 2001 verwenden als Begriff „persönliche Reifung" statt „persönliches Wachstum"). Es handelt sich um ein Skalenkonstrukt (10 Items), welches Veränderungen „durch den Verlust" (lese: Trennung/Scheidung im Manuskript 3 und Verwitwung im Manuskript 4) auf

einer Skala von 0 „Ich habe diese Veränderung nicht als Folge des Verlustes erfahren“ bis 5 „Ich habe diese Veränderung zu einem sehr hohen Grad als Folge des Verlustes erfahren“ quantifiziert. Das ursprüngliche Messinstrument umfasste 21 Items (Tedeschi & Calhoun 1996), die als Gesamtindex bzw. fünf Subdimensionen auszuwerten seien (vgl. Maercker & Langner 2001). Die vorliegende Dissertation verwendet die kurze Fragebogenversion (*PTGI-SF*: *Posttraumatic Growth Inventory-Short Form*; Cann et al. 2010) mit zehn Items und fünf Subdimensionen: Wertschätzung des Lebens, persönliche Stärke, spirituelle Veränderung, Beziehungen zu anderen und neue Möglichkeiten. Die Items wurden dreimal (in jeder Welle) erhoben – eine seltene Ausnahme im Vergleich zu früheren Studien mit nur einer oder höchstens zwei Messungen (u.a. Mangelsdorf, Eid & Luhmann 2018). Da die fünf-faktorielle Struktur der PTGI-Skala nicht für alle Länderkontexte validiert werden konnte (vgl. u.a. Lamela et al. 2014 für Portugal; Mordeno et al. 2016 für die Philippinen), betonen manche Studien (u.a. Linley, Andrews & Joseph 2007) die Notwendigkeit der Skalenüberprüfung. In Manuskripten 3 und 4 wurde deshalb eine explorative Faktorenanalyse im Full-Information-Maximum-Likelihood-Verfahren (FIML) durchgeführt und für beide Stichproben jeweils eine drei-faktorielle statt einer fünf-faktoriellen Lösung ermittelt. Im Manuskript 3 wurde zusätzlich die Messinvarianz des persönlichen Wachstums zwischen den Wellen mittels einer konfirmatorischen Multi-Gruppen-Faktorenanalyse getestet. Der PTGI-SF-Gesamtindex setzte sich in Manuskripten 3 und 4 demzufolge aus sechs Items und drei Subdimensionen zusammen: Wertschätzung des Lebens, persönliche Starke und spirituelle Veränderung (skaliert von 0 bis 5, vgl. obige Codierung).

Die analytischen Stichprobengrößen reichen von 20.621 SOEP-Befragten (Manuskript 2) über 4.581 bzw. 3.441 NEPS-Schulkinder (Manuskript 1) bis hin zu 575 Getrennten (Manuskript 3) und 508 Verwitweten der LIVES-Studie (Manuskript 4). Der Unterschied in den Stichprobenumfängen zwischen dem ersten und dem zweiten Teil der vorliegenden Dissertation liegt daran, dass Manuskripte 1 und 2 jeweils Vergleichsgruppen von Personen ohne Erfahrung des kritischen Lebensereignisses einbeziehen. Gemeint sind 4.094 bzw. 2.995 regulär versetzte Schulkinder (Manuskript 1) und 19.953 kontinuierlich Verheiratete (Manuskript 2), denen das jeweilige Ereignis womöglich zukünftig bevorsteht. Aus diesen Angaben ergeben sich 487 bzw. 446 Ereignisse der Rückversetzung und Klassenstufenwiederholung im NEPS (Manuskript 1) und – eingeschränkt durch den Erhebungszeitraum der SF-12 Skala – 668 eheliche Trennungen und Scheidungen im SOEP (Manuskript 2). Da die PTGI-SF-Items in Manuskripten 3 und 4 ereignisbedingt – also nur bei bereits Getrennten und Verwitweten – erhoben werden konnten, entfiel die Möglichkeit einer Vergleichsgruppe. Die hohe Anzahl an Ereignissen in der LIVES-Studie ließ sich dank besonderen Ziehungskriterien erreichen (es wurden gezielt jeweils Getrennte/Geschiedene und Verwitwete rekrutiert, bei denen das entsprechende Ereignis höchstens fünf Jahre zurücklag; Perrig-Chiello & Margelisch 2015). Für die NEPS-Stichprobe wurden je zwei Stichprobenumfänge angegeben, dies resultiert aus einer inhaltlichen Überlegung. Die eingegrenzte Stichprobe umfasst nur diejenigen Schulkinder, die von ihren Zeugnisnoten her mindestens einmal eine ausreichende, mangelhafte oder ungenügende Note auf dem Halbjahres- oder Jahreszeugnis während der Schullaufbahn erzielt haben.

1.4.2 Beobachtungszeiträume und Analyseverfahren

Alle vier Manuskripte bauen auf ereigniszentrierten Analyseverfahren auf. Die Beobachtungszeiträume ergaben sich aus der Chronologie der vorhandenen Messungen der Outcomevariablen vor und nach dem jeweiligen Lebensereignis. Im Manuskript 1 erstreckte sich der Gesamtbeobachtungszeitraum auf höchstens sieben Jahre vor der Rückversetzung und fünf Jahre nach der Klassenstufenwiederholung. Im Manuskript 2 wurde die Outcomevariable frühestens 14 Jahre vor und spätestens 11 Jahre nach der ehelichen Trennung beobachtet. Für Manuskripte 3 und 4 waren keine Messungen aus der Zeit vor dem Ereignis vorhanden, die Beobachtungszeiträume umfassten jeweils bis zu 12 Jahre nach der ehelichen Trennung (Manuskript 3) und bis zu 8 Jahre nach der Verwitwung (Manuskript 4). In allen Manuskripten wurden – basierend auf einer eingehenden deskriptiven Inspektion und Poweranalysen (Letzteres im Manuskript 4) – gering besetzte Prozesszeit-Zellen (bspw. an Verteilungsrändern oder bei größeren Abständen zwischen den Beobachtungen) wohlüberlegt zusammengefasst mit dem Ziel, angemessene ereigniszentrierte Prozesszeitachsen für Auswertungszwecke zu konstruieren.

Die vorliegende Dissertation legt in ihrem ersten Teil (Manuskripte 1 und 2) den Schwerpunkt auf intraindividuelle differenzielle Entwicklungsverläufe des subjektiven Wohlbefindens und nutzt als Analyseverfahren so genannte „Impact Functions“ in der Fixed-Effects-Regression-Variante (Andreß, Golsch & Schmidt 2013; Ludwig & Brüderl 2021). Vorausgesetzt, man verfügt über Beobachtungen vor wie auch nach dem Ereignis, lässt sich mittels Impact Functions „der zeitliche Verlauf eines kausalen Effekts“ (Ludwig & Brüderl 2021: 454) um ein Ereignis herum schätzen. Impact Functions lassen sich in: „Treppen“ Impact Functions (*Step Impact Functions*; für die Schätzung des zeitkonstanten Effekts eines Ereignisses), kontinuierliche Impact Functions (*Continuous Impact Functions*; für die Schätzung des unmittelbaren Effekts eines Ereignisses und seiner zeitveränderlichen Polynomfunktion danach) und Dummy Impact Functions (*Dummy Impact Functions*; für eine flexible Schätzung des Effekts eines Ereignisses zu jedem durch mehrere Dummy-Variablen definierten Zeitpunkt, einschließlich möglicher Antizipation-Effekte) unterteilen (Ludwig & Brüderl 2021). In Manuskripten 1 und 2 wurde die zuletzt genannte flexible Schätzvariante im Fixed-Effects-Ansatz eingesetzt. Die Analysen basieren auf zwei sorgfältig „zugeschnitten“ Schätzstichproben und umfassen jeweils sechs Prozesszeit-Dummies, davon nur eine inhaltlich wohlbedachte Antizipation-Dummy im Manuskript 2 (vgl. Empfehlungen von Ludwig & Brüderl 2021). Die analytische Schätzgleichung sieht in ihrer verallgemeinerten Form wie folgt aus:

$$Outcome_{it} = \alpha_i + \sum_{k=0}^{K} \beta_k D_{k,it} + \beta' X_{it} + \varepsilon_{it}$$

mit $D_{k,it}$ als Set von Prozesszeit-Dummies im Zeitverlauf definiert durch den Zähler k ($k = 0$ entspricht der ersten Beobachtung nach dem Ereignis; $k = -1$ wäre der Zählerbeginn für Manuskript 2), X_{it} als Vektor aller zeitveränderlichen Confounders, α_{it} als personenspezifischen Fixed-Effects sowie ε_{it} als zeitveränderlichem, exogenem Fehlerterm (vgl. Ludwig & Brüderl 2021). Die Analysemethode ist auch

unter dem Begriff *Distributed Fixed-Effects* bekannt (Dougherty 2006). Für jede Prozesszeit-Dummy ergibt sich ein durchschnittliches personenspezifisches Niveau des Wohlbefindens, dessen Höhe mit dem durchschnittlichen personenspezifischen Ausgangsniveau aus der Zeit vor dem Ereignis (Baseline-Dummy) verglichen wird. Als Gesamtbild entsteht ein Entwicklungsverlauf des Wohlbefindens. Für die differenzielle Betrachtung wurden die Verläufe gruppenspezifisch geplottet (allgemeiner Verlauf und sechs differenzielle Verläufe im Manuskript 1 sowie zehn differenzielle Verläufe im Manuskript 2). Die gewählte Analysemethode bringt mehrere Vorteile. Der Fixed-Effects-Schätzer ist sowohl konsistent als auch unverzerrt, auch unter dem Aspekt der unbeobachteten zeitkonstanten personenspezifischen Heterogenität. Die Schätzung des kausalen Effekts funktioniert auch ohne zwingende ereignisbedingte Randomisierung, womit das Problem der Selbstselektion größtenteils umgegangen werden kann (vgl. Ludwig & Brüderl 2021). Zudem lässt sich mittels Prozesszeit-Dummies eine feingliedrige Dynamik des Wohlbefindens in Form von unmittelbaren, kurz-, mittel- und langfristigen Effekten nachbilden. Beide Manuskripte schließen sorgfältig ausgewählte zeitveränderliche Confounders ein.

Die Wahl des analytischen Vorgehens für den zweiten Teil der vorliegenden Dissertation (Manuskripte 3 und 4) zielte auf die Erforschung gruppenspezifischer Trajektorien des psychologischen Wohlbefindens, einschließlich der Niveauunterschiede zwischen den Gruppen. Dies ließ sich trotz des Drei-Wellen-Befragungsdesigns (nach dem Ereignis) mittels Wachstumskurven in der Random-Effects-Regressionsvariante umsetzen. Die Prozesszeit entsprach allerdings nicht dem biologischen Alter (die häufigste Wahl bei Wachstumskurven), sondern der Trennungs- (Manuskript 3) und Verwitwungsdauer in Jahren (Manuskript 4). Anstelle von Zeit-Dummies wurde nun eine sparsamere Modellspezifikation mittels quadratischer (Manuskript 3) und kubischer (Manuskript 4) Polynomfunktion der Prozesszeit gewählt, ergänzt um Interaktionsterme zwischen der Prozesszeit und zeitkonstanter Gruppenvariable. In der Terminologie von Ludwig & Brüderl (2021) entspricht dieses Vorgehen den gruppenspezifischen kontinuierlichen Impact Functions im Random-Effects-Ansatz. Die analytische Schätzgleichung sieht in ihrer verallgemeinerten Form für eine lineare Modellspezifikation wie folgt aus:

$$Outcome_{it} = \alpha_i + \vartheta G_i + \beta PZ_{it} + \delta(G_i * PZ_{it}) + \beta' X_{it} + \tau' C_i + \varepsilon_{it}$$

mit G_i als zeitkonstanter Gruppenvariable, PZ_{it} als Prozesszeit, ϑ als Gruppenunterschied zu $PZ = 0$, β als Veränderung pro Jahr, δ als Veränderung des Gruppenunterschieds pro Jahr, X_{it} als Vektor aller zeitveränderlichen Confounders, C_i als Vektor zeitkonstanter Variablen, α_{it} als personenspezifischen Random-Effects sowie ε_{it} als zeitveränderlichem Fehlerterm (abgewandelt von Brüderl, Kratz & Bauer 2019). Diese Art von Modellierung korrespondiert mit einem holistischen Blick auf den Lebensverlauf bzw. Lebensphasen, ohne den Anspruch kausale Effekte zu schätzen. Vergleiche gruppenspezifischer Niveauunterschiede sind im Zeitverlauf nur im Random-Effects-Ansatz möglich, daher wird durch den Einsatz von Wachstumskurven das gesamte Potenzial der verfügbaren Paneldaten genutzt. Nachteilig ist lediglich, dass Gruppeneffekte in der Random-Effects-Spezifikation von eventuellem Problem der

unbeobachteten Heterogenität betroffen sein können. Mehrere zeitkonstante und zeitveränderliche Kovariaten wurden stufenweise in die Analysen aufgenommen, die gruppenspezifischen Trajektorien blieben davon weitgehend unbeeinflusst.

Die vorliegende Dissertation macht Gebrauch von etlichen Robustheitsanalysen (z.B. mittels eines Mehrebenen-Hybridmodells im Manuskript 1), beschäftigt sich gründlich mit der Problematik potenzieller Methodenartefakte wie Panelattrition und verwendet mehrere diagnostische Tests (u.a. den Hausmann-Test oder den Wald-Test). An dieser Stelle ist letztlich zu erwähnen, dass die Autorin der vorliegenden Dissertation für sämtliche Arbeit mit empirischen Daten in allen vier Manuskripten alleinverantwortlich war.

1.5 Zusammenfassung der Ergebnisse einzelner Studien

Im Folgenden werden die wichtigsten Ergebnisse der vorliegenden Dissertation zusammengetragen. Die Darstellung erfolgt in der Reihenfolge der Manuskripte.

Manuskript 1 mit dem Titel „*Critical Events Throughout the Educational Career: The Effect of Grade Retention and Repetition on School-Aged Children's Well-Being*“ ist eingebettet im Kontext des deutschen Sekundarschulsystems und verfolgt zwei Forschungsziele: Erstens, die prozentualen (stichprobenbezogenen) Anteile an Rückversetzung nach Geschlecht und besuchter weiterführender Schulform zu ermitteln und zweitens, die differenziellen Verläufe der Lebens- und Schulzufriedenheit um das Ereignis der Rückversetzung und Klassenstufenwiederholung aufzudecken. Insgesamt gesehen erleben 20,3% aller Schulkinder in Deutschland eine Rückversetzung während der Schullaufbahn (OECD 2016). Doch es gelten diverse bundeslandspezifische Regelungen, bedingt durch den föderalistischen Charakter des deutschen Bildungssystems. Alle im Manuskript 1 durchgeführten Analysen basieren auf einer Stichprobe von Schulkindern ohne Migrationshintergrund um für die Beurteilung der Effektivität der Rückversetzung als Maßnahme die schulbezogene herkunftsbedingte Heterogenität zu reduzieren. Die Studie zeigt zunächst in deskriptiver Hinsicht, dass Jungen öfter als Mädchen eine Jahrgangsstufe wiederholen. Dies lässt sich, unter anderem, durch tendenziell bessere Schulleistungen von Mädchen und ihre höhere Affinität für schulbezogene Sachen erklären. Es wurden auch Stichprobenanteile für vier weiterführende Schulformen: Hauptschulen, Schulen mit mehreren Bildungsgängen, Realschulen und Gymnasien ermittelt. Dabei wurde der höchste Anteil an Rückversetzungen für Realschulen und Gymnasien festgestellt, was in einer Stichprobe von Kindern ohne Migrationshintergrund auf mögliche positive Selektion deutet (Kinder mit Migrationshintergrund besuchen generell weniger anspruchsvolle Schulformen). Da die Anzahl an Rückversetzungen für Gesamt- und Förderschulen unzureichend war, wurden diese beiden Schulformen aus den Analysen ausgeschlossen. Die Fixed-Effects-Regressionen brachten die wichtigsten Erkenntnisse hervor. Im Jahr der Rückversetzung (Entscheidungsjahr) wurde allgemein zwar ein signifikanter Rückgang der Schulzufriedenheit im Vergleich zum Ausgangsniveau beobachtet, dieser war aber von kurzer Dauer. Denn bereits im darauffolgenden Schuljahr (das erste

Schuljahr in der neuen Klasse) erfolgte eine vollständige Erholung bzw. sogar eine kontinuierliche Verbesserung der Lebens- und Schulzufriedenheit über das Ausgangsniveau hinaus. Für Jungen zeigte sich sowohl für die Lebens- als auch Schulzufriedenheit ein ähnliches Muster, für Mädchen nur für die Schulzufriedenheit. Mit Blick auf die besuchte Schulform profitierte insbesondere das Wohlbefinden der Gymnasialkinder und in geringerem Maße auch das der Realschulkinder von einer Rückversetzung. Diese Erkenntnis wurde umfassend diskutiert, mögliche Erklärungen zielen auf bessere Unterstützung der Herkunftsfamilie, Freunde und Lehrkräfte oder Nutzung der Option freiwilliger Wiederholung mit dem Ziel der Leistungsverbesserung.

Manuskript 2 betitelt „*Mental Health Dynamics Around Marital Dissolution. Moderating Effects of Parenthood and Children's Age*" widmet sich den Verläufen mentaler gesundheitsbezogener Lebensqualität von getrennten kinderlosen Frauen bzw. Müttern und kinderlosen Männern bzw. Vätern in Abhängigkeit vom Alter des jüngsten leiblichen Kindes im Haushalt. Die Studie ist im Kontext des deutschen Scheidungsrechts angesiedelt: Einer Scheidung muss ein Trennungsjahr als Nachweis der Ehezerrüttung vorangehen (es sein denn, es tritt der Fall unzumutbarer Härte ein). Zudem darf eine Ehe nur durch eine richterliche Entscheidung geschieden werden (vgl. Bürgerliches Gesetzbuch sowie das Gesetz über das Verfahren in Familiensachen). Bei einer Scheidung mit Kindern kommt das Thema des Sorgerechts bzw. der Übertragung des Sorgerechts hinzu. Mehr als 80% aller Ehen in Deutschland werden nach dem Trennungsjahr geschieden, etwa 50% der Ehen haben zum Zeitpunkt der Scheidung minderjährige Kinder, davon circa die Hälfte ein Kind (Statistisches Bundesamt 2018). Manuskript 2 nimmt als Ausgangspunkt den allgemeinen Verlauf des subjektiven Wohlbefindens um eine Trennung/ Scheidung herum (mit einer Verschlechterung des Wohlbefindens im Vorfeld des Ereignisses und einer nachfolgenden Erholung) und stellt dies betreffend zwei Forschungshypothesen auf. Zum einen wird erwartet, dass das V-förmige Verlaufsmuster des subjektiven Wohlbefindens um eheliche Trennung für Eltern (Mütter wie auch Väter) markanter ausfallen wird als für Kinderlose. Zum anderen – bezogen explizit auf die Elternschaft – dass sich der Rückgang des Wohlbefindens bei Eltern jüngerer Kinder, vor allem bei alleinerziehenden Müttern, deutlicher manifestieren wird als bei Eltern älterer Kinder. Die Befragten wurden in zehn distinkte Gruppen (je fünf für Frauen und Männer) nach den Kriterien der Präsenz und der Entwicklungsphase des Kindes (frühe Kindheit, mittlere Kindheit, Adoleszenz und Erwachsenenalter) unterteilt. Die Ergebnisse der Fixed-Effects-Regressionen legten in beinahe allen Gruppen entweder adaptive oder resiliente Muster der mentalen Verfassung um eine Trennung offen. Ein antizipatorischer (negativer) Effekt im Vorfeld der Trennung ließ sich nur für kinderlose Männer, Mütter von Säuglingen und Kleinkindern sowie Mütter von bereits erwachsenen Kindern beobachten. Eine vollständige Erholung erfolgte in den meisten Gruppen binnen zwei bis drei Jahre, mit Ausnahme alleinerziehender Mütter von Säuglingen und Kleinkindern. Für diese Gruppe ließ sich – als einzige Gruppe – eine chronische Verschlechterung der mentalen Lebensqualität nach der Trennung erfassen. Als Kontrast ergab sich gerade bei Vätern von jüngeren Kindern das Muster der Resilienz. Die Studie hebt hervor und diskutiert geschlechtsspezifische Ungleichheiten im Kontext der ehelichen Trennung.

Manuskript 3 mit dem Titel "*Personal Growth Following Marital Dissolution: Examining Gender and Reasons for Gray Divorce"* setzt sich mit dem Ereignis ehelicher Trennung im Alter 45+ auseinander und richtet den Fokus auf die Erforschung geschlechts- und trennungsgrundspezifischer Verläufe des posttraumatischen persönlichen Wachstums nach überwiegend (sehr) langen Ehen. Der Studie liegt der Kontext des schweizerischen Scheidungsrechts zugrunde: Für den häufigsten Fall einer einvernehmlichen Scheidung reichen lediglich ein Scheidungsbegehren und -konvention, sodass eine Scheidung binnen weniger Monate vollzogen wird. Im Falle einer strittigen Scheidung muss entweder eine zweijährige Trennungsphase nachgewiesen werden oder die Fortsetzung der Ehe als unzumutbar gelten (Schweizerisches Zivilgesetzbuch). Scheidungen mit mindestens einem Ehegatten im Alter 50+ stellten in der Schweiz im Jahr 2020 fast die Hälfte aller Scheidungen dar. Die Forschungshypothesen wurden in Abhängigkeit von Geschlecht und zwei Gruppen von Trennungsgründen hergeleitet. Als Gruppierungskriterium für – insgesamt 11 als Mehrfachantwortset erhobene – Trennungsgründe diente die Nennung sexueller und/oder emotionaler Untreue des/r Ehepartners/in (eine theoriegeleitete Entscheidung, die im Manuskript 3 ausführlich begründet wurde). Für Frauen und Betrogene wurde jeweils mehr persönliches Wachstum (in Entwicklung über die Zeit und als Niveauunterschied) infolge ehelicher Trennung erwartet im Vergleich zu entsprechend Männern und Personen, die keine Untreue als Trennungsgrund nannten. Ein abruptes oder unerwartetes Ende einer Ehe wegen Untreue kann mehr Wachstumsprozesse anstoßen als ein langsames Auseinanderleben. Da Frauen, erstens, mehr auf soziale Netzwerke zugreifen und diese bekanntlich Wachstumsprozesse fördern können (vgl. dazu ebenfalls Manuskript 4), und da sie, zweitens, häufiger als Männer als Betrogene dastehen (mehr als 70% aller Betrogenen), wurde das größte persönliche Wachstum bei betrogenen Frauen vermutet. Die gruppenspezifischen Wachstumskurven gaben stabile Verläufe des persönlichen Wachstums und seiner drei Subdimensionen: Wertschätzung des Lebens, persönliche Starke und spirituelle Veränderung her, mit kleinen bis moderaten Veränderungen über den Beobachtungszeitraum (0 bis 12 Trennungsjahre). In Übereinstimmung mit den ersten beiden Hypothesen zeigten sich allerdings mittel- und langfristig signifikante Unterschiede nach Geschlecht und ehelicher Untreue. Diese ließen sich für das Geschlecht primär auf Unterschiede in persönlicher Stärke zurückführen, für die Untreue jedoch auf Unterschiede in Wertschätzung des Lebens und spiritueller Veränderung. Betrogene Frauen berichteten im Schnitt die höchsten Werte des persönlichen Wachstums und seiner Subdimensionen. Die Erkenntnisse wurden mit Blick auf potenzielle psychologische Erträge infolge einer Trennung umfassend diskutiert.

Manuskript 4 betitelt „*Social Dimensions of Personal Growth Following Widowhood: A Three-Wave Study*" verhilft zum Verständnis persönlicher Wachstumsprozesse nach einer Verwitwung, einem Ereignis von dem – auch im Kontext der Schweiz – überwiegend Frauen betroffen sind. Die Studie nutzt gruppenspezifische Wachstumskurven mit dem Ziel, den Gesamtverlauf des persönlichen Wachstums sowie seine gruppenspezifischen Verläufe in Abhängigkeit von zwei Aspekten sozialer Unterstützung bis zu 8 Jahre nach der Verwitwung zu ermitteln. Für die früheren Jahre des Trauerprozesses wurde angenommen, dass Wachstumsprozesse durch eine verlustbedingte aktive Suche nach Unterstützung

und Trost hervorgerufen werden können. Für die späteren Jahre lautete die Erwartung, dass sich der moderierende Einfluss der sozialen Einbettung (versus Einsamkeit) zunehmend zeigen müsste, anstelle sozialer Unterstützung. Dies ließ sich wie folgt begründen: In früheren Trauerjahren benötigen viele Betroffene aktive Unterstützung im Aufarbeiten des Verlustes und in der Reorganisation des Lebens. In späteren Jahren zählt primär das wahrgenommene Ausmaß an verfügbaren Unterstützungsoptionen – auf lange Sicht als Ausdruck positiver Veränderung durch Bildung eines Unterstützungsnetzwerks. Es wurden drei zeitkonstante Gruppen für die aktive Suche nach Unterstützung und Trost gebildet: 1) Personen, die nach Unterstützung und Trost durch informelle (z.B. Familie und Freunde) und formelle (z.B. kirchliche Seelsorge, Psychologen) soziale Netzwerke suchten, 2) Personen, die ausschließlich allein versuchten, mit dem Verlust zurechtzukommen und 3) Personen, die eine Mischung aus beiden Copingstrategien nutzten. Bezogen auf den Grad der sozialen Einbettung wurde zwischen schwacher versus starker Einbettung differenziert. Ähnlich wie im Manuskript 3 zeigten sich auch in dieser Studie relativ stabile (flache oder nur leicht gewölbte) und tendenziell über die Zeit abfallende Verläufe des persönlichen Wachstums und seiner Subdimensionen. Die differenzielle Betrachtung legte deutliche Niveauunterschiede offen, insbesondere zwischen Verwitweten, die selbst aktiv nach Unterstützung und Trost suchten versus denjenigen, die allein versuchten mit dem Verlust zurechtzukommen. Die Letzteren berichteten im Schnitt niedrigste Niveaus an persönlichem Wachstum, Wertschätzung des Lebens, persönlicher Stärke und spiritueller Veränderung über den Beobachtungszeitraum. Anders als ursprünglich angenommen zeigten sich kaum Unterschiede nach sozialer Einbettung. Die Erkenntnisse unterstreichen die fundamentale Rolle sozialer Unterstützung als Schlüsselressource in allen Phasen des Trauerprozesses nach einer Verwitwung.

1.6 Diskussion und Schlussfolgerungen

Die vorliegende Dissertation untersucht Reaktionsmuster und zeitliche Tendenzen des subjektiven und psychologischen Wohlbefindens im Kontext dreier kritischer – prinzipiell eher negativ aufgefasster – Lebensereignisse: einer Klassenstufenwiederholung, ehelicher Trennung/Scheidung und Verwitwung. Die Reaktionsmuster und zeitliche Tendenzen werden dabei nicht nur allgemein, sondern vorrangig in einer differenziellen Betrachtung erforscht: unter Einbeziehung diverser moderierender Faktoren wie Soziodemografie, Ressourcen und Kontext. Die Arbeit verfolgt sonach als Hauptziel, zu einem tieferen Verständnis von Entwicklungschancen und Vulnerabilitäten in kritischen Lebensphasen beizutragen.

Die neuesten Empfehlungen unterstreichen die Notwendigkeit längsschnittlicher Forschung (u.a. Diener et al. 2017; Infurna & Jayawickreme 2019; Luhmann & Intesalino 2018; Mangelsdorf, Eid & Luhmann 2019). In Bezug auf Studien zur Adaptation schreiben Luhmann und Intesalino Folgendes (2018: 16; übersetzt aus dem Englischen): „Eine ideale Studie sollte längsschnittlich sein und ihren Fokus auf einen diskreten Stimulus oder ein Ereignis legen“. Für Wachstumsprozesse wird Ähnliches gefordert (vgl. Jayawickreme et al. 2021). Des Weiteren sollen, unter anderem, multiple Messungen

des Wohlbefindens vorliegen (im Optimalfall auch im Vorfeld eines Ereignisses), eine Vergleichsgruppe inkludiert sein, verschiedene Generationen, Altersgruppen, Zeitperioden und Kontexte berücksichtigt sowie die Nutzung geeigneter längsschnittlicher Analyseverfahren gewährleistet werden (Luhmann & Intesalino 2018). Doch die Autorinnen pointieren, dass keine einzelne Studie all diese Anforderungen erfüllen kann (vgl. Luhmann & Intesalino 2018). Die vorliegende Dissertation orientiert sich an diesen Empfehlungen und bemüht sich stets – sofern die verfügbaren Studiendesigns und die verwendeten Paneldaten es zulassen – in methodischer Hinsicht trotz einiger datenbedingter Limitationen das meist Mögliche umzusetzen (vgl. Kapitel 1.4 Reflexion des methodischen Vorgehens).

Die Ergebnisse der vorliegenden Dissertation sind im zeitlichen Bezug zu jeweiligem Ereignis zu interpretieren. Die Verfügbarkeit mehrerer wiederholter Messungen machte es möglich zwischen kurz-, mittel- und langfristigen Folgen eines Ereignisses für das Wohlbefinden zu unterscheiden. Im ersten Teil der Arbeit konnten auch unmittelbare und im Manuskript 2 sogar antizipatorische Effekte ermittelt werden. Im Falle der Klassenstufenwiederholung als Beispiel brachte das den Vorteil, dass – anders als in Querschnittstudien oder Studien mit ungenauen Zeitangaben oder (zu) großen Abständen zwischen den Messungen – die Effekte der Rückversetzung und der darauffolgenden Wiederholung klar voneinander getrennt werden konnten. Dies führte wiederum zur Schlussfolgerung, dass für den Erhalt des Wohlbefindens und einen erfolgreichen Wechsel in die neue Klasse die betroffenen Schulkinder bereits im Jahr der Rückversetzung und nicht erst ein Jahr später die nötige Unterstützung seitens der Schule, Herkunftsfamilie und Peers erhalten sollten.

Den Kern der vorliegenden Dissertation stellen Ergebnisse differenzieller Analysen dar. Die Kombination aus zeitlichem Bezug und Gruppenspezifik bzw. verfügbaren Ressourcen hilft in zweierlei Hinsicht die ereignisbedingten Entwicklungschancen und Vulnerabilitäten zu identifizieren: zum einen durch die Erfassung zeitlicher Dynamiken, zum anderen der Niveauunterschiede. Die Ergebnisse dieser Arbeit machen Hoffnung und heben hervor, dass kritische Ereignisse mit traumatisierendem Potenzial nicht zwangsläufig mit negativen Folgen einhergehen müssen, der Entwicklungsverlauf und die Bilanz hängen allerdings von verfügbaren Ressourcen und Kontexteinflüssen ab. Die Erkenntnis bezieht sich sowohl auf Dynamiken des subjektiven als auch psychologischen Wohlbefindens. Adaptation ist häufig, jedoch keine unvermeidliche Anpassungsreaktion – dies konnte im ersten Teil der Arbeit sowohl am Beispiel der Klassenstufenwiederholung als auch der ehelichen Trennung gezeigt werden. Im Falle der Klassenstufenwiederholung (Manuskript 1) wurde nicht nur eine Erholung, sondern eine unmittelbare Verbesserung des subjektiven Wohlbefindens, insbesondere bei Gymnasialschulkindern (meistens aus sozial privilegierten Familien mit gutem Zugang zu Ressourcen; Buchwald & Hobfoll 2021) beobachtet. Als starker Kontrast zu diesem Befund wirkte deshalb im Falle der ehelichen Trennung (Manuskript 2) der Entwicklungsverlauf der chronischen Verschlechterung bei getrennten, alleinerziehenden Müttern von Säuglingen und Kleinkindern. Alleinerziehende Mütter sind im deutschen Kontext einem höheren Armutsrisiko als alleinerziehende Väter ausgesetzt und können dadurch trotz Erwerbstätigkeit leichter in eine Ressourcenverlustspirale geraten (Lenze 2021). Resilienz im Kontext kritischer Ereignisse und

subjektiven Wohlbefindens ist „nicht so verbreitet wie gedacht“, betonen Infurna und Luthar (2016). Die Ergebnisse des ersten Teils der vorliegenden Dissertation unterstützen diese Ansicht. Daran lässt sich direkt die optimistische Aussage von Diener et al. (2017: 89) anknüpfen: „Wir sind nicht mehr in der fatalistischen Idee (der hedonistischen Adaptation) gefangen, dass nichts unternommen werden kann, um das subjektive Wohlbefinden zu verbessern“. Man sollte allerdings wissen, welche Gruppen zu welchem Zeitpunkt vulnerabel sind, um gezielte Interventionen zur Prävention und Förderung des Wohlbefindens vorbereiten und einsetzen zu können. Im zweiten Teil der vorliegenden Dissertation steht das posttraumatische persönliche Wachstum im Zentrum der Ausführungen als Ausdruck einer „traumaassoziierten Erweiterung psychischer Ressourcen“ (Mangelsdorf 2020: 23). In den Verläufen des psychologischen Wohlbefindens zeigte sich zwar wenig Varianz über die Zeit, dafür aber deutliche Unterschiede in Abhängigkeit von den moderierenden Faktoren, insbesondere Geschlecht und sozialer Unterstützung. Der Stabilität der Verläufe können vielerlei Ursachen zugrunde liegen, eine davon ist die individuelle Deutung des Ereignisses, die je nach Qualität der Ehe, Vorhersehbarkeit des Verlustes, Krankheit oder Pflegebedürftigkeit von höchsttraumatisch (Broken-Heart-Syndrom als Beispiel) bis hin zu entlastend und erlösend variieren kann. Wachstumsprozesse können daher für manche Individuen bereits unmittelbar nach dem Ereignis einsetzen, während andere Individuen diese erst verzögert erfahren (vgl. Jayawickreme et al. 2021b). Weitere Ursachen können in einer (zu) geringen Anzahl an Beobachtungen zu Beginn des Trennungs- oder Trauerprozesses liegen, oder auch einer ungenauen Rekonstruktion der wahrgenommenen verlustbedingten Veränderung (Jayawickreme et al. 2021b; Jayawickreme & Blackie 2014). Die Ergebnisse bringen hervor, dass vor allem Frauen (Manuskript 3) und aktiv nach Unterstützung und Trost suchende Personen (Manuskript 4) anders (als die jeweilige Referenzgruppe) auf einschneidende Lebensveränderungen reagieren und in der Lage sind im Kontext des Partnerverlustes sowohl mehr Ressourcen zu generieren als auch mehr positive psychologische Erträge in Form von Wertschätzung des Lebens, persönlicher Stärke und Spiritualität zu erzielen.

Die vorliegende Dissertation macht zwei Aspekte deutlich: Erstens, dass die Entwicklung des Wohlbefindens im Kontext kritischer Lebensereignisse von vielen verschiedenen Faktoren abhängt und zweitens, dass kritische Lebensereignisse nicht nur mit Verlusten einhergehen (müssen), sondern auch „positive Lektionen“ anstoßen (Tedeschi & Calhoun 2004) und Individuen vor neue Chancen stellen können. Die Arbeit identifiziert nicht nur vulnerable oder resiliente Gruppen, sondern auch Gruppen, die trotz anfänglicher Verluste im Zeitverlauf von kritischen Lebensereignissen profitieren und einen Prozess der Reifung erleben. Es ist die Aufgabe zukünftiger Forschung nach weiteren Faktoren zwecks Identifikation solcher Gruppen zu suchen und diese Faktoren unter dem Aspekt zeitlicher Dynamiken des Wohlbefindens mittels geeigneter Längsschnittdaten und Analyseverfahren zu erforschen. Es wäre in dieser Hinsicht optimal, wenn ausreichend viele Messungen der Outcomevariablen bereits vor und selbstverständlich auch nach dem Ereignis vorliegen würden und eine Vergleichsgruppe vorhanden wäre. Beim Letzten handelt sich um häufige Limitationen, die auch im zweiten Teil der vorliegenden Dissertation trotz eines beispiellosen Studiendesigns nicht vollständig umgegangen werden konnten.

Das Wohlbefinden ist ein facettenreiches Konstrukt, je nach Merkmal können daher unterschiedliche Entwicklungsverläufe aufgedeckt werden. So kann in Bezug auf die kognitiv-evaluative Komponente ein resilientes Muster entstehen, jedoch nicht zwingend in Bezug auf die affektive Komponente (vgl. Kettlewell 2020). Differenzielle Entwicklungsverläufe des Wohlbefindens sollten daher im Optimalfall mittels verschiedener Outcomevariablen erforscht werden, sobald die verfügbaren Daten es zulassen. Auch Kontexteinflüsse dürfen nicht außer Acht gelassen werden; vor allem komparative Forschung ist in dieser Hinsicht gefragt, um neue Erkenntnisse zu gewinnen.

Das Wohlbefinden lässt sich steigern, auch die Resilienz ist trainierbar. Für die Verbesserung des subjektiven Wohlbefindens wurden bereits im Allgemeinen einige Interventionen bzw. effektive Manipulationen des Wohlbefindens konzipiert, darunter Taten der Freundlichkeit, Dankbarkeitsbriefe, Spenden oder eine so genannte Well-Being-Therapy (Mischung aus Verhaltenstherapie und Elementen Positiver Psychologie; vgl. Diener et al. 2017). Im Kontext kritischer Lebensereignisse bedarf es mehr Wissen, wer konkret und vor allem zu welchem Zeitpunkt/über welchen Zeitraum auf Unterstützung angewiesen ist. Für Alleinerziehende, als mögliches Beispiel, existiert bereits eine Bestandsaufnahme von Interventionen zur Gesundheitsförderung und Prävention (Geene & Boger 2017). Das bundesweite Projekt Opstapje richtet sich explizit an bildungsferne, sozial benachteiligte alleinerziehende Mütter und Väter sowie Eltern in Trennung und Scheidung mit Kleinkindern ab 18 Monaten mit dem Ziel des Empowerments, Ressourcenstärkung und Autonomie (Geene & Boger 2017: 112f). Maßgeschneiderte Interventionen zwecks Steigerung des Wohlbefindens und Umgang mit Anpassungsproblemen lassen sich nur auf Basis umfassender Kenntnisse über individuelle Charakteristika, verfügbare Ressourcen sowie zeitliche Dynamiken entwickeln. Die vorliegende Dissertation ist ein gutes Beispiel dafür, dass eine solche Erkenntnissammlung zum großen Teil mittels einer differenziellen und längsschnittlichen Betrachtung gewonnen werden kann.

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TEIL B

Manuskripte

Manuskript 1: Critical Events Throughout the Educational Career:
The Effect of Grade Retention and Repetition on School-Aged Children's Well-Being[1]

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Abstract

More than 20% of all school-aged children in Germany experience a grade retention and repetition during the educational career which is likely to affect their well-being as a central element of school success. This study aims at revealing the temporal dynamics of general and school well-being around the event of grade retention (i.e., the year when the decision to repeat a grade is taken) and the subsequent grade repetition (i.e., the repeated school year) during secondary school in Germany. Longitudinal data from the National Educational Panel Study (NEPS) is used on native students attending grades 5 through to 12 (N = 4581 from originally 273 schools). Distributed fixed-effects regressions by gender and school type have been conducted, using satisfaction with school and life as outcomes. Although retention decisions often trigger an immediate decrease in students' well-being, there arise still benefits from this event in the short-term, middle-term, and long-term, though trajectories differ by gender and school type. Overall, it is necessary to promote students' well-being throughout their educational career, particularly in those critical periods when they face grade retention. Results highlight that tailored programs for both genders and students in different school types should be provided to foster well-being during this phase.

1.1 Introduction

The educational career of school-aged children (herein after called students) in Germany is strongly characterized by systematic transitions due to the hierarchical structure of the educational system that provides different school types (Van Ophuysen 2009; Baumert, Stanat & Watermann 2006). In most cases, transitions take place as so-called normative or regular transitions, e.g., from kindergarten to primary school, from primary to lower secondary level education, and then to upper secondary level or post-secondary non-tertiary education. Furthermore, there are also non-normative or irregular transitions possible, for instance, grade repetition or change of the attended school type, that are

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mainly due to poor school performance and might affect school careers either. Since the 1980s, grade repetition has been critically questioned, especially by teachers, and potential negative experiences of affected students have been highlighted (Bärsch 1987). The reasons for the need of grade repetition include mainly a lack of promotion for the upcoming school year due to a failure in achieving the basic learning objectives of a grade in several school subjects (Roßbach & Tietze 2006). Sometimes a grade repetition is based on a voluntary repetition decision (Federal Statistical Office 2011). Thus, the decision to repeat a grade is made primarily conditional on low school performance (Bless 2017; Palowski 2016); in cases of low school performance, teachers, parents, or both decide that a student has to be retained for one school year, meaning a repetition of the same school grade. Students face then a grade retention decision. Hence, the year in which the decision to repeat a grade is made is herein after defined as the year of grade retention. The idea of grade repetition is that retained students are unlikely to make sufficient progress in the next school grade due to their low school performance, and successful progress in learning is rather unlikely in the next school grade. The year in which students repeat a grade is subsequently herein after named grade repetition. Sometimes, grade repetition serves as a targeted measure, pursuing the idea that the level of students' learning and achievement within a school class should be rather homogeneous in order to enable "smoother learning progresses" (Federal Statistical Office 2011; Palowski 2016). In addition, grade repetition might serve as a remedial function by offering students the opportunity to make up for previous deficits in individual school subjects without the additional burden of learning new content (Palowski 2016).

One fifth of all students (20.3%) in Germany experience a grade retention and repetition during their school career (OECD 2016). In the 2016/2017 school year, 2.3% of students repeated a grade, with noticeable differences, however, among the federal states. For instance, the rate of grade retention is 1.2% in Berlin and 4% in Bavaria: Educational systems in federal states in Germany are heterogeneous and apply grade retention decision and repetition differently, mainly due to low school performances of students. In either case, a forced or voluntary decision is required, either by teachers, parents, or students' own choice (Statista 2020). An international comparison reveals that the use of grade repetition as a pedagogical measure varies greatly among countries. The repetition rate in Germany (20.3%) is above the average rate for grade repetition in OECD countries (i.e., 12.4% of all students) (OECD 2014). In comparison, data from the PISA study 2012 (the OECD's Programme for International Student Assessment) show that in Belgium, for example, 36.1% of students were retained once during their school career while in Great Britain only 2.7% of students, and Norway does not allow grade retentions at all (OECD 2014).

In Germany, there is a gender-specific difference in the frequency of grade repetition showing that boys more frequently experience grade repetition during their school career than girls (2.8% of boys and 1.8% of girls) (Federal Statistical Office 2018). Further, the rates of grade repetition also differ among school types in Germany, showing a so-called social gradient. One should note that the

German school system is hierarchically structured. After four or six years of primary school, ("Grundschule") students enroll in different types of secondary school. The school type with the highest educational standards is the grammar school ("Gymnasium"), while the school type with the lowest educational standards is the general school ("Hauptschule"). Placed in between are comprehensive schools ("Gesamtschule"), intermediate schools („Realschule"), schools with different tracks of education ("Schule mit mehreren Bildungsgängen"), and schools for students with special educational needs („Förderschule"). In 2016/17, for instance, more students repeated a grade at a general school (4.7%) than at a grammar school (2.1% in 8-year programs and 2.0% in 9-year programs). Compared to repetition rates at general schools in Germany, a lower percentage of grade repetition was found in intermediate schools (4.3%) than in schools with different tracks (3.4%).

1.1.1 Grade Retention as a Critical Event During the School Career

All kind of transitions, whether normative or non-normative, become part of a students' biography. According to Elder (1985), a biography refers to "pathways through the age-differentiated life span, to social patterns in the timing, duration, spacing, and order of events" (Elder & Rockwell 1979: 2). In the biography, a distinction can be made between "transitions" and "trajectories" (Elder 1985; Sackmann & Wingens 2003). Trajectories refer to a longer period of time (Elder 1985; Sackmann 2013) while transitions are limited in time and are about coping with discontinuous changes (Griebel 2012).

Transitions can be perceived as critical events. In general, events are defined as critical if they trigger profound emotions and stress (e.g., divorce, difficult illnesses, deaths) and require adaptation (see in particular Holmes and Rahe (1967) and their Social Readjustment Rating Scale; Filipp & Aymanns 2018). As a result of these events, previous goals and values are called into question, and new skills and behaviors are required. Critical events do not necessarily have negative consequences and the outcome depends on individuals' (coping) resources and the cause, magnitude, and relevance of the critical event (Filipp & Aymanns 2018). Regarding the theoretical perspective, previous research on critical life events has shown that these potential stressors may have either negative consequences for well-being (stress theory perspective) or can trigger positive responses and change (development theory; Filipp & Aymanns 2018; Sirsch 2016). Following the cognitive-transactional stress concept of Lazarus and Folkman (1987), the stress theory states that an interplay of the event itself and the subjective perception and evaluation by individuals is decisive on whether stress arises after a critical life event. From the perspective of the development theory, however, the potential for change arising from critical events is emphasized, from which people can benefit and gain experience (Filipp & Aymanns 2018).

Both normative (i.e., regular) transitions and irregular transitions are often described as critical events in the life course and school transition research (Elder 1985; Filipp & Aymanns 2018). Critical events can manifest themselves in unsuccessful school careers of students (Graalmann 2018;

Koch 2011). For example, experiencing a grade repetition usually means a change in the learning environment, as students are in a new class with other classmates than before. The same applies when students need to change their school type, for instance, to a school type with lower educational standards (i.e., a downward transition) due to their unsatisfactory school performance or school-related misconduct. Thus, grade repetitions or downward transitions go hand in hand with adaptation tasks and opportunities for development and learning (Sirsch 2016; Koch 2011). Adaptation tasks relate to different aspects such as social aspects (e.g., loss of stable relationships with classmates and teachers), aspects of instruction (e.g., the teaching process), or organizational aspects (e.g., new schedules and teaching structures) (Van Ophuysen 2009; Hanewald 2013).

Critical events do not only affect the individual educational biographies of students (Graalmann 2018; Hanewald 2013) but also their well-being (Knoppick et al. 2015; Vockert, Rathmann & Loter 2019). Thus, studying critical events throughout the educational career is important because well-being at school age is regarded as a central element for success in school, besides students' school performance (Rathmann & Hurrelmann 2018).

1.1.2 Well-Being

Well-being is defined differently in many studies (Hascher, Morinaj & Waber 2018; Mander, Lester & Cross 2015), mostly as a multidimensional construct that includes psychological components (e.g., psychosomatic abnormalities), affective components (e.g., school satisfaction), and cognitive components (e.g., life satisfaction) (Hascher, Morinaj & Waber 2018; Hascher 2004). However, in many studies, only individual components are examined in detail (Vockert, Rathmann & Loter 2019; Mander, Lester & Cross 2015).

General well-being is the subjective experience of adolescents "as a cognitive evaluation of one's overall life or important domains (e.g., family, school)" (Huebner et al. 2005: 15). It includes both cognitive (e.g., life satisfaction) and affective components (e.g., positive emotions such as enjoyment and self-esteem and negative emotions such as depression and anxiety). Studies also distinguish between mental well-being (e.g., depression, stress; Lester & Mander 2015) and emotional well-being (e.g., peer and contact problems, hyperactivity; Bilz, Ottova & Ravens-Sieberer 2012). General well-being also refers to self-esteem (Hascher, Morinaj & Waber 2018) and self-reported health (Inchley, Currie & Young 2016)

School well-being is also often defined as a multidimensional construct (Hascher, Morinaj & Waber 2018; Inchley, Currie & Young 2016) that comprises positive emotions (e.g., school satisfaction or school enjoyment) and negative emotions (e.g., school demotivation or school disengagement) (Hascher, Morinaj & Waber 2018; Trabe 2018). Studies indicate that school well-being is divided into affective and cognitive components (Trabe 2018): Affective aspects refer to the subjectively experienced emotional state of students in connection with school, while cognitive aspects include the

evaluation of everyday school life by students (Trabe 2018). School satisfaction is a cognitive component of school well-being and refers to students' attitudes towards school.

1.1.3 Well-Being During the School Career

Previous studies have shown that although the overall well-being of students declines during primary school (Hascher & Hagenauer 2011a), it is positively associated with learning success and teaching competencies (Heise & Rahm 2007). Even though students indicate high average values of well-being during their educational career compared to adulthood, general well-being varies according to gender, socio-economic background, and the type of school attended (Herke, Rathmann & Richter 2019; Rathmann & Kuntz 2018; Rathmann et al. 2016; Hascher & Hagenauer 2011b).

Qualitative and quantitative research on students' well-being has shown different gender-specific differences, depending on the indicator of well-being (Hascher & Hagenauer 2011a; 2011b; Gysin 2017). A study by Hascher and Hagenauer (2011b), for example, revealed that girls are more likely to report positive attitudes towards school compared to boys, and girls' enjoyment of school is more pronounced. In contrast, female students are also more likely to complain about psychological problems with regard to school, are more concerned about school (Hascher & Hagenauer 2011b), and report lower scores of health and satisfaction with life (Rathmann et al. 2018a; 2018b). Boys, however, are more likely to report lower satisfaction with school (Hascher & Hagenauer 2011b). Also, findings on well-being trajectories over time are heterogeneous for both genders: General and school well-being declines during school time, but to a greater extent among boys than among girls (Hascher 2004; Hascher & Hagenauer 2011a; Herke, Rathmann & Richter 2019).

Alongside gender as a horizontal dimension of inequality, the vertical dimension of inequality—usually the socio-economic resources of the family of origin—also plays a key role in the psychosocial and health-related development of adolescents (Hurrelmann & Bauer 2015). Studies show that belonging to a lower social, educational, or income status group is likely to be associated with a lower general well-being among students (Rathmann & Kuntz 2018; Rathmann et al. 2016). Further, the socio-economic background of families correlates with social resources and the extent of family support (Watermann & Baumert 2006). Inequalities in well-being usually follow a social gradient, i.e., lower socio-economic family status (low parental education, occupational status, or income) is often associated with lower well-being among young people (Rathmann et al. 2016; Heilmann et al. 2018). Previous empirical studies focused on inequalities in well-being related to the socio-economic background of parents (Rathmann et al. 2018c). Current studies, however, make use also of the adolescents' own or future socio-economic status, such as the attended type of school or subjective measures of social status that are assessed by young people themselves (Rathmann & Kuntz 2018; Lampert et al. 2018). The results of these studies indicate that students who attend a school type with lower educational standards (e.g., general or schools with different tracks) are more likely to

report lower life satisfaction than students who attend a school type with higher educational standards (e.g., grammar schools in Germany) (Herke, Rathmann & Richter 2019). Regarding commitment to school and learning among students, school types other than grammar school are often attended by students who are more likely to show greater alienation with school, and where poorer teaching quality, less autonomy, and less interaction among students are more often reported (Bilz, Ottova & Ravens-Sieberer 2012; Rathmann et al. 2016). Further, students in general schools also had an increased likelihood of sick leave days and are more likely to report poor self-reported health compared to peers in grammar schools (Rathmann et al. 2018b). Thus, school types differ in terms of their learning milieus (Baumert, Stanat & Watermann 2006) which in turn are associated with students' school failure and ambition as well as their general and school-related well-being (Rathmann et al. 2018b). Different learning environments are primarily due to institutional differences, e.g., in curricular requirements or institutional cultures (Baumert, Stanat & Watermann 2006; Köller & Baumert 2001).

1.1.4 The Effect of Transitions on Students' Well-Being

Overall, the majority of previous studies focused on the effects of the transition from primary to secondary school (i.e., a regular normative transition; Van Ophuysen 2009; Hanewald 2013; Riglin et al. 2013). Most of those studies found a negative effect on having experienced such transition on well-being, especially for satisfaction with school, as well as the emotional and mental well-being of adolescents (Riglin et al. 2013; Nielsen et al. 2017). However, only a few of those effects are of a longitudinal nature, providing evidence that the effects of the transition are usually short-lived (Stradling & McNeil 2000; for further findings see West, Sweeting & Young 2009). Students who have problems managing the transition are more likely to report school demotivation and disengagement (Wassell, Preston & Jones 2007). Manifestation of certain behavioral patterns (e.g., lower participation in lessons or motivation; Hanewald 2013; Galton, Morrison & Pell 2000), a decrease in satisfaction with school, and appreciation of individual school subjects or teachers were also observed (Van Ophuysen 2009; Hirsch & Rapkin 1987). In particular, findings from qualitative studies emphasize that for some students a school transition also represents a "longed-for opportunity" (Büchner & Koch 2001), while for other students, it is a "fear inducing threat" (Büchner & Koch 2001). Moreover, the experience of a transition may also be related to the well-being of adolescents after their school time, indicating a long-term effect (Riglin et al. 2013; West, Sweeting & Young 2009).

The consequence of a grade repetition has been, so far, considered primarily in relation to academic achievement in individual school subjects and student's motivation (Kretschmann et al. 2019; Marsh et al. 2018; Schwerdt, West & Winters 2017). Meta-analyses based mostly on studies from the 1990s found mixed evidence on the efficacy of early grade repetition showing it rather as an ineffective intervention for later academic achievement and socioemotional adjustment (Hattie 2013;

Jimerson 2001). Some studies show a steep decline in students' motivation in the retention year and a middle-term recovery to the baseline level within two years (Schwerdt, West & Winters 2017). Also, a short-term increase in performance observed after grade repetition seems to attenuate after a few years (Klapproth et al. 2016). Moreover, students who have already repeated a grade once are, in general, at higher risk to experience another grade repetition later in their educational career (Bless 2017) what might negatively affect the further course of their career at school (Gomolla & Radtke 2009). Quantitative studies conclude that grade repetition would not lead to a general improvement in school performance, and is, from an economic point of view, a "waste of money invested in education" (Hattie 2013: 117f). Qualitative studies, however, emphasize that a general rejection of grade repetition is premature (Palowski 2016). Positive consequences for well-being can result from grade repetition, especially if it was based on a voluntary decision of students and their parents (Palowski 2016; Rathmann et al. 2016). For instance, a supportive environment outside school, a high level of students' individual educational aspiration, or a reflective examination of the causes and consequences of grade retention could help students to perceive the event as an opportunity (Palowski 2016; Wu, West & Hughes 2010).

Previous international studies on the effect of grade retention and repetition on well-being revealed heterogeneous results (Bless 2017; Hanewald 2013; Wu, West & Hughes 2010). A study from Luxembourg found no significant changes in students' well-being after having experienced a grade repetition (Klapproth et al. 2016). Another study, based on three school districts in Texas, showed that well-being of retained students benefits from grade repetition in the short-term and middle-term compared to regularly promoted students (Wu, West & Hughes 2010). Hyperactivity, sadness, and personal withdrawal decrease in the short- and middle-term, whereas school engagement, school belongingness, and average peer-rated liking increase. The latter increased only in the short-term, but showed a substantial decrease in the longer term, possibly as a result of stigmatization by new classmates (Wu, West & Hughes 2010).

With regard to gender, the extent to which boys and girls differ in their well-being after being retained has hardly been investigated, so far. Few studies showed that depression and internalizing behavior (i.e., hyperactivity) were more frequently reported after a regular transition from primary to secondary school for girls than for boys (Inchley, Currie & Young 2016; West, Sweeting & Young 2009). The reason for grade retention and repetition is mostly linked to low school performances (Roßbach & Tietze 2006). A qualitative study from Switzerland highlighted that girls with low school performances have lower self-esteem compared to boys (Gysin 2017). Girls more often had concerns and (psychosomatic) complaints in relation to school (Inchley, Currie & Young 2016; Hascher & Hagenauer 2011a) or school climate (Rathmann et al. 2018a; 2018b). Thus, one can hypothesize that well-being among girls is more likely to be negatively affected in the year of a grade retention decision and also during and after having experienced the grade repetition.

As in the case of gender, there is scarce evidence on the effect of grade repetition on well-being among students attending different types of school. Previous studies examined differences in well-being between school types in a more generalized manner. They showed that students in school types other than grammar school (i.e., Gymnasium), such as general schools, reported lower well-being on average than grammar school students (Herke, Rathmann & Richter 2019; Rathmann et al. 2018c). In addition, the likelihood and frequencies of grade retention differ strongly between school types (Federal Statistical Office 2018), showing that students attending other school types than grammar school experience more frequently a grade retention and repetition. Even though we observe an increase in participation in education and higher qualification in the era of educational expansion in Germany, there are still social inequalities with regard to the transition to schools with higher educational standards, because it is still linked to the social background of parents (Becker 2017). As educational aspirations of parents with students attending grammar schools are likely to be higher, it is reasonable to assume that the impact of grade retention and repetition on well-being among students in grammar schools turns out to be more negative compared to the well-being of students in other school types. In line with this, prior findings revealed that grammar school students often show stronger performance orientation and educational demands (Kramer et al. 2009). Furthermore, because the frequency of experiencing grade repetition in grammar schools is the lowest, one can assume that this event may more negatively affect grammar students' well-being. In contrast, students in general schools in Germany are more likely to have parents with a lower educational background and, thus, will be from a lower socio-economic background compared to students from grammar schools (Baumert, Stanat & Watermann 2006). Intermediate schools and schools with different tracks are more heterogeneous in the composition of students with regard to these characteristics (Baumert, Stanat & Watermann 2006). In addition, school types other than grammar schools are more often confronted with a classroom climate that is less conducive to learning (Baumert, Stanat & Watermann 2006) and attended by students from more heterogeneous socio-economic backgrounds, which in turn has an impact on the learning atmosphere, classroom climate and shared values such as the experience of a grade repetition.

In sum, there are only few longitudinal studies (Klapproth et al. 2016; Wu, West & Hughes 2010) that allow conclusions to be drawn about the effect of grade retention decision and grade repetition on well-being, psychosocial outcomes, students' motivation, and achievement. Our study is the first longitudinal study looking at this effect in the German secondary educational system with regard to students' overall and school-related well-being as outcome. Due to the high rate of grade retention and repetition in Germany, this critical life course event requires a detailed examination.

1.2 Research Objectives and Hypotheses

1.2.1 Objectives

By the use of longitudinal data from the National Educational Panel Study (NEPS), our study aims at providing counterfactual evidence on the effect of having experienced grade retention and repetition on overall and school-related well-being of native students, differentiating by students' socio-demographic characteristics (i.e., gender and the attended school type as proxy information for the socio-economic background). We focus on the following research questions:

1. What is the sample percentage of students who experienced a grade retention decision and grade repetition over the secondary school career according to different socio-demographic and economic background characteristics, i.e., gender and the attended type of school?
2. What is the overall pattern of temporal dynamics of students' well-being around the event of grade retention decision and grade repetition?
3. What are the group-specific patterns of temporal dynamics of students' well-being (i.e., by gender and the attended type of school) around the event of grade retention decision and grade repetition?

1.2.2 Hypotheses

Based on the theoretical background and previous empirical evidence, the following hypotheses are derived in order to answer the above-mentioned research questions. First, in a descriptive manner:

H1a (Hypotheses 1a): We assume that boys experience more frequently a grade retention decision and grade repetition compared to girls.
H1b (Hypotheses 1b): We assume that the frequency of having experienced a grade retention and grade repetition follows a social gradient, indicating that students attending school types other than grammar schools experience grade retention and grade repetition more frequently.

Second, this study addresses students' well-being dynamics around the event of grade retention decision and grade repetition. As this study examines well-being changes in the year when a grade retention decision has taken place and in subsequent years (compared to secondary school years before the retention decision, i.e., baseline level), we are able to provide a more detailed picture of well-being throughout this critical period in the secondary school career:

H2 (Hypotheses 2): We assume that well-being declines in the year of grade retention decision and continues to decline over the year when the grade repetition takes place. However, according to the results of other studies mentioned above, these effects should attenuate in the subsequent years after grade repetition, indicating that students' well-being rises and return back to the initial level.

Third, the following hypotheses address students' well-being dynamics around the event of grade retention decision and grade repetition depending on gender.

H3a (Hypotheses 3a): According to previous findings, girls are more likely to show lower levels of well-being than boys after a regular (i.e., normative) transition from primary to secondary school. Thus, we assume that well-being of girls is likely to decrease in the year of grade retention decision and repetition because they are more concerned about school; this negative effect should attenuate in the subsequent years.

H3b (Hypotheses 3b): For boys, we expect that well-being does not change in the year of grade retention decision and grade repetition, because they do not care as much about school as girls and experience a grade repetition more frequently. Male students may not perceive a grade repetition in terms of a critical event that could affect their well-being.

Fourth, regarding well-being dynamics around the event of grade retention decision and grade repetition of students attending different school types previous evidence is very scarce. Therefore, it is hardly possible to formulate unambiguous research hypotheses:

H3c (Hypotheses 3c): We assume that well-being of students attending general schools (i.e., Hauptschule) and intermediate schools (i.e., Realschule) does not significantly change during the years of grade retention decision and grade repetition, as students in those school types are more likely to perceive those events as less critical for their well-being. This might be due to the generally higher frequency of experiencing a grade retention decision and grade repetition in these types of school.

H3d (Hypotheses 3d): We assume that well-being of students attending schools with different tracks of education (i.e., Schulen mit mehreren Bildungsgängen) declines in the years of grade retention decision and grade repetition. According to official data in Germany, students attending this type of school are less often confronted with grade repetitions as in general schools (e.g., because the change of school track is possible within the same school). Aside from that, the decline in well-being in the years of grade retention and repetition may be due to the heterogeneous composition of students in this kind of schools (i.e., socio-economic background, aspirations, and educational orientation) and the general risk of being downgraded to a school track with lower educational standards. As the percentage of grade retention is rather low in schools with different tracks, the experience of this event could be perceived as an individual school failure which might negatively affect students' well-being.

H3e (Hypotheses 3e): For students in grammar schools (i.e., Gymnasium) the lowest percentages of grade retentions have been found. We hypothesize that due to predominantly higher educational requirements, aspirations, and pressure to perform, grade retention decision is likely to be experienced as school failure that might provoke a well-being shock and self-doubts among students. Hence,

grammar school students are likely to experience a significant well-being decline in the year of grade retention decision and a subsequent slow recovery to the initial well-being level.

1.3 Material and Methods

1.3.1 Data

The National Educational Panel Study (NEPS) is carried out by the Leibniz Institute for Educational Research (LIfBi) at the University of Bamberg in Germany. NEPS focuses on educational processes across the life span and is part of the Framework Program for the Promotion of Empirical Educational Research funded by the German Federal Ministry of Education and Research (BMBF). NEPS started in 2010 with six cohorts (SC1: Newborn, SC2: Kindergarten children, SC3: Grade 5 (secondary schools), SC4: Grade 9, SC5: Students in higher education, SC6: Adults) which are each revisited annually or semi-annually (Blossfeld, Roßbach & Maurice 2011) and offer a wealth of variables, in particular in the area of competence development, learning environments, educational decisions, migration background, and educational returns. NEPS provides detailed longitudinal information on the German education landscape. In addition to students, survey respondents consist of class, mathematics, and German language teachers as well as parents of the participating students. NEPS survey instruments were previously submitted to the respective ministries of education of the sixteen German federal states, checked, and approved. NEPS works closely with the responsible data protection officers of the federal states to ensure strict compliance with the statutory data protection provisions.

1.3.2 Sample Selection

The present study focuses on well-being trajectories of secondary students in Germany (SC3: starting with grade 5, doi:10.5157/NEPS:SC3:9.0.0). The analyses are based on nine NEPS waves from 2010/11 to 2017/2018. The final analytical sample consists of N = 4581 students from originally 273 schools in Germany.

The sample selection was conducted in several steps, beginning with all available data on N = 8317 secondary students (**Figure M1.1**). First, with regard to previous findings on educational success of particular groups of migrants in Germany (with Vietnamese and Korean children as the most successful groups) and several theoretical reasons (e.g., heterogeneous parental aspirations and socialization practices, heterogeneous cultural backgrounds of children of migrants, and, primarily, their disparate patterns of adaptation to the German school system (Nauck & Lotter 2015; Nauck, Schnoor & Herold 2017), first-generation and second-generation migrants were excluded from the sample (N = 2255). Second, we dropped students with missing information on the attended school type (N = 30). Third, because valid information on well-being from the time before grade retention

was indispensable for our analyses, and we neither have it for students from the initial sample in grade 5 (first observed wave) nor for students from the refreshment sample in grades 5 to 7 (with Wave 3 as the first observed wave), we lost all observed events of grade retention and repetition that occurred in grade 5 (N = 138) and all that occurred in the refreshment sample in grades 5 to 7 (N = 71). Fourth, we identified and excluded students who reported longitudinally inconsistent information on grade retention and repetition (N = 51). Fifth, we excluded those with missing information on both dependent variables (N = 80) and all explanatory variables (N = 56). Finally, and sixth, we reduced our sample to those who reported at least two well-being values, one before and one after the event of grade retention and repetition and ended up with a sample of N = 5586 secondary students.

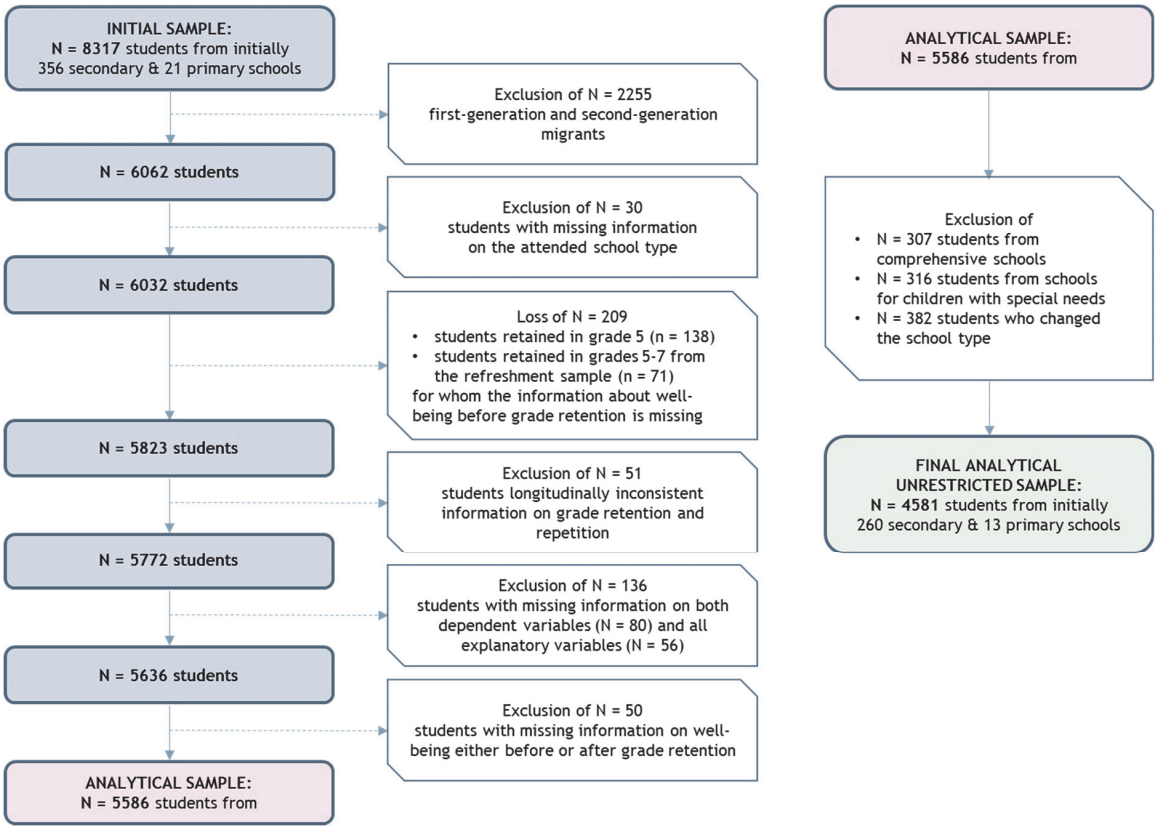


Figure M1.1: Flowchart of Analytical Sample Selection Process

From these 5586 students, N = 307 were attending comprehensive schools and N = 316 schools for children with special needs. Because the overall number of grade retentions and repetitions at those two types of school were negligibly low (N = 17 and N = 0 respectively), they cannot be considered in further analyses (N = 4963). The last group excluded from the sample were students who changed school type during their secondary school career (N = 382) reporting the highest rate of grade retentions and repetitions (19.6%; N = 75). On the one hand, in this group, well-being dynamics

around grade retention and repetition are very heterogeneous with regard to downward and upward educational mobility, i.e., including not only students facing downward transfer to schools with lower demands after being retained but also students facing upward transfer to schools with higher demands before being retained. On the other hand, due to the temporal complexity of multiple (often simultaneous) transitions in this group (to a new school, new school type, and new class), causal dependencies can hardly be disentangled without implementing several additional theoretical and methodological assumptions.

1.3.3 Students Who Experienced Grade Retention and Repetition and the Comparison Group

The final unrestricted analytical sample consists of N = 4581 native students enrolled in general, intermediate, grammar schools and schools with different tracks of education. From these students, N = 487 students experienced grade retention from grade 6 onwards. The respective comparison group of those who did not experience a grade retention up to grade 12 consists of N = 4094 students.

Because inadequate or unsatisfactory marks on the school certificate are, in Germany, one of the most important criteria for not being promoted to the next grade, we created a restricted analytical subsample reduced to those students who had ever had at least one sufficient (grade "4"), inadequate (grade "5") or unsatisfactory grade (grade "6") on their half-year or annual school certificate in any school subject surveyed by NEPS (i.e., mathematics, German, physics, chemistry, biology, natural sciences). This subsample consists of N = 3441 students who have ever been potentially at risk for grade repetition with regard to their marks on the school certificate.

From these students, N = 446 experienced grade retention and repetition, a number that slightly differs from the number of grade retentions in the overall sample (N = 487). Indeed, we identified N = 41 students who experienced grade retention despite adequate school marks, mostly from intermediate (N = 12) and grammar (N = 21) schools. Possible reasons for this could be refusing school, illness, family issues, missing data, or socially desirable, biased responses on school marks. Unfortunately, due to the lack of respective items, we cannot distinguish between mandatory and voluntary grade repetition, the latter with the aim of improving school marks (**Figure M1.2**).

The regression results for both restricted and unrestricted samples are similar (**Table M1.2** and **Table M1.3**: Models 1 and 2, **Figure M1.3**a-b, and **Figure M1.4**a-b). Because the restricted sample constitutes a substantially better comparison group than the unrestricted one, for further regression analyses we will proceed with the restricted sample of N = 3441 students, of whom N = 446 experienced grade retention and repetition and N = 2995 did not.

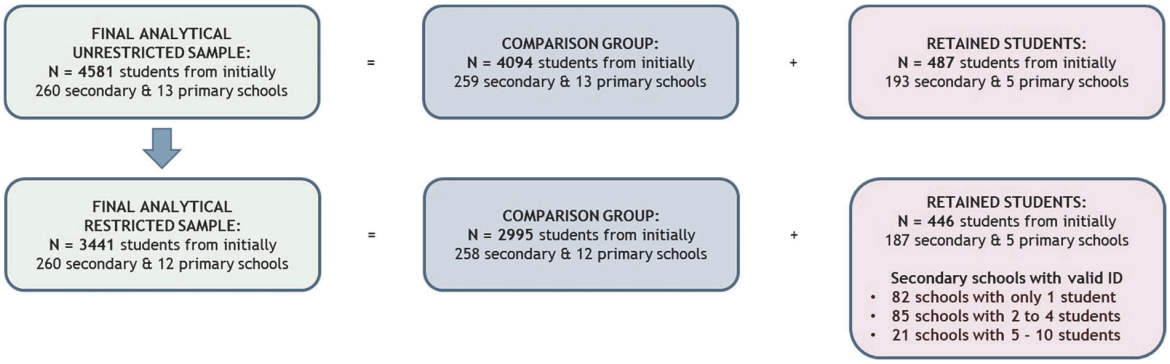


Figure M1.2: Comparison of the Unrestricted and Restricted Sample

1.3.4 Indicators

1.3.4.1 Dependent Variables

We focus on two student's well-being aspects: 1) satisfaction with life and 2) satisfaction with school situation with nine available measures each, starting at Wave 1 in 2010/11 (for the refreshment sample at Wave 3 in 2012/13 respectively). Both outcomes are coded 0–10: "0" completely dissatisfied and "10" completely satisfied; the correlation between them equals 0.50 in the analytical sample.

We use satisfaction with life—"How satisfied are you currently with your life in general?"—as a proxy for general well-being (Cantril 1965). The individual measurement of life satisfaction has been shown to behave similarly to the psychometrically determined Satisfaction With Life Scale (Cheung & Lucas 2014) and has been proven to be an important indicator for the well-being of adolescents (Venetz 2014).

School well-being is measured in NEPS with the question "How satisfied are you with your school situation?". It has been shown that satisfaction with school is a reliable indicator of the successful or unsuccessful educational integration of students (Venetz 2014).

1.3.4.2 Group-Specific Variables

In order to reveal group-specific well-being trajectories around the event of grade retention and repetition, we split students into time-constant distinct groups by gender and school type.

The individual school type corresponds to the school type the student was enrolled in over the observational period. We aggregated all available information about the attended school type for each student in each wave, relying mainly on sampling information, and counted the episodes. For students from the unrestricted sample who were enrolled over time constantly in one school type, we created a time-invariant group variable with: N = 507 students at general schools (with n = 47 grade retentions, retention rate 9.3%), N = 657 students at schools with different tracks (n = 54 grade retentions, rate 8.2%), N = 1051 students at intermediate schools (n = 161 grade retentions, rate

15.3%) and N = 2366 students at grammar schools (n = 225 grade retentions, rate 9.5%). Furthermore, we count N = 2218 female (n = 179 retentions, rate 8.1%) and N = 2363 male students (n = 308 retentions, rate 13.0%) in the overall sample.

In the restricted sample of lower achieving students, the sample sizes look as follows:

- N = 1597 female students with n = 153 grade retentions (9.6%)
- N = 1844 male students with n = 293 grade retentions (15.9%)
- N = 470 students at general schools with n = 46 grade retentions (9.8%)
- N = 518 students at schools with different tracks with n = 47 grade retentions (9.1%)
- N = 864 students at intermediate schools with n = 149 grade retentions (17.2%)
- N = 1589 students at grammar schools with n = 204 grade retentions (12.8%)

1.3.4.3 Event Time Dummies

In order to investigate changes in well-being around the event of grade retention and repetition, an event-centered time axis using time dummy variables was created.

The reference category, i.e., the first time dummy corresponds with the time before retention decision (maximum 7 to 1 year before) and includes well-being observations of all N = 3441 students from the restricted sample (these with transition and these without transition).

All further time dummies refer solely to students who experienced grade retention (N = 446), i.e., for whom the time is "running". The second time dummy refers to the year of the retention decision, the third one the year of grade repetition. The subsequent three time-dummies correspond with the short-term (+1), medium-term (+2), and long-term effect of grade retention (+3 to +5, coded "later"). It is guaranteed that all N = 446 students were observed at baseline and at least one another time point after grade retention.

1.3.4.4 Time-Varying Confounders

We carefully decided to include only four substantively important time-varying confounders that are known from previous studies to be associated with changes in well-being around the event of grade retention and repetition. We include (1) linear, quadratic, and cubic mean-centered student's age; terms that capture both a non-linear declining trajectory of well-being over time and age-specific abilities to cope with the event. Furthermore, we incorporate (2) student's individual self-rated health (Question: "How would you generally describe your state of health?", coded: "0" very bad and "4" very good) that is associated with both changes in well-being and school attendance (e.g., with chronic absenteeism also related to poverty or poor parental health) (Allison et al. 2019), (3) a dummy variable for a successful transition to vocational training which for some students is a (positive) part of a recovery process after the event (coded: "0" not in training and "1" in training) and (4) a dummy variable for irrevocable dropouts (coded: "0" if a student remained in the sample at Wave 9 and "1" for the last wave a student was observed at and dropped out, irrevocably) with the aim to account

for potentially nonignorable missingness in trajectories of well-being. A further substantively important confounder is parental support in school matters; unfortunately, the data on these items are only of cross-sectional nature, collected at Waves 4 and 9 (including a great amount of missings by design at wave 9).

Waves 4 and 7 were most affected by irrevocable dropout with respectively N = 116 and N = 162 students (i.e., overall N = 278) from all N = 564 dropouts in Waves 1 to 8. Only N = 39 of them experienced grade retention and repetition. The well-being average values of those who dropped out were 8.07 for satisfaction with life and 7.16 for satisfaction with school at the last available wave.

1.3.5 Statistical Analysis

We estimated distributed fixed-effects (FE) regression models (Dougherty 2006) for students' well-being by gender and school type, including all four confounders each, with age in a cubic specification. The "within" estimator compares the average well-being from baseline (time before retention decision) with the average well-being in each particular time dummy. The analysis model equation on well-being (WB) is presented below (see also Clark & Georgellis 2013):

$$WB_{it} = \alpha_i + \beta_{retention} D_{ret,it} + \beta_{repetition} D_{rep,it} + \beta_{+1} D_{+1,it} + \beta_{+2} D_{+2,it} + \beta_{later} D_{later,it} + \beta' X_{it} + \varepsilon_{it}$$

where $D_{ret,it}$ to $D_{later,it}$ are time dummies, X_{it} is a vector of time-varying confounders and $D_{earlier,it}$ (not shown in the equation) is the omitted reference category (baseline).

All regression models were estimated with the xtreg-command in Stata (Version 16.0) with the option vce(cluster ID_t) for panel-robust standard errors. In our particular case of retained students who change their classes in the year of grade repetition (and thus, students with changing class IDs), the possibilities of making use of the nested structure of the data (in terms of students nested in classes; Florean, Hofmann & Kleinert 2019) are very limited. Unfortunately, NEPS school IDs refer solely to sampled schools from Wave 1 (for refreshment sample from Wave 3) and are set as missing after school change or individual tracing, e.g., due to school refusal. In a longitudinal manner, accounting for school IDs would lead to an essential loss of observations at higher panel waves and thorough exclusion of students attending schools in Berlin and Brandenburg from the analytical sample (in both federal states, primary school lasts six instead of four years and the valid school IDs refer to primary school and not to secondary school). Including a comparison group in the analysis is important with regard to the estimation of the confounders, however, it should be stressed that only the group of retained students contribute to the fixed-effects estimation (Brüderl 2010). In the retention group, N = 446 retained students are nested in 187 secondary schools (for N = 5 students we know only the ID of the primary school). More than 40% of schools (n = 82) count only one retained student (**Figure M1.2**). Thus, in our case, the use of multilevel modeling would be very limited due to data sparseness,

i.e., a small number of retained students nested in schools (Clarke 2008). In the **Appendix M1.A**, we provide robustness checks on our results accounting for the nested data structure. For this purpose, we apply random-effect-within-between three-level models (REWB) (Bell & Jones 2015) with observations (i) nested in students who are (ii) nested in schools, finding no indication of the necessity to account for non-independence of observations (**Figure M1.A1**).

1.4 Results

1.4.1 Descriptive Results

Table M1.1 shows the composition of the restricted sample for 1) the comparison group (N = 2995) at the first observed wave and 2) for retained students (N = 446) at both the first and last observed wave before grade retention. At the first observed wave, students from both groups were on average 11 to 12 years old and rated their health in a similar good manner; for retained students, however, the average well-being values were slightly lower than for the comparison group (average value of life satisfaction of 7.93 in the comparison group versus 7.59 in the retained group; for school satisfaction respectively 7.38 versus 6.87). The descriptive results in **Table M1.1** indicate the highest well-being values in the comparison group and the lowest values in the group of retained students at the last wave before grade retention. For retained students, both life satisfaction and school satisfaction decline respectively from 7.59 to 7.17 and from 6.87 to 5.91 over time prior to grade retention.

While the comparison group is almost equally composed of 52% male and 48% female students, boys predominate in the grade retention group (66% versus 34%). Whereas in the grade retention group, girls reported higher well-being values than boys at the first observed wave, the tendency changed for life satisfaction at the last observed wave before retention (6.91 among girls versus 7.30 among boys for life satisfaction; 6.21 among girls versus 5.75 among boys for school satisfaction).

The percentage distribution of the attended school type is quite similar between the comparison and the retained group. The comparison group assembles 46% of grammar school students, followed by intermediate school students (24%), students enrolled in schools with different tracks (16%), and general school students (14%). The order remains the same in the group of retained students with grammar school students as the most frequent group (46%) and general school students as the less frequent group (10%). The highest average life and school satisfaction among all school types were reported by grammar school students, both in the comparison group (8.27 and 7.81 respectively) and at the first observed wave before retention (7.81 and 7.06 respectively). In contrast, general school students and students at schools with different tracks reported the lowest well-being values (with the lowest life satisfaction value of 7.52 and school satisfaction value of 7.00 in the comparison group). At the last wave before grade retention, grammar schools slipped to second place and were overtaken by general schools with regard to life satisfaction (7.37 versus 7.25) and by intermediate

schools with regard to satisfaction with school (6.19 versus 5.89). Again, students at schools with different tracks reported the lowest average well-being at the last wave before grade retention and repetition (6.81 for life satisfaction and 5.40 for school satisfaction). Most grade retentions occurred in the third and subsequent years after attending secondary school education, i.e., from grade 8 on.

Table M1.1: Sample Composition (Restricted Sample) for Students Without and With Grade Repetition

Sample composition	Comparison Group (First Observed Wave) (N = 2,995)	Retained Students (First Observed Wave) (N = 446)	Retained Students (Last Wave Before Retention) (N = 446)
Well-being (outcomes)			
Life satisfaction (LSat)	7.93 (2.30)	7.59 (2.53)	7.17 (2.25)
School satisfaction (SSat)	7.38 (2.48)	6.87 (2.72)	5.91 (2.45)
Gender			
- female	48% (N = 1,444) (LSat: 7.82, SSat: 7.44)	34% (N = 153) (LSat: 7.71, SSat: 7.42)	34% (N = 153) (LSat: 6.91, SSat: 6.21)
- male	52% (N = 1,551) (LSat: 8.03, SSat: 7.32)	66% (N = 293) (LSat: 7.54, SSat: 6.58)	66% (N = 293) (LSat: 7.30, SSat: 5.75)
School type (time-constant)			
- general ('Hauptschule')	14% (N = 424) (LSat: 7.58, SSat: 7.00)	10% (N = 46) (LSat: 7.63, SSat: 6.57)	10% (N = 46) (LSat: 7.37, SSat: 5.59)
- with different tracks ('Schule mit mehreren Bildungsgängen')	16% (N = 471) (LSat: 7.52, SSat: 7.00)	11% (N = 47) (LSat: 7.04, SSat: 6.79)	11% (N = 47) (LSat: 6.81, SSat: 5.40)
- intermediate ('Realschule')	24% (N = 715) (LSat: 7.74, SSat: 7.03)	33% (N = 149) (LSat: 7.46, SSat: 6.72)	33% (N = 149) (LSat: 7.10, SSat: 6.19)
- grammar ('Gymnasium')	46% (N = 1,385) (LSat: 8.27, SSat: 7.81)	46% (N = 204) (LSat: 7.81, SSat: 7.06)	46% (N = 204) (LSat: 7.25, SSat: 5.89)
Time-varying confounders			
Age	11.90 (1.11)	11.62 (1.00)	13.91 (1.48)
Self-rated health	3.27 (0.74)	3.16 (0.82)	3.08 (0.84)
Vocational training	0% (N = 1)	0% (N = 0)	0% (N = 0)
Irrevocable dropout	0% (N = 11)	0% (N = 0)	0% (N = 0)
Additional information: Grade retention in			
- Grade 6	---	4% (N = 18)	
- Grade 7	---	13% (N = 57)	
- Grade 8	---	21% (N = 95)	
- Grade 9	---	23% (N = 104)	
- Grade 10	---	21% (N = 93)	
- Grade 11	---	18% (N = 79)	

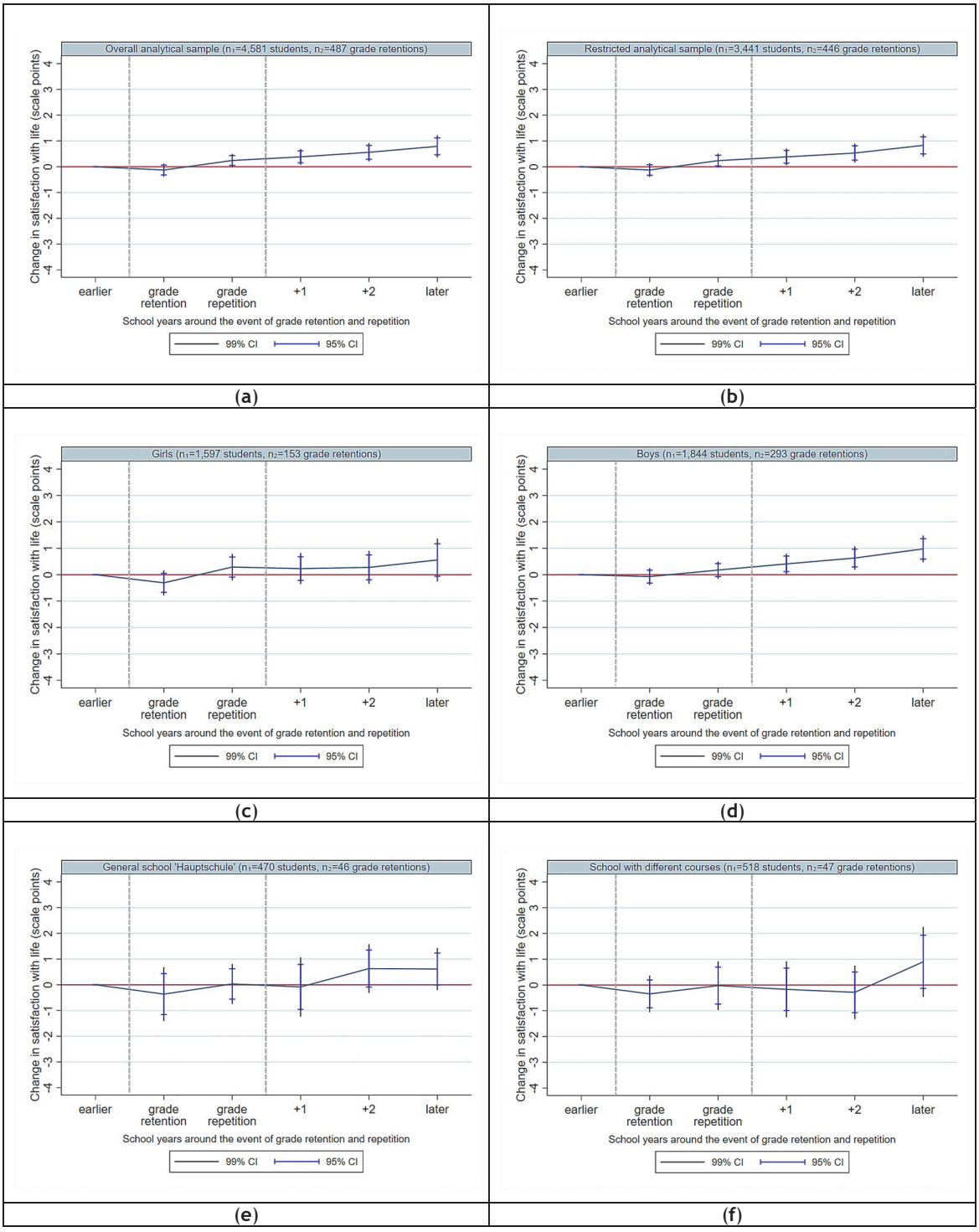
Notes: LSat: life satisfaction; SSat: school satisfaction; sample distribution unweighted, mean values (and standard deviations), and frequencies in %.

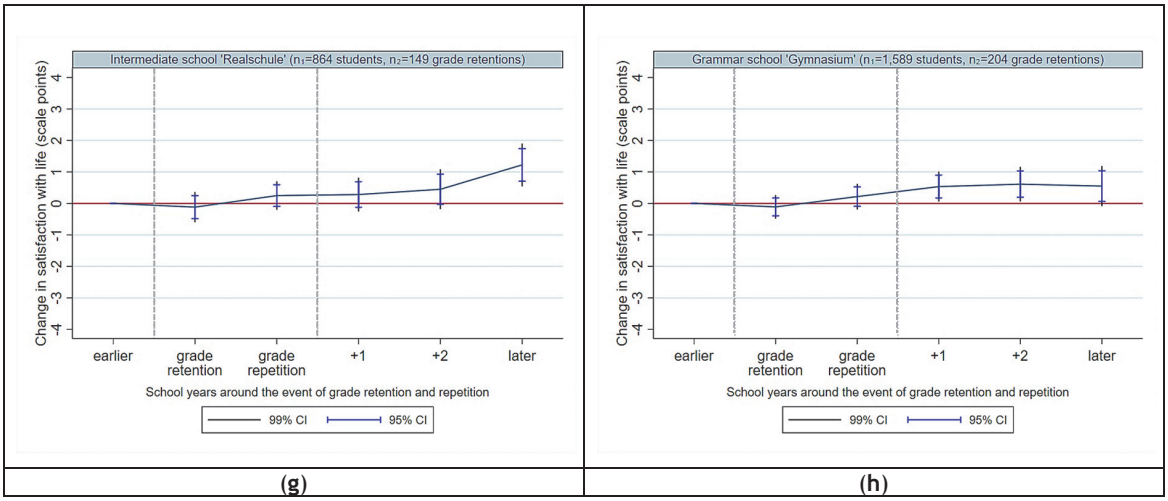
1.4.2 Results From Fixed-Effects Regressions

1.4.2.1 Satisfaction With Life

In order to graphically illustrate our results from fixed-effects regressions, we provide eight plots for satisfaction with life: for unrestricted and restricted analytical sample (**Figure M1.3**a-b), for female and male students (**Figure M1.3**c-d), and different school types (**Figure M1.3**e-h). The X-axis corresponds with the time dummies and represents time before, during, and after the event of grade retention and repetition. The Y-axis shows the amount of change in students' well-being (scale points)

compared to the baseline level (i.e., compared to the average overall well-being level prior to grade retention). The pictured confidence intervals refer to 99% and 95% level of confidence.





(**g**) (**h**)

Figure M1.3: Distributed Fixed-Effects for Satisfaction With Life: Overall, by Gender and Attended School Type

The overall life satisfaction (**Figure M1.3**b, **Table M1.2**: Model 2) is shown to deteriorate by 0.13 scale points in the year of retention decision (i.e., when students learn they will not get a promotion to the next grade), though this effect is not significant. In the year of grade repetition (i.e., when students repeat the grade in a new class), life satisfaction increases by 0.24 scale points compared to the baseline, though missing the threshold of 1% significance level. Hence, grade retention and repetition do not affect life satisfaction in an immediate significant way. However, from the first year after grade retention (starting at +1), life satisfaction starts to improve continuously and increases in the middle and long term to become highly significant up to 0.53 scale points (at +2) and up to 0.83 scale points later on (at +3/ +5) compared to baseline. Thus, retention decision and the subsequent repetition do not seem to have any impact on satisfaction with life in an immediate way. Though, from a middle-term and long-term perspective, the experience of grade retention and repetition leads to a highly significant improvement of the well-being of students enrolled in secondary schools.

The gender-specific results indicate different time paths for girls (**Figure M1.3**c, **Table M1.2**: Model 3) and boys (**Figure M1.3**d, **Table M1.2**: Model 4). Similar for both groups is the result that neither retention decision nor grade repetition do affect life satisfaction in an immediate way. Male students seem to benefit significantly from grade retention already from the first year after grade repetition, by experiencing a significant improvement in life satisfaction in the short-, middle- and long-term. In contrast, life satisfaction of female students starts to improve slowly after grade repetition, however, this change is not significant over time compared to the baseline.

Looking at the school type-specific trajectories of life satisfaction, we do not observe any significant (positive or negative) change in life satisfaction in the years of retention decision and grade repetition compared to the baseline for any examined school type. For students enrolled in

schools with lower educational standards (general schools and schools with different tracks), the experience of grade retention and repetition does not have any significant impact on life satisfaction at any time point after the event (**Figure M1.3**e-f, **Table M1.2**: Model 5 and 6). For intermediate and grammar schools, a temporal increase in life satisfaction is observed: Intermediate school students (**Figure M1.3**g, **Table M1.2**: Model 7) seem to take a significant advantage from grade retention and repetition in the long-term, whereas grammar school students (**Figure M1.3**h, **Table M1.2**: Model 8) in particular in the short- and middle-term.

Table M1.2: Distributed Fixed-Effects for Satisfaction With Life: Overall, by Gender and Attended School Type

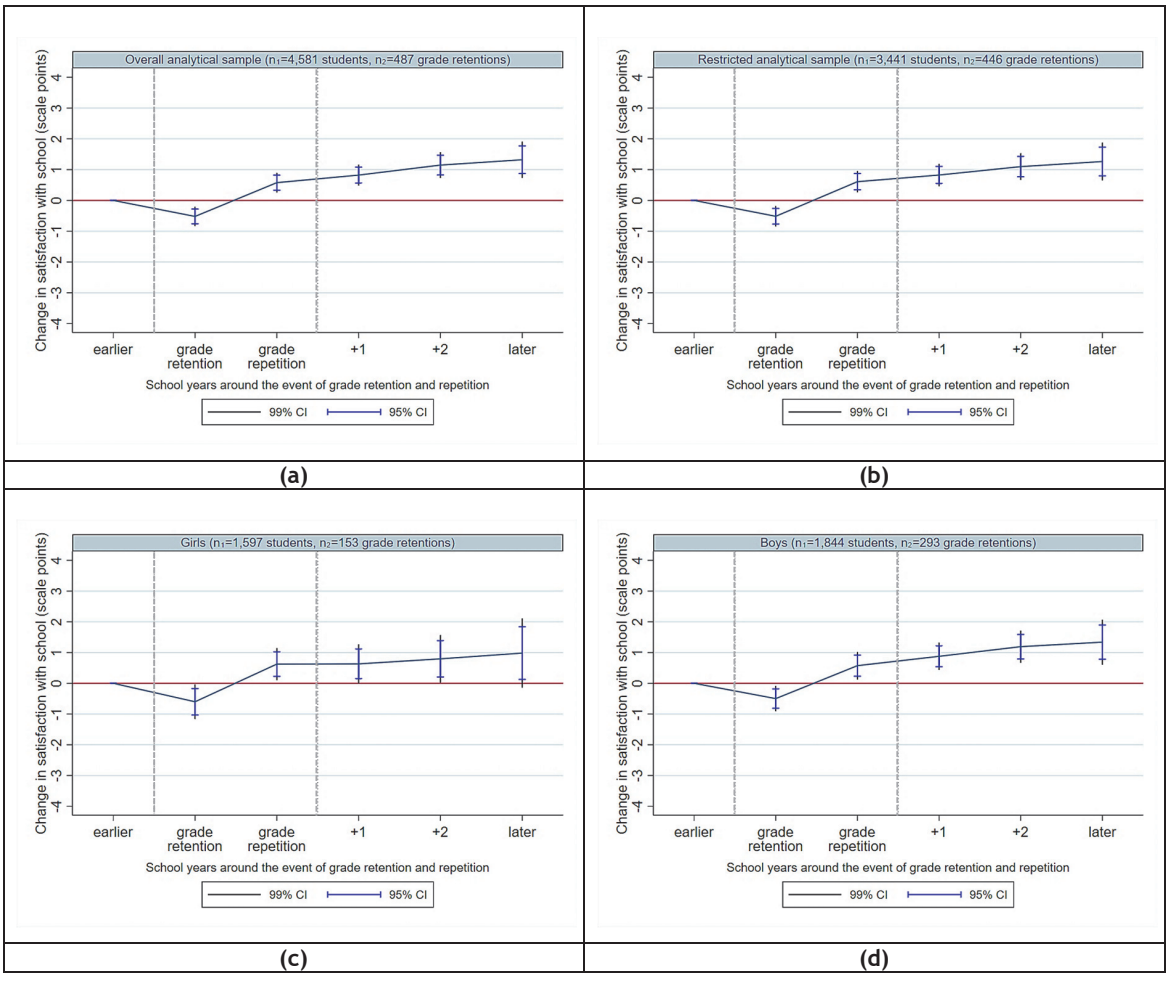
Fixed-Effects Results for Life Satisfaction	**Model 1 (Figure M1.3a) Overall Sample**	**Model 2 (Figure M1.3b) Restricted Sample**	**Model 3 (Figure M1.3c) Girls**	**Model 4 (Figure M1.3d) Boys**
	$\hat{b}$ $(\widehat{SE})$	$\hat{b}$ $(\widehat{SE})$	$\hat{b}$ $(\widehat{SE})$	$\hat{b}$ $(\widehat{SE})$
D1: Grade retention	-0.13 (0.10)	-0.13 (0.10)	-0.31 (0.18)	-0.07 (0.12)
D2: Grade repetition	0.24 (0.10)*	0.24 (0.11)*	0.29 (0.19)	0.17 (0.13)
D3: +1	0.38 (0.12)***	0.38 (0.13)**	0.23 (0.23)	0.41 (0.15)**
D4: +2	0.56 (0.14)***	0.53 (0.14)***	0.28 (0.24)	0.63 (0.17)***
D5: Later	0.79 (0.17)***	0.83 (0.17)***	0.56 (0.31)	0.98 (0.20)***
Age (linear)	-0.79 (0.06)***	-0.86 (0.08)***	-0.85 (0.11)***	-0.85 (0.11)***
Age (quadratic)	0.16 (0.02)***	0.18 (0.02)***	0.15 (0.03)***	0.20 (0.03)***
Age (cubic)	-0.01 (0.00)***	-0.01 (0.00)***	-0.01 (0.00)***	-0.01 (0.00)***
Self-rated health	0.55 (0.02)***	0.59 (0.03)***	0.61 (0.04)***	0.55 (0.04)***
Vocational training	0.75 (0.05)***	0.73 (0.06)***	0.83 (0.09)***	0.69 (0.08)***
Irrevocable dropout	0.27 (0.09)**	0.28 (0.10)**	0.16 (0.13)	0.40 (0.15)**
Number of cases				
Number of person-years	N = 29,872	N = 22,002	N = 10,337	N = 11,665
Number of individuals	N = 4,581	N = 3,441	N = 1,597	N = 1,844
R-squared within	0.069	0.073	0.092	0.064
	Model 5 (Figure M1.3e) General school	**Model 6 (Figure M1.3f) School with tracks**	**Model 7 (Figure M1.3g) Intermediate school**	**Model 8 (Figure M1.3h) Grammar school**
	$\hat{b}$ $(\widehat{SE})$	$\hat{b}$ $(\widehat{SE})$	$\hat{b}$ $(\widehat{SE})$	$\hat{b}$ $(\widehat{SE})$
D1: Grade retention	-0.36 (0.41)	-0.34 (0.27)	-0.12 (0.19)	-0.11 (0.14)
D2: Grade repetition	0.03 (0.30)	-0.02 (0.36)	0.25 (0.17)	0.22 (0.16)
D3: +1	-0.08 (0.45)	-0.17 (0.42)	0.28 (0.21)	0.53 (0.18)**
D4: +2	0.63 (0.37)	-0.28 (0.40)	0.45 (0.24)	0.61 (0.21)**
D5: Later	0.61 (0.32)	0.90 (0.53)	1.22 (0.26)***	0.55 (0.25)*
Age (linear)	-0.59 (0.28)*	-1.20 (0.24)***	-0.81 (0.18)***	-0.84 (0.10)***
Age (quadratic)	0.13 (0.06)*	0.27 (0.06)***	0.17 (0.04)***	0.16 (0.02)***
Age (cubic)	-0.01 (0.00)	-0.02 (0.00)***	-0.01 (0.00)***	-0.01 (0.00)***
Self-rated health	0.50 (0.07)***	0.66 (0.07)***	0.58 (0.05)***	0.58 (0.04)***
Vocational training	0.14 (0.16)	0.79 (0.16)***	0.32 (0.10)***	0.73 (0.16)***
Irrevocable dropout	0.10 (0.27)	0.36 (0.22)	0.14 (0.16)	0.28 (0.21)
Number of cases				
Number of person-years	N = 2,393	N = 2,916	N = 5,514	N = 11,179
Number of individuals	N = 470	N = 518	N = 864	N = 1,589
R-squared within	0.056	0.095	0.083	0.080

Notes: *p < .05. **p < .01. ***p < .001.

1.4.2.2 Satisfaction With School

With regard to school satisfaction, we provide (as for life satisfaction) further eight plots: For unrestricted and restricted sample (**Figure M1.4**a-b), for female and male students (**Figure M1.4**c-d), and

for different school types (**Figure M1.4**e-h). The overall school satisfaction (**Figure M1.4**b, **Table M1.3**: Model 2) is shown to deteriorate by 0.52 scale points in the year of retention decision (i.e., when students learn they will not get a promotion to the next grade). Unlike the effect for life satisfaction, this effect is highly significant. In the year of grade repetition (i.e., when students repeat the grade in a new class), life satisfaction increases significantly, up to 0.61 scale points compared to the baseline (and by 1.13 scale points compared to the year of retention). Therefore, we observe a pattern of a dynamic change of school well-being within one year since the retention decision, starting with a temporary negative shock and evolving into an immediate well-being improvement. In the subsequent school years, the average school satisfaction increases continuously to the level of 1.26 scale points (at +3/+5). Thus, although the retention decision causes an immediate drop in school satisfaction, it normalizes and increases rapidly within a year, and improves continuously in the short, middle- and long-term, indicating significant well-being gains.



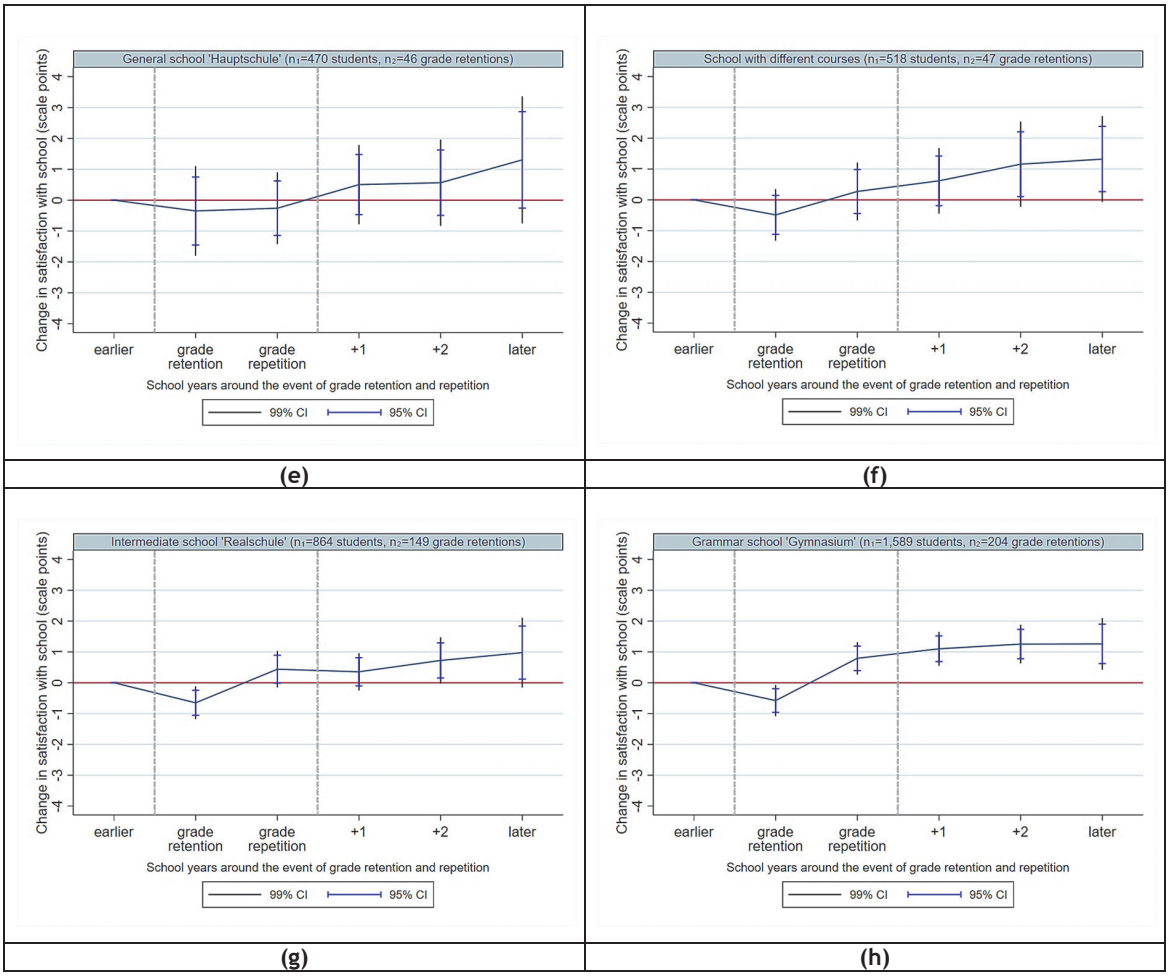


Figure M1.4: Distributed Fixed-Effects for Satisfaction With School: Overall, by Gender and Attended School Type

The gender-specific results show similar trajectories of school satisfaction for girls (**Figure M1.4**c, **Table M1.3**: Model 3) and boys (**Figure M1.4**d, **Table M1.3**: Model 4), in line with its overall trajectory (see again **Figure M1.4**b). However, the pattern of improvement is faster (as it is for life satisfaction) and more concise for male students both in the short-term, middle-term, and long-term. For female students, the long-term effect is missing the threshold of 1% significance.

The school type-specific trajectories of school satisfaction yield a heterogeneous picture. For general school students (similar to the results for life satisfaction), grade retention and repetition do not affect satisfaction with school significantly at any observed time point (**Figure M1.4**e, **Table M1.3**: Model 5). For intermediate and grammar school students (**Figure M1.4**g-h, **Table M1.3**: Model 7 and 8), the retention decision implies a significant immediate decrease in school satisfaction followed, however, by an immediate recovery to the baseline level (intermediate schools) or an immediate improvement significantly above the baseline level (grammar schools). We show again that the

negative impact of grade retention and repetition is only of an immediate nature. Students enrolled in schools with different tracks (**Figure M1.4**f, **Table M1.3**: Model 6) and intermediate schools (**Figure M1.4**g, **Table M1.3**: Model 7) seem to benefit from grade retention and repetition only in the long-term; yet, the effects have to be regarded with suspicion since they are missing the threshold of 1% level of significance. In contrast, grammar school students (**Figure M1.4**h, **Table M1.3**: Model 8) are the only school type that benefits from the experience of grade retention and repetition in the short-term, middle-term, and long-term.

Table M1.3: Distributed Fixed-Effects for Satisfaction With School: Overall, by Gender and Attended School Type

Fixed-Effects Results for School Satisfaction	**Model 1 (Figure M1.4a) Overall Sample**	**Model 2 (Figure M1.4b) Restricted Sample**	**Model 3 (Figure M1.4c) Girls**	**Model 4 (Figure M1.4d) Boys**
	$\hat{b}$ $(\widehat{SE})$	$\hat{b}$ $(\widehat{SE})$	$\hat{b}$ $(\widehat{SE})$	$\hat{b}$ $(\widehat{SE})$
D1: Grade retention	-0.52 (0.12)***	-0.52 (0.13)***	-0.60 (0.22)**	-0.50 (0.16)**
D2: Grade repetition	0.58 (0.12)***	0.61 (0.13)***	0.63 (0.20)**	0.57 (0.17)***
D3: +1	0.82 (0.13)***	0.82 (0.14)***	0.63 (0.25)**	0.88 (0.17)***
D4: +2	1.15 (0.16)***	1.10 (0.17)***	0.80 (0.30)**	1.19 (0.20)***
D5: Later	1.32 (0.23)***	1.26 (0.24)***	0.98 (0.44)*	1.33 (0.28)***
Age (linear)	-0.92 (0.07)***	-1.20 (0.09)***	-1.16 (0.12)***	-1.23 (0.12)***
Age (quadratic)	0.18 (0.02)***	0.24 (0.02)***	0.22 (0.03)***	0.26 (0.03)***
Age (cubic)	-0.01 (0.00)***	-0.01 (0.00)***	-0.01 (0.00)***	-0.02 (0.00)***
Self-rated health	0.46 (0.02)***	0.49 (0.03)***	0.49 (0.04)***	0.48 (0.04)***
Vocational training	1.17 (0.07)***	1.25 (0.08)***	1.28 (0.12)***	1.21 (0.11)***
Irrevocable dropout	0.01 (0.10)	-0.00 (0.13)	0.04 (0.19)	-0.03 (0.17)
Number of cases				
Number of person-years	N = 29,872	N = 22,002	N = 10,337	N = 11,665
Number of individuals	N = 4,581	N = 3,441	N = 1,597	N = 1,844
R-squared within	0.065	0.076	0.083	0.072
	Model 5 (Figure M1.4e) General school	**Model 6 (Figure M1.4f) School with tracks**	**Model 7 (Figure M1.4g) Intermediate school**	**Model 8 (Figure M1.4h) Grammar school**
	$\hat{b}$ $(\widehat{SE})$	$\hat{b}$ $(\widehat{SE})$	$\hat{b}$ $(\widehat{SE})$	$\hat{b}$ $(\widehat{SE})$
D1: Grade retention	-0.35 (0.56)	-0.49 (0.32)	-0.65 (0.21)**	-0.58 (0.20)**
D2: Grade repetition	-0.26 (0.45)	0.27 (0.36)	0.44 (0.23)	0.79 (0.20)***
D3: +1	0.50 (0.50)	0.62 (0.41)	0.36 (0.23)	1.10 (0.21)***
D4: +2	0.56 (0.54)	1.16 (0.54)*	0.72 (0.29)*	1.25 (0.24)***
D5: Later	1.31 (0.79)	1.32 (0.54)*	0.98 (0.44)*	1.26 (0.32)***
Age (linear)	-0.67 (0.32)*	-1.42 (0.26)***	-1.21 (0.19)***	-1.16 (0.11)***
Age (quadratic)	0.14 (0.07)	0.33 (0.06)***	0.27 (0.04)***	0.21 (0.03)***
Age (cubic)	-0.01 (0.00)	-0.02 (0.00)***	-0.02 (0.00)***	-0.01 (0.00)***
Self-rated health	0.41 (0.08)***	0.48 (0.07)***	0.54 (0.05)***	0.48 (0.04)***
Vocational training	0.53 (0.21)**	1.40 (0.18)***	0.75 (0.13)***	1.78 (0.24)***
Irrevocable dropout	-0.43 (0.30)	-0.05 (0.25)	-0.31 (0.23)	0.48 (0.24)*
Number of cases				
Number of person-years	N = 2,393	N = 2,916	N = 5,514	N = 11,179
Number of individuals	N = 470	N = 518	N = 864	N = 1,589
R-squared within	0.047	0.087	0.086	0.095

Notes: *p < .05. **p < .01. ***p < .001.

1.4.2.3 Effects of Time-Varying Confounders

The effects of all four time-varying confounders reveal a homogenous pattern over our fixed-effects models. First, except for general school students, all estimated age terms were highly significant

(with a negative linear, positive quadratic, and negative cubic effect), indicating an L-shaped trajectory of school and general well-being over time. Second, the effects of self-rated health were positive and highly significant in all models, ranging from 0.50 to 0.66 for life satisfaction and from 0.41 to 0.54 for school satisfaction. Third, being in vocational training influences life satisfaction in a positive way (except for general school students); the effect varied between 0.32 for intermediate and 0.83 for female students. The same pattern applied to school satisfaction with the highest positive effect of 1.78 for grammar school students. Fourth, the effect of the irrevocable dropout was significant at 1% level only for life satisfaction in the overall sample and for male students. Those students who irrevocably dropped out reported higher general well-being scores compared to those who remained in the sample.

Unfortunately, due to scarce longitudinal information on critical family events that are known to affect children's well-being in a tremendous way, we are not able to account for separation, divorce, or death of parents in our analyses.

1.5 Discussion

To our best knowledge, this is the first longitudinal study anchored in the German educational system that examines the impact of grade retention decision and grade repetition on the overall and school-related well-being of native students at secondary schools. By using fixed-effects regression models that eliminate time-invariant intra-individual unobserved heterogeneity, it was possible to examine well-being changes around the event of grade retention and repetition, i.e., when the decision of grade retention takes place, in the subsequent year of grade repetition, and the period before and after having experienced those events. The research aims of this study were as follows: First, to examine, in a descriptive manner, the sample percentage of native students who experienced a grade retention decision and grade repetition. Second, to reveal dynamics in students' well-being around the event of grade retention and repetition in the short-term, medium-term, and long-term accounting for unobserved heterogeneity within the fixed-effects approach. Third, to reveal group-specific well-being trajectories by socio-demographic characteristics, i.e., conditional on gender and the attended type of school.

1.5.1 Grade Retention in Germany: Descriptive Findings

The descriptive results support our first hypothesis—H1a—assuming that male students are more frequently affected by grade retention than female students. A brief reminder: The sample percentage of grade retentions in the unrestricted sample was 13.0% for boys and 8.1% for girls (respectively, 15.9% for boys and 9.6% for girls in the restricted sample). This gender-specific pattern is consistent with previous findings (Federal Statistical Office 2018; Klapproth et al. 2016). The reason for the

gender-specific imbalance might be mainly due to the lower reading skills of boys and the more rule-compliant behavior of girls (Prenzel et al. 2013). Further, girls are, in general, more likely to show a stronger perception of personal responsibility for issues related to school, schoolwork, and other obligations in life, and they have, on average, better school marks than boys (Eurydice 2010; Wiklund et al. 2012).

Hypothesis H1b, assuming that the percentage of native students having experienced a grade retention follows a social gradient differentiated by the attended school type, has to be withdrawn. In contrast to statistics from official data (Federal Statistical Office 2018), students in intermediate schools are in our sample most frequently affected by a grade retention and subsequent grade repetition (15.3% in the unrestricted and 17.2% in the restricted sample), followed by grammar school students (9.5% in the unrestricted and 12.8% in the restricted sample). The percentage of retained students is the lowest (8.2% in the unrestricted and 9.1% in the restricted sample) in schools with different tracks of education. The main reason for differences in these percentages might be the positive selection effect for native students being more likely to attend schools with higher educational standards compared to migrants (Nauck & Lotter 2015; Nauck, Schnoor & Herold 2017). Further reasons could be, on the one hand, that grade repetition has already been abolished in some school types (i.e., schools with different tracks in the Federal State of Bremen) in some federal states (i.e., Hamburg, Rhineland Palatinate, or Berlin), or they only take place with exceptions. On the other hand, a voluntary grade repetition is more likely to take place in grammar schools, since these school types are more focused on high level school performances and thus, the strive for performance improvement may be stronger than in other school types.

1.5.2 The Effect of Grade Retention and Repetition on Students' Well-Being: Results From Fixed-Effects Regressions

One of the most unambiguous and important findings of our study (contrary to the assumption in hypothesis H2), is that students' well-being benefits from a grade retention decision and repetition in the short-term, middle-term, and long-term instead of being penalized by these events. Our results reveal only an immediate negative effect in the year of grade retention decision on school satisfaction (but not on life satisfaction) that, however, vanishes quickly within the subsequent years after grade repetition. Unlike previous studies, which mainly used growth curves and propensity score matching (Wu, West & Hughes 2010; Mathys, Véronneau & Lecocq 2017), and similar to the longitudinal study on students' motivation by Kretschmann et al. (2019), we do not find any evidence for an enduring negative impact of grade repetition on students' well-being. From a longitudinal perspective, grade retention and repetition do not seem to be purposeless; our results indicate its effectiveness, starting already in the year of grade repetition. Even if a grade retention decision may initially be experienced by students as a critical event, it seems to be associated longitudinally with a fast adaptation to peers

and circumstances in the new class as well as further developmental opportunities, e.g., an improvement in school performance (Schwerdt, West & Winters 2017). The opportunities resulting from a grade retention decision and grade repetition are well expressed by the phrase "the positive lessons of loss" (Filipp & Aymanns 2018: 99) which highlights that critical life events might trigger a crucial individual cognitive, emotional, and behavioral transformation that offers "a second chance" in student's life. These individual responses, however, are assumed to differ depending on gender or attended school type, which is discussed in detail in the section below.

1.5.3 Grade Retention: Gender-Specific Results

With regard to life satisfaction, hypothesis H3a assuming that girls' general well-being decreases in the years of grade retention decision and grade repetition with a recovery in the subsequent years, can only be partially supported by our results. The same applies to H3b assuming that boys' general well-being does not change in the year of grade retention decision and in the subsequent years. Our study shows that grade retention decision does not affect life satisfaction in an immediate way; this applies to both genders. For male students, life satisfaction does not change in the year of retention decision, begins, however, to significantly increase from the year of grade repetition. For female students, the effect of grade retention on life satisfaction is not significant over time. Due to the lack of studies on gender-specific well-being dynamics around the event of grade retention and repetition, we refer to studies dedicated to normative transitions (e.g., transitions from primary to secondary school) and their impact on life satisfaction. In general, findings from prior studies are rather heterogeneous (Van Ophuysen 2009; Lester & Mander 2015; Nielsen et al. 2017; Knoppick et al. 2016). Girls are more likely to report higher levels of depression and internalizing behavior after having experienced a transition to secondary school (Inchley, Currie & Young 2016; West, Sweeting & Young 2009), whereas boys report significantly more contact and peer problems as well as problems of externalizing behavior (Lester & Mander 2015; Inchley, Currie & Young 2016). Overall, the current state of research shows that boys and girls react differently to critical events in terms of transitions (Lester & Mander 2015; Inchley, Currie & Young 2016; West, Sweeting & Young 2009). Although previous findings reveal an increase in contact and peer problems in boys after a normative transition (Bilz, Ottova & Ravens-Sieberer 2012), the negative trajectory is not apparent for boys' life satisfaction with regard to the event of grade retention and repetition. In contrast, our results show an increase in boys' life satisfaction in the middle-term and long-term. This might be due to the fact that boys are more at risk of repeating a grade than girls, i.e., grade retention is socially less stigmatizing for them. Further, self-esteem among boys might also be less exposed to stigma by their new classmates. Boys are less worried about school and, thus, grade repetition is considered to be less problematic. For girls, our results show no change in life satisfaction over time compared to the baseline level prior to grade retention. This could be explained by girls' generally higher intrinsic performance attribution (Gysin 2017), which

is likely to be accompanied by anger about, and frustration of, not having accomplished a high level of school performance. This, in turn, affects their life satisfaction negatively, preventing its greater increase. Overall, very little is known about gender-specific coping with critical life events at school. Previous studies show that boys are more likely to focus on the present, while girls tend to worry more about the future (Wilhsson et al. 2017). Boys are also, in general, better at ignoring problems (Seiffge-Krenke 2015), seeking distraction by engaging in hobbies or participating in sports (Plenty et al. 2014).

With regard to satisfaction with school, hypothesis H3a for girls is partially supported by our results, hypothesis H3b for boys, however, has to be rejected. For both genders, school satisfaction decreases in the year of grade retention decision and improves continuously afterwards; this pattern is more concise for boys. As already mentioned, there is a research gap on longitudinal studies on the effect of grade retention on school satisfaction to date. The existing evidence from related studies indicates that girls report higher levels of perceived pressure and demands from school compared to boys (Moksnes et al. 2016). Girls are also more at risk for school-related burnout (Walburg 2014) and a decline in self-esteem (Bluth et al. 2017). A study from Switzerland (Gysin 2017) shows gender-specific differences in the impact of school marks on self-esteem, revealing a stronger negative effect of poor school marks on girls' self-esteem compared to boys. Boys tend to show more frequently externalizing behavior due to their low school performance attribution and are more likely to explain their poor performances at school by not relating it to a possible failure by themselves, but rather to external circumstances, e.g., the demands of teachers (Gysin 2017). It is known that students' self-concept suffers from the experience of grade retention (Marsh et al. 2018). Because this seems to be more pronounced for girls than boys, slower recovery from grade retention may be assumed for girls' school satisfaction. Some studies show that a better school performance and school grades go hand in hand with a higher satisfaction with school (Hascher & Hagenauer 2011b; Eder 2007). Although previous findings stress that girls more frequently report positive attitudes towards school, more enjoyable experiences at school, and higher school-related well-being compared to boys (Hascher & Hagenauer 2011a; Gysin 2017; Huber, Gysin & Braun 2011), what may suggest a faster recovery from repeating a grade in school satisfaction for girls, this is not fully reflected in our results. Boys not only fully recover from grade retention but also improve faster in their school well-being.

Due to the general lack of longitudinal studies on gender-specific well-being trajectories around the event of grade retention and repetition, not to mention the lack of studies on secondary school system in Germany, while discussing our findings, we help us with studies on primary schools, e.g., by Wu, West & Hughes (2010). The study reveals that students' mean rated liking increases in the short-term after having experienced grade retention but decreases in the middle-term and long-term (Wu, West & Hughes 2010). What we observe in our study, is rather a continuous improvement of school-related well-being for both genders. The discrepancy between (not really comparable) previous findings and our results may be additionally attributed by a possible age effect. It seems likely

that students—depending on their age—have different abilities to cope with the event of grade retention and repetition. A study from Germany on the transition from primary to secondary school shows that students who change to a secondary school after 4th grade of primary school report a lower academic self-concept than students who change after 6th grade (Knoppick et al. 2015), e.g., in Berlin or Brandenburg.

1.5.4 Grade Retention: School Type-Specific Results

With regard to general well-being of students attending different school types, hypothesis H3c assumed that well-being does not change around the event of grade retention and repetition for students attending general and intermediate schools. Hypothesis H3c is supported by our results for general school students, but not for intermediate school students; the latter showing a long-term increase in life satisfaction after repeating a grade. Hypothesis H3d for students at schools with different tracks has also to be withdrawn. We observe no significant change in life satisfaction after being retained for these students (as for general school students). The same applies to hypothesis H3e assuming for grammar school students a significant decline in life satisfaction in the year of grade retention with a slow recovery in subsequent years. Grammar school students report no immediate changes in general well-being in the years of grade retention and repetition, but a significant improvement in short-term and middle-term.

To date, there is no empirical evidence on well-being trajectories around the event of grade retention and repetition conditional on the attended school type. Previous studies reveal, in general, that lower life satisfaction (Rathmann et al. 2018a) has been reported among students in school types with lower educational standards (i.e., general schools in Germany). Studies using longitudinal data show, e.g., that students at general schools report lower life satisfaction at the beginning of grade 5 (just after the transition to secondary school) than students from other school types (Herke, Rathmann & Richter 2019). An explanation for this could be that at the end of primary school and the beginning of secondary school, students start to perceive differences in social composition and educational aspirations between different secondary school types (Kramer et al. 2009). This may lead to a reflection and consolidation of their educational position in the educational system (Kramer et al. 2009). For instance, students from school types with lower educational standards, e.g., general schools in Germany, are more likely to be confronted with feelings of being “left behind” and get “used to failure” due to numerous setbacks they have already experienced during their school career (so-called “failed careers”; Frenzel 2013), i.e., more often grade repetitions, retentions due to the lack of school readiness or being downgraded to a type of school with lower educational standards and aspirations (Kramer et al. 2009). This might be the reason why, in our study, the event of grade retention and repetition does not negatively affect life satisfaction of general school students and students from schools with different tracks. A study by Kramer et al. (2009) on child orientation frameworks

for students at lower secondary schools find that early failure in the form of, e.g., grade retention in primary school leads to a stronger feeling of distance from school in the long run (Kramer et al. 2009). In addition, some studies emphasize a strong association between students' well-being and their socio-economic background often approximated by the attended type of school, i.e., students with a higher socio-economic background have a higher likelihood of attending school types such as grammar schools (Rathmann & Kuntz 2018; Rathmann et al. 2016).

For school satisfaction, hypothesis H3c is, again, fully supported for general school students, but not for intermediate school students; the latter showing a significant decline in school well-being in the year of grade retention. As for the case of life satisfaction, hypothesis H3d for students at schools with tracks has to be rejected. Overall, our results indicate certain similarities in well-being dynamics among general school students and students at schools with tracks (mostly general and intermediate school tracks). The level of school satisfaction of intermediate school students is similar around the event of grade retention and repetition similarly to this of grammar school students; the latter revealing, however, the most advantageous pattern that allows us to partially withdraw the hypothesis H3e. Intermediate school students and grammar school students experience a significant decrease in school satisfaction in the year of grade retention, however, only the school satisfaction of grammar school students improves continuously over time. The difference in dynamics of school well-being between students at general schools (and schools with tracks), and students attending other school types might be related to less demanding learning and achievement requirements than those at other school types, often internalized by students (Seiffge-Krenke 2015). Another explanation is that students in schools with lower educational standards find themselves in an environment in which being retained is a common and shared experience among classmates. A qualitative study on the educational orientation of students in so-called "exclusive" educational settings in Germany (i.e., grammar schools) concludes that those students are more likely to be characterized by a strong orientation towards school achievement (Helsper et al. 2018). Even if it can be assumed that a higher aspiration for school success at grammar schools (Kramer et al. 2009; Helsper et al. 2018) may lead to a decrease in school satisfaction around the event of grade retention and repetition, our results reveal different dynamics. Grade repetition has, contrary to hypothesis H3e, a positive immediate, short-, middle- and long-term effect on school satisfaction of students in grammar schools, maybe because those students are more likely to experience a voluntary grade repetition than students in other school types. They are also more likely to live in families with higher socio-economic background and be supported by their relatives in order to cope with critical events. A central aspect in experiencing such events is that students have to make adjustments to previously habitualized behaviors that have been interrupted by the event itself (Filipp & Aymanns 2018). Consequently, each student has a personal evaluation of the event of grade retention and repetition and makes an individual adjustment to this event. Whether this event is perceived to be critical in the long-term depends on

social and institutional support (e.g., peers, family, teachers), as in the example of coping with a normative transition from primary to secondary school (Keay, Lang & Frederickson 2015).

In sum, the findings of this study highlight that the event of grade retention and repetition seems to be perceived rather as an opportunity than a critical event with regard to students' well-being, in particular for boys and grammar school students. Despite the change of the previous familiar class environment, grade repetition affects well-being of retained students mostly in a positive manner. As a conclusion of this study, the event of grade repetition and retention should not be classified overhasty as not having any positive effects on students' well-being. Further longitudinal studies are essential to understand more about well-being dynamics of students in German educational system, considering, e.g., social, and institutional support or regional variation among federal states in making decisions about voluntariness and efficacy of grade retention as an intervention in students' educational career.

1.6 Limitations

One of the strengths of this study is the use of longitudinal NEPS data, applying fixed-effects regressions. For the first time in the German context, conclusions can be drawn about temporary dynamics of students' well-being around the event of grade retention and repetition. The stratified cluster sample of NEPS allows the best possible representation of the German school landscape, one that is undistorted across school types, federal states, and regions (Blossfeld, Roßbach & Maurice 2011).

It should be noted that a stratified analysis by the federal state of NEPS data is only permitted under certain conditions. Due to the federal state-specific design of the school system, differences in well-being observed between school types may be attributable to variances among federal states. Further studies are also encouraged to use multiple items of general and school-related well-being. From this, the multidimensional construct of well-being, not available in NEPS, can be captured more precisely and target group-specific measures can be developed.

NEPS includes data on a broad variety of student migration backgrounds. Previous studies have already shown that ethnic groups differ both in their school performance and their educational goals and aspirations (Nauck & Lotter 2015). Because ethnic heterogeneity is assumed to trigger heterogeneous effects on the relevance of grade retention for general and school well-being, all migrants were excluded from our analysis. Future studies are encouraged to investigate the importance of grade retention for the well-being of students with a migration background.

Lastly, due to limited data, we are not able to differentiate between involuntary and voluntary grade retentions and repetitions. Because previous studies show that the impact of grade retention for well-being might differ depending on whether retention was voluntary or whether it took place at an upper secondary level, also this needs to be examined more closely in follow-up studies.

1.7 Conclusions

Our study highlights the experience of being retained as rather advantageous for secondary students' well-being, except for the immediate negative effect in the year of retention decision that, however, attenuates or turns positive already in the year of grade repetition. This study shows positive short-term, middle-term, and long-term effects on general- and school-related well-being, particularly for boys and students in grammar schools. The patterns are more pronounced for school well-being compared to general well-being.

Previous evidence provides heterogeneous findings on the effects of school transitions on well-being of students. An adequate examination of the role of school transitions on students' well-being requires a longitudinal view at particular groups of students (e.g., conditional on gender or school types) and several indicators of well-being. In our study, it is not possible to make any statements about potential benefits of grade retention for school performance. However, this study highlights that critical voices against grade retention should consider the positive effects revealed in this study, particularly on the well-being of boys and grammar school students. According to our results, grade repetition is not effective for general well-being of girls (unlike school well-being) and well-being of students attending school types other than grammar school. The general trend, though, beginning from the repetition year tends to be positive also for other school types, even if not significant.

Since there are hardly any initiatives to promote well-being of retained students, it is important for future research and interventions to review best practice examples to monitor and support them during this critical period. Previous findings suggest that teachers can provide support during periods of transition (Graalmann 2018). Positive findings on the impact of social and professional support by peers, teachers, and parents observed during normative transitions from primary to secondary schools could also be adapted to grade retention when designing future interventions during school transitions (Van Ophuysen 2009; Keay, Lang & Frederickson 2015). Future initiatives should also consider support for students coping with grade retention and repetition (Lester & Mander 2015), e.g., accompanied by teachers before and after the transition to the new class (Graalmann 2018). This could have a positive effect on students' well-being since a positive assessment of an imminent transition often goes hand in hand with a positive development of well-being after a transition (Knoppick et al. 2016).

Appendix M1.A

Additional information: Blue lines correspond to results ignoring the nested structure of the data (i.e., results presented in our manuscript; red lines correspond to results from REWB (hybrid) models accounting for the nested structure of the data. To avoid essential loss of observations at higher panel waves and thorough exclusion of students attending schools in Berlin and Brandenburg, in all cases school IDs from the first observed wave have been applied to all subsequent waves (i.e., irrespective of the possibility of school change). Exemplarily, we show models for life and school satisfaction for the restricted overall sample and for general secondary schools with the smallest sample sizes. We are assured of the robustness of all other results presented and discussed in the manuscript.

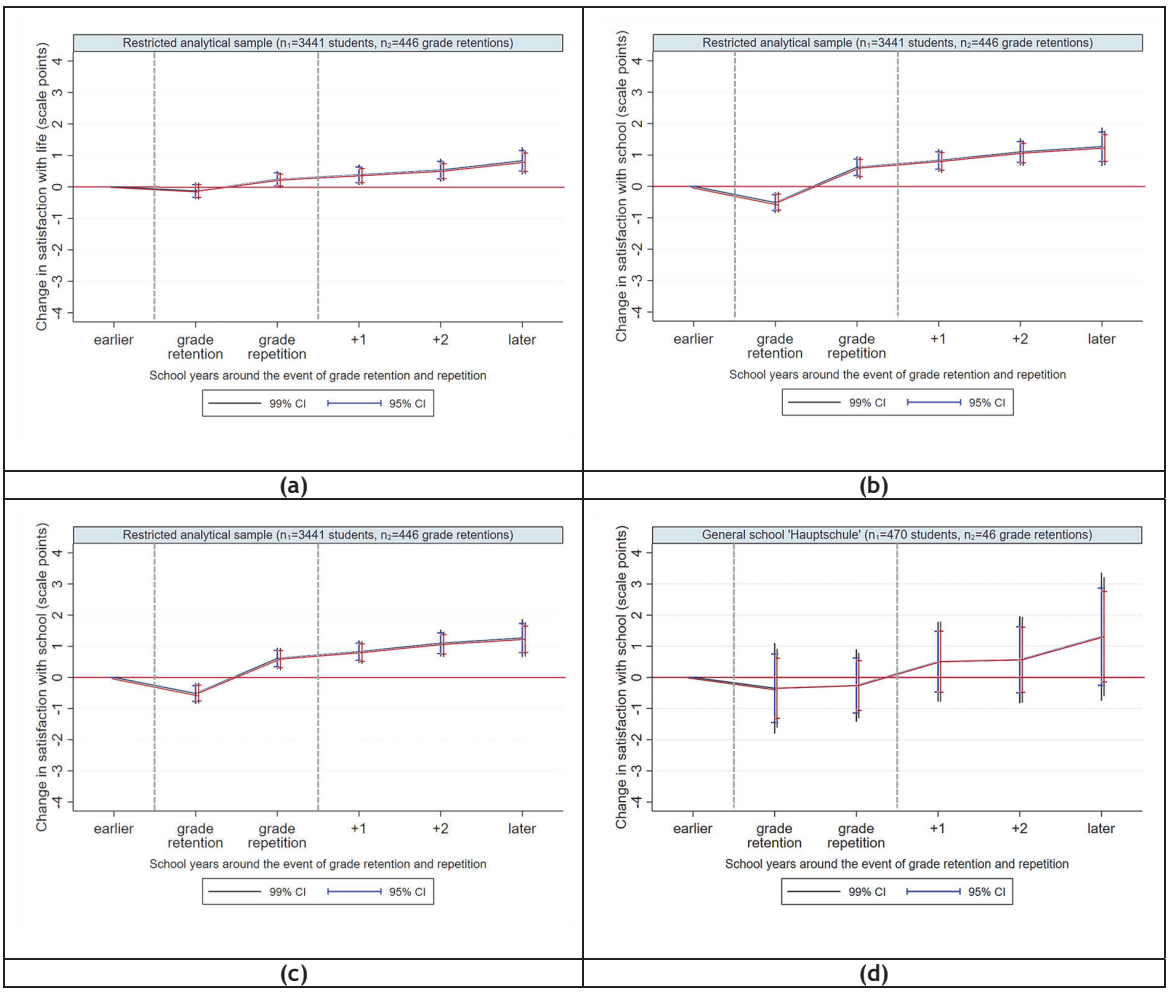


Figure M1.A1: Model Comparison for Testing the Non-Independence of Observations

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Manuskript 2: Mental Health Dynamics Around Marital Dissolution. Moderating Effects of Parenthood and Children's Age[1]

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Abstract

Our study is the first that aims at estimating the intra-individual effect of marital dissolution on mental health, conditional on parenthood status and age of the youngest biological child. We rely on the set point model that predicts a nonlinear, homeostatic self-regulation process with an anticipatory effect and a subsequent recovery phase. Assuming heterogeneous effects, we expect both parenthood status and age of the youngest biological child grouped into five distinct categories to moderate the strength of the dissolution-health nexus. We use GSOEP data and restrict our sample to women and men who were at risk for first marital dissolution within the observational period 2002 to 2016. The dependent variable is the mental health component of the SF-12 survey instrument. We estimate distributed fixed-effects (dummy impact functions), covering the time span from three (or more) years before marital dissolution up to six (or more) years afterwards. Compared to the baseline, childless women exhibit a considerable impairment in mental health after dissolution, experiencing a slower recovery than childless men. Our most unambiguous result is the negative anticipation and a subsequent downward trajectory of mental health among mothers of infants and toddlers, whereas in the respective group of fathers we do not observe any change over time. In all other parent groups, mental health reacts mostly in a short-term manner to dissolution, except for fathers of pre- and primary school children whose mental health remains unchanged. Our study provides new evidence on mental health dynamics around marital dissolution and raises the awareness of mental distress, loneliness, and potential social exclusion faced by childless and parents, in particular by lone mothers of young children.

2.1 Introduction

During the year 2016, almost one million couples divorced in Europe, and over 160 thousand of them in Germany (Eurostat 2018). From all German divorces, 83% occurred just after the obligatory "sepa-

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ration year", 16% on average three years after separation, and the remaining 1% terminated exceptionally before the expiration of the separation year (Federal Statistical Office 2018). 51% of all divorce applications were filed by women, 41% by men and 8% by both spouses. About half of divorcing German couples had minor children (Federal Statistical Office 2018).

Separations and divorces have a multitude of effects for those involved. In this paper, we study temporal dynamics of mental health around marital dissolution. We are particularly interested to learn more about gender specific differences of these dynamics and the moderating role of (non)parenthood. Whether a couple has a child or not, may strongly influence the decision to separate and divorce. Couples having children are less likely to divorce, especially when they have several children (with 2-3 children minimizing the risk of divorce; Andersson 1997) and/or young children (Waite & Lillard 1991; Steele et al. 2005). Part of the effect may be causal, meaning that children increase partners' commitment to the (marital) union, but it may also reflect selection, as partners less committed to a union are less likely to have children together (Coppola & Di Cesare 2008; Lyngstad & Jalovaara 2010).

Presence of a child may also affect partners' experience of divorce. Although research from past decades accumulated vast evidence that divorce is detrimental to mental health (Amato & Keith 1991; Hank & Wagner 2013), the question of moderating effects of parenthood has been addressed by only a handful of papers (Blekesaune & Barrett 2005; Williams & Dunne-Bryant 2006; Leopold & Kalmijn 2016). Unfortunately, most previous studies use less than ideal research designs, making it difficult to draw firm conclusions. First of all, viewing marital dissolution as a dynamic process rather than an enduring state requires analyses of panel data and an adequate longitudinal modeling approach that considers anticipatory effects and subsequent adaptation (Amato 2000). Second, past research rarely accounts for the ages of children and typically pools together childless people in one category with parents of adult children. Our analysis overcomes these methodological limitations. First, we use fixed-effects regression for panel data to control for time-invariant intra-individual unobserved heterogeneity around marital dissolution. Second, we account for baseline age-related dynamics of mental health. And third, we distinguish five categories of (non)parenthood, from childless, through parents of infants and toddlers to those having pre- and primary school children, to those having adolescent or adult children.

Mental health—the outcome variable studied by us—is defined by the WHO as "a state of well-being in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community" (WHO 2018). The question whether the presence of children aggravates the consequences of marital dissolution for mental health is important from a substantive point of view: divorces affecting both parents and children are common and have long-reaching consequences. The experience of marital dissolution and conflict affects partners' well-being for several years afterwards (Lucas 2005), influences their children's well-being (Amato, Loomis & Booth 1995), and shapes family ties

and behaviour among children and grandchildren of divorcees (Amato & Cheadle 2005). Moreover, we consider mental rather than physical health because mental health is more sensitive to life events in a short- and mid-term perspective.

Our study aims at the existing research gap on the role of diverse stages of parenthood in explaining mental health of parents around marital dissolution. Examining the complex role played by children at different developmental stages improves our understanding of negative consequences of marital dissolution as well as of benefits derived from marriage. Negative consequences of marital dissolution for mental health are typically interpreted in terms of being deprived of a protective effect of marriage itself. However, such reasoning must be questioned, should the negative effects of marital dissolution be contingent on having children. More generally, studying the moderator effect of parenthood enriches our knowledge on the heterogeneity of mental health consequences around first marital dissolution, a topic that has been called for as an important direction of future research (Amato 2010).

2.2 Theoretical Background

In order to theorize consequences of marital dissolution, several approaches have proved to be fruitful (Amato 2000). First, although marital dissolution is generally conceived of as a negative critical life event producing grief and suffering, it has been argued that for some individuals (e.g., a wife with an abusive husband) it might be potentially beneficial (Amato 2000). This implies that studies on health consequences around marital dissolution need to consider effect heterogeneity across individuals by identifying and modeling key moderator variables. Complementing previous studies which have focused, for instance, on cross-country differences in divorce effects (i.e., macro-level moderators, e.g., Kalmijn 2010) or moderation of divorce effects by union type (Kalmijn 2017), our study examines moderating effects of presence and age of biological children.

Second, even if the effects of dissolution are detrimental to mental health, these adverse effects may be short-lived (as posited by the so-called crisis model) rather than sustained long-term health declines (chronic strain model) (Amato 2000). The notion of short-term health declines after dissolution with subsequent adaptation, i.e., recovery to a baseline level, is in line with the set point theory from happiness research (Lucas et al. 2003; Lucas 2016). Therefore, a thorough study of dissolution effects has to account for health shifts over time and should employ a model sufficiently flexible to allow for distinguishing between short-lived and long-term effects.

This leads to the third point, the issue of causality. Arguably, marital dissolution is a process rather than an isolated event (Booth et al. 1983), which, first, implies that individuals may experience emotional distress at different stages in this process (Emery 1994) and, second, that for some individuals it may be rather pre-separation conflicts or marital abuse than the act of dissolution itself that generates mental health problems. Unfortunately, these rather subtle epiphenomena are harder

to measure than objective transitions, especially in large scale studies. However, the processual nature of dissolution suggests that modeling several time points before and after it may be a better suited approach than considering dissolution as a dichotomy.

Fourth, while divorce is generally theorized to affect health, pre-divorce health may also affect the risk of dissolution (Wade & Pevalin 2004). Previous studies suggest that health problems are positively associated with the risk of marital dissolution (Rapp 2012). Unfortunately, it is not easy to rule out selection on health when studying causal effects of dissolution on health. Nonetheless, a fixed-effects analytical framework is a promising way of controlling for systematic (time-invariant) pre-divorce health differences among individuals (Brüderl & Ludwig 2015).

2.3 The Moderating Effect of Children

The effect of marital dissolution on mental health may be more negative in marriages with children than among the childless. According to the economic model of the family, children are an example of union-specific capital, which means that having children might be more beneficial for partners living together than for those living separately (Lyngstad & Jalovaara 2010). This suggests that divorcing parents lose "more" during a marital breakup than divorcing childless do. However, one should be careful about involuntary childlessness because it may trigger a dissolution among the childless (Lyngstad & Jalovaara 2010). Further, marital dissolution itself has been argued to impinge upon parent-child interactions (Grau & Bierhoff 2003; Tein, Sandler & Zautra 2000) increasing behavioural problems of the child. This may be aggravated by sharing the custody, as it forces parents to stay in regular contact with each other. All this suggests that parenthood could make a dissolution more painful and prolong the process of adjustment.

However, the benefits and burdens of having a child plausibly change with the age of the child, and the moderating effect of parenthood likely reflects that. Moreover, family is a gendered institution, and the experiences of mothers and fathers can be qualitatively different (Cooke 2004). Therefore, we systematically theorize on how mental health consequences of marital dissolution differ with child's age and parent's gender.

2.3.1 Age of the Child

Having a young (defined as infant and toddler) child may exacerbate the effect of marital dissolution because child's fear, anxiety, and behavioural problems triggered by dissolution (Strohschein 2005) are an additional stressor for separating parents (Amato 2000). Moreover, because of the monetary costs of childrearing and institutional childcare, young children may increase the risk of economic hardship, especially for lone mothers (Casper, McLanahan & Garfinkel 1994). As noted before, the presence of children affects the risk of parental dissolution, with the strongest stabilizing effect of

young children. This is a potential source of bias in causal estimates: If couples generally tend to avoid splitting up while having young children, marital dissolution that can occur in further period may take place in extremely troubled (e.g., abusive) marriages. This implies that mental health consequences of dissolutions involving young children may be particularly negative also due to self-selection. In principle, having a young child might also have a protective effect ("buffering effect", see Cohen & Wills 1985) during dissolution. The period shortly after birth stands out with an increased parental life satisfaction (Myrskylä & Margolis 2014; Pollmann-Schult 2014; Mikucka 2016), suggesting that especially young children may provide joy and a sense of meaning to their parents. However, this increase tends to wear off within a few years, which makes the overall protective effect implausible.

To our knowledge, past studies only rarely theorize the effects of school-aged or teenage children on parental mental health. The well-being gains from parenthood at these ages are generally smaller than with young children (Nomaguchi 2012), suggesting weaker protective effects and lower levels of parental satisfaction with the quality of parent-child-relationship. It is likely that behavioural problems associated with marital conflict combined with children's increasing autonomy exacerbate the negative effects of divorce, especially during the adolescent stage (Masche 2008). However, the stabilizing effect of parenthood plausibly becomes weaker as children grow up, reducing the negative selection into divorce.

The effect of adult children is more often addressed theoretically. Economic models of parenthood postulate that adult children are a potential source of practical and emotional support for their parents (Ikkink, van Tilburg & Knipscheer 1999). Such support during a marital dissolution might in principle reduce the negative consequences of divorce. However, in Western European countries parents support their children into adulthood (Brandt & Deindl 2013), and the roles tend to reverse at older ages. Thus, whereas the protective effect of children in middle-aged divorcing couples may be rather weak, it should be stronger for grey divorces of long-term marriages in old age (Kalmijn 2007). However, even after a late divorce, mothers have still more contact with children and receive more support from them than fathers (Kalmijn 2007).

Summing up, past conceptualizations suggest a negative moderating effect of young children during parental dissolution: Not only children's behavioural problems may constitute additional stressors, but also (due to the stabilizing effect of small children) the dissolutions of marriages with small children may be particularly painful. These effects plausibly become weaker as children grow older.

2.3.2 Gender of the Parent

In Germany, mothers are typically the main caregivers, and they shoulder most of child-related work, although formally in the year 2016, as many as 97% of divorcing couples shared custody (Federal Statistical Office 2018). After marital dissolution, mothers—especially of young children—may suffer

from role strain, being caught between child-care responsibilities and breadwinner demands (Fokkema 2002). This may be aggravated by the worsening of their economic situation (Andreß et al. 2006), for example when alimonies fail to cover the costs of childrearing (Holden & Smock 1991).

All this may suggest that mothers take on the more difficult role after marital dissolution. However, fathers may suffer from the lack of everyday contact with a child (Juby et al. 2007) and associated relational problems (Amato & Booth 1996). Additionally, the obligation to pay alimonies (which in Germany increases with the age of the child according to the so-called "Düsseldorfer Tabelle") combined with higher (than the pre-divorce) costs of independent residence are likely to undermine their financial situation (Andreß et al. 2006).

In sum, the challenges of marital dissolution among mothers seem particularly high at child's younger ages and may reduce when increasing child's independence makes it easier to combine breadwinning and childcare. This pattern may be different for fathers, for whom the financial costs and the risk of conflict or lack of contact with children may become increasingly problematic as children grow older.

2.4 Previous Research

A large body of research has documented that marital dissolution has a detrimental effect on many outcomes including health and well-being (Amato 2000; 2010). However, a closer inspection of previous research shows that a major part of the evidence is based on cross-sectional studies, and most longitudinal studies include few time points (Turner 2006; Arránz Becker, Loter & Becker 2017). Moreover, relatively few studies have systematically scrutinized moderating effects of children by comparing effects of marital dissolution among parents to those among childless individuals.

Cross-sectional studies have shown that divorced mothers have higher odds of poor self-rated health (Lahelma et al. 2002), depression (Afifi, Cox & Enns 2006), and a variety of mental disorders (Afifi, Cox & Enns 2006; Cairney et al. 2006) and illnesses (Benzeval 1998). Interestingly, in these studies, the divorce event itself (rather than the lack of marriage) appears to be crucial because, for instance, never married mothers did not exhibit a particularly high risk of psychiatric disorders (Afifi, Cox & Enns 2006; Cairney et al. 2006; Turner 2006). Moreover, this health-related disadvantage of divorced mothers seems to persist into older age (Berkman et al. 2015). As mentioned above, conclusions from cross-sectional studies regarding potential causal effects are ineligible because cross-sectional research cannot disentangle selection and causality and cannot contribute to our knowledge of the temporal shape of marital dissolution effects either. Thus, in the following, we focus on insights from the few existing longitudinal studies.

The probably most comprehensive study, so far, by Kalmijn and Leopold (2016) on the moderating effect of parenthood after divorce found stronger decreases in subjective well-being among parents of children at age 0-4 compared to childless individuals and parents of children at age 5-18,

emphasizing the important role of parenthood as moderator. To our best knowledge, this is the only study using German panel data, focusing primarily on well-being and its dynamics after divorce. In line with these results, Williams and Dunne-Bryant (2006) found a positive effect of dissolution on depressive symptoms that was largely limited to parents with children at age 0-5. Similarly, a study by Blekesaune and Barrett (2005) using Norwegian registry data found negative but short-lived health consequences of marital dissolution, which were stronger among parents than among the childless. Finally, there are two studies by Lorenz et al. using a dataset on women in rural Iowa (Lorenz et al. 1997; 2006). The first one showed an elevated level of depression among divorced compared to married mothers which tended to become smaller over time but did not vanish before a period of three years (Lorenz et al. 1997). The second one showed that whereas divorce had an adverse short-term effect on mental health, declines in physical health only became visible a decade later (Lorenz et al. 2006).

Yet, findings from these studies should be interpreted with caution. First, some studies used a random-effects approach; thus, unobserved heterogeneity may have introduced bias into the reported effect estimates. Second, some studies did not include a comparison group of constantly married. In doing so, health trends and other time-varying information of the married cannot be taken into account at baseline leading, not only to biased estimates of confounders but also biased estimates of the causal effect. Third, some studies pooled childless individuals together with parents having adult children and/or parents having non-coresident children ignoring an important substantial distinction. Fourth, some studies did not include pre-divorce observations, and lastly, fifth, some used lagged dependent variable (LDV) regression with two time points, although LDV regression may yield biased estimates (Vaisey & Miles 2017).

In sum, previous studies on divorce effects on parental health outcomes suffer from considerable gaps and shortcomings. There are many cross-sectional studies which do not always distinguish between never married and divorced individuals. The few existing panel studies are often based on few waves of data (Turner 2006), so their capacity to determine the causal ordering (i.e., to control for selection effects when studying causal effects) is limited. Moreover, unobserved heterogeneity largely remains an unresolved issue because pre-divorce health differences between people who separate and who stay married are not controlled for, which lead to an overestimation of causal divorce effects. And finally, the temporal shape of divorce effects has seldom been investigated, thus neglecting an important aspect for both scholarly research and for planning interventions.

2.5 Aims of the Current Paper

Against this background, our study provides a description of intra-individual trajectories of mental health among childless men and women, and mothers and fathers across a nine-year period surrounding dissolutions of first marriages. We analyse mental health as the outcome because we expect it to

be of reactive nature in the relatively short run covered by this study, whereas shifts in physical health associated with dissolution may be rather slow and require data spanning decades rather than years (Lorenz et al. 2006). In line with research on the impact of divorce on well-being (Lucas et al. 2003; Lucas 2016), we expect that mental health declines already before union dissolution, and this decline is followed by a subsequent phase of (complete or partial) adaptation, i.e., recovery of mental health. Our **first (general) hypothesis** is that the effect of marital dissolution should be more evident among parents, both mothers, and fathers, than among childless individuals. Further, we compare mental health trajectories of subgroups defined by the age of the youngest biological child at the time of marital dissolution, to test our **second hypothesis** that the negative moderating effect of children around dissolution should be more visible among parents of younger children than among parents of older children. We assume that this pattern is most clear-cut among mothers who suffer from role strain while combining breadwinning and caring for young children and who can abruptly be thrusted into a low-income group of single mothers. For fathers, changes in mental health related to growing up of children may be less pronounced.

2.6 Method

2.6.1 Data and Sample

We use longitudinal data from the German Socio-Economic Panel (SOEP 2017), a panel survey that was initiated in West Germany in 1984 and in East Germany in 1990, with subsequent waves conducted annually.

Because our outcome of interest was first collected in the year 2002 and its last available measure is from the year 2016, the observational period is left-truncated and ranges from 2002 to 2016. Further, the data are prone to right-censoring—we cannot identify individuals who left the panel before marital dissolution occurred as well as individuals who are still in the panel but who will separate after 2016.

We restrict our estimation sample to men and women who were at risk for first marital dissolution within the observational period. Thus, it includes both individuals who experienced a transition to first marital dissolution between 2002 and 2016 (N=541 transitions for men and N=692 for women) and individuals who were potentially at risk for a transition into first marital dissolution but stayed married until the last wave they were observed, up to 2016 (N=9,883 men and N=10,070 women). The last mentioned served as comparison group. Basically, including a comparison group to the estimation sample does not affect the effect of marital dissolution, because this group does not contribute to the fixed-effects estimation. However, omitting the comparison group would lead to biased estimates of the confounders. For instance, the age effect estimated only for those who ex-

perienced marital dissolution might be underestimated or overestimated as compared to the full estimation sample, and this would in consequence bias the effect of marital dissolution as well (Brüderl 2010). Finally, all "treated" respondents who were not observed both before and during marital dissolution were excluded from the sample. This includes: (1) separated, divorced, widowed, and second married when first observed, (2) those whose spouse died during the observational period, and (3) all person-years after widowhood of those who experienced a transition to separation first (married – separated – widowed). Yet, individuals who remarried after marital dissolution (married – separated – remarried) were not immediately censored and stayed in the estimation sample for up to four years after remarriage. This is because the initial years in a second marriage could serve as the continuation of a recovery process after marital dissolution.

Individuals younger than 16 (marriageable age in Germany), refugees, individuals who experienced child's death during the observational period, as well as marriages lasting shorter than 24 months (overlapping transitions to first marriage and first separation) were excluded from the analysis. Further, we dropped the first and the second marriage year for all individuals accounting for potential inflated levels of mental health due to honeymoon effects.

Finally, because our outcome of interest was measured only in even numbered years, we had to drop observations from odd years losing for this reason several transitions (N = 243 for men and N = 322 for women). The final sample consists of 10,181 men and 10,440 women, out of which 298 men and 370 women got separated between 2002 and 2016 and who were observed at least three years prior to marital dissolution. For less than 10% of men and women who experienced a transition, the year of marital separation was missing and replaced by the year of divorce for further analyses.

2.6.2 Dependent Variable

Our dependent variable is mental health-related quality of life—one of two subdimensions within the framework of the SF-12 health survey instrument, available in GSOEP biennially since 2002 (Nübling, Andersen & Mühlbacher 2006). When referring to perceived mental health-related quality of life, for the sake of brevity we will use the shorter term "mental health". Originally, the SF-12 physical and mental health composite scores were extracted via principal component analysis (PCA) with varimax rotation based on twelve health-related items pertaining to eight subscales (see Appendix in Nübling, Andersen & Mühlbacher 2006). The mental health component consists conceptually of the following four subscales: vitality (one item: energy level), social functioning (one item: limitation of social activities due to health), role emotional (two items: accomplished less due to emotional problems, less careful due to emotional problems) and mental health (two items: blue and downhearted, calm, and peaceful). The scores used in this study were also extracted via PCA; however, we applied oblimin rotation, allowing the components to be non-orthogonal (the component correlation was 0.53). Our

analysis yielded the expected two-component solution for the total estimation sample (criterion: eigenvalues greater than 1) with standardized PCA loadings for mental health ranging from 0.71 to 0.90 (except for the loading on vitality which was 0.57). Finally, we rescaled the PCA scores to the range 0 to 100. Higher values correspond to better mental health, lower values to poorer mental health.

2.6.3 Grouping Variable: Child's Age

Because our focus is on maternal and paternal trajectories of mental health, we created five distinct groups of separated individuals defined by the age of the youngest biological child in the year of marital dissolution. Our age categories reflect the theoretical arguments presented in the background section and correspond both to institutional care arrangements in Germany (nurseries and kindergartens, pre-elementary and elementary schooling, secondary schooling) and to four stages of life course development derived from the literature (Kuh et al. 2003): early childhood, middle childhood, adolescence, and adulthood.

For individuals who experienced a transition to marital dissolution, the age of the youngest child in the year of dissolution was the criterion to categorize the respondents into distinct groups. For individuals belonging to the comparison group without a transition until 2016 but who were still at risk of a dissolution, we used the year of the last observation in the panel and computed the age of the youngest child based on the next year (i.e., last observation + 1). For instance, if the last panel observation for a (first married) respondent was 2014 and the youngest child was born in 2012, this respondent was placed in the group of parents with children at age 0-4 (the youngest child was three years old in 2015). The main reason for using the last panel observation instead of, for example, the first one is the closest temporal proximity to a potential dissolution that might have occurred after the last available observation (e.g., after 2014 as in the example above). Our grouping scheme can be summarized as follows:

(1) childless individuals (771 women including 54 transitions; 1,617 men including 60 transitions)
(2) parents of infants and toddlers aged 0 to 4 (860 mothers including 49 transitions; 754 fathers including 32 transitions)
(3) parents of pre- and primary school children aged 5 to 10 (1,892 mothers including 86 transitions; 1,705 fathers including 67 transitions)
(4) parents of adolescent children aged 11 to 17 (1,476 mothers including 98 transitions; 1,350 fathers including 67 transitions)
(5) parents of adult children aged 18 and older (5,441 mothers including 83 transitions; 4,755 fathers including 72 transitions).

2.6.4 Event Time Dummies

To model health dynamics around marital dissolution, we constructed an "event-centered" time scale that ranges from -14 years before to +11 years after dissolution. Again, because our observational period starts 2002 and ends 2016, we can observe each individual for 14 years at the most. As we are interested not only in adaption after marital dissolution but also in anticipation prior to dissolution, we set the reference category (our baseline) to "-3 years before marital dissolution and earlier" (up to max. -14 years before). Thus, one extremum would be: start of observation at "-14" and end of observation at "0" which refers to the year of marital dissolution, and the other extremum would be: start of observation at "-3" (because we observe all individuals at least three years prior to marital dissolution) and end of observation at "+11". The baseline category "-3 years before dissolution and earlier" comprises (1) all person-years between the 14th and the 3rd year before marital dissolution of individuals who experienced a transition and (2) all person-years of individuals without a transition, i.e., the comparison group of constantly married. After specifying the baseline, we created five time dummies for those with transition to marital dissolution, generating a progressive time axis starting after -3. According to this, the first time dummy captures mental health shifts prior to marital dissolution (i.e., anticipation) and covers the period two to one year before marital dissolution ("-2 to -1"). The biennial coding of the dummies (either the second or first year before dissolution) results from the biennial collection of data on mental health in the GSOEP data.[2] Therefore, the second time dummy captures the immediate and short-term effect of the event "year of first marital dissolution to +1" and covers a period between the dissolution and one year after (carefully differentiating between those who were still married and those who have been already separated at the time of interview in the year of marital dissolution), whereas the last three dummies capture mental health shifts following the event (i.e., adaptation): "+2 to +3" years after dissolution, "+4 to +5" years afterwards and "+6 and later" (up to max. +11 years after marital dissolution).

2.6.5 Time-Varying Confounders

To reduce potential risk of overcontrol bias (Elwert & Winship 2014), we carefully chose only five substantively important confounders. We include (1) linear and quadratic individual's age terms that capture general health decline, (2) a dummy for co-residence with current partner (1=yes, 0=no), (3) a dummy for co-residence with at least one child, without differentiating whether it is a biological one or not (1=yes, 0=no), (4) a dummy capturing pregnancy and birth coded '1' for the period of one

[2] Respondents for whom the year of dissolution was an odd year can thus contribute to the time axis only at years -13, -11, -9, -7, -5, -3, -1, +1, +3, +5, +7, +9, +11. Respondents for whom the year of dissolution was an even year can contribute to the time axis only at years -12, -10, -8, -6, -4, -2, 0, +2, +4, +6, +8, +10. Hence, to avoid potential selection and to ascertain that we observe all individuals at each particular time point (and not only at every second wave), we combined one odd and one even time point creating each time dummy.

year before a birth of a child, up to one year after it, and '0' otherwise, and (5) a dummy for remarriage (1=yes, 0=no).

2.6.6 Method of Analysis

We estimate distributed fixed-effects (FE) regression models (Dougherty 2006) for mental health, separately for men and women by children's age group. Instead of contrasting the global average before and after the transition, we assume the effect of marital dissolution on mental health to be "distributed" across time. In other words: The within estimator compares the average mental health from the baseline "-3 years before marital dissolution and earlier" with the average mental health in each particular time dummy. The model equation for our analysis on mental health (abbreviation: MH) is presented below (see also Clark & Georgellis 2013):

$$MH_{it} = \alpha_i + \beta_{-2/-1} D_{-2/-1,it} + \beta_{0/+1} D_{0/+1,it} + \beta_{+2/+3} D_{+2/+3,it} + \beta_{+4/+5} D_{+4/+5,it} + \beta_{+6+} D_{+6+,it} + \beta' X_{it} + \varepsilon_{it}$$

where $D_{-2/-1,it}$ to $D_{+6+,it}$ are time dummies, X_{it} is a vector of time-varying confounders and $D_{-3,it}$ (not shown in the equation) is the omitted reference category (baseline).

This kind of modeling enables us, first, to carefully examine patterns of temporal mental health dynamics prior to the event (anticipation), in the year of the event or shortly afterwards (immediate and short-term effect) as well as following the event (adaptation). Second, comparing the same individuals before and after the event (within-subject design) brings us an advantage over previous studies by eliminating person-related time-invariant unobserved heterogeneity from the analysis. Third, this approach also accounts for potential selection of married individuals with poorer health into marital dissolution.

All FE regression models were estimated with the xtreg-command in Stata (Version 15.1) applying panel-robust standard errors.

2.7 Results

2.7.1 Descriptives

Table M2.1 and **Table M2.2** present sample composition by the age of the youngest biological child for women (**Table M2.1**) and men (**Table M2.2**): without transition to marital dissolution (comparison group) as well as with transition to marital dissolution—at baseline and at the first available observation as separated.

Table M2.1: Sample Composition by Age of the Youngest Biological Child Before and After Marital Separation for Women

	WOMEN IN THE COMPARISON GROUP (last available observation as married)				
	Childless (*N* = 717)	Child at age 0-4 (N = 811)	Child at age 5-10 (N = 1,806)	Child at age 11-17 (*N* = 1,378)	Child at age 18+ (*N* = 5,358)
Mental health-related quality of life, *M* (*SD*)	67.63 (17.06)	69.95 (13.80)	69.50 (14.16)	68.87 (15.17)	67.48 (16.26)
Confounders					
Age, *M* (*SD*)	52.27 (15.88)	33.89 (5.04)	39.03 (5.25)	44.48 (5.16)	62.05 (10.82)
Co-residence: current partner, (%)	99%	99%	99%	99%	99%
Co-residence: child, (%)	2%	98%	99%	99%	6%
1 year before and after birth, (%)	0%	42%	0%	---	---
Remarriage, (%)	---	---	---	---	---
Additional information					
Marital duration, *M (SD)*	23.61 (16.17)	8.37 (4.39)	12.56 (4.87)	18.87 (5.23)	38.74 (11.55)
Two and more children, (%)	---	77%	83%	84%	76%
	WOMEN WITH TRANSITION TO MARITAL SEPARATION (at baseline: -3 and before)				
	Childless (*N* = 54)	Child at age 0-4 (N = 49)	Child at age 5-10 (N = 86)	Child at age 11-17 (*N* = 98)	Child at age 18+ (*N* = 83)
Mental health-related quality of life, *M* (*SD*)	64.78 (15.05)	66.43 (17.05)	66.75 (15.23)	67.49 (14.06)	61.12 (18.11)
Confounders					
Age, *M* (*SD*)	36.59 (10.22)	30.82 (5.67)	35.77 (5.08)	41.36 (5.10)	53.51 (9.86)
Co-residence: current partner, (%)	100%	100%	100%	98%	99%
Co-residence: child, (%)	0%	96%	100%	100%	31%
1 year before and after birth, (%)	0%	63%	1%	---	---
Remarriage, (%)	---	---	---	---	---
Additional information					
Marital duration, *M (SD)*	7.78 (7.26)	6.04 (3.95)	10.05 (4.83)	15.83 (5.49)	29.25 (11.37)
Two and more children, (%)	---	67%	65%	75%	74%
	WOMEN WITH TRANSITION TO MARITAL SEPARATION (first available observation as separated)				
	Childless (*N* = 54)	Child at age 0-4 (N = 49)	Child at age 5-10 (N =86)	Child at age 11-17 (*N* = 98)	Child at age 18+ (*N* = 83)
Mental health-related quality of life, *M* (*SD*)	61.96 (16.70)	62.31 (19.21)	63.42 (19.33)	63.03 (17.56)	58.62 (19.28)
Confounders					
Age, *M* (*SD*)	40.18 (10.47)	34.37 (5.74)	39.46 (5.08)	45.23 (5.09)	57.22 (9.85)
Co-residence: current partner, (%)	17%	25%	24%	55%	41%
Co-residence: child, (%)	0%	94%	95%	67%	1%
1 year before and after birth, (%)	4%	12%	5%	---	---
Remarriage, (%)	0%	0%	1%	0%	0%
Additional information					
Marital duration, *M (SD)*	10.24 (7.22)	8.43 (3.96)	12.55 (4.74)	18.47 (5.41)	31.89 (11.38)
Two and more children, (%)	0%	75%	65%	75%	74%

Notes: Symbol "---" in place of percentage indicates no valid observations for a given variable at a given time point or at any time point.

Table M2.2: Sample Composition by Age of the Youngest Biological Child Before and After Marital Separation for Men

	MEN IN THE COMPARISON GROUP (last available observation as married)				
	Childless (*N* = 1,557)	Child at age 0-4 (N = 722)	Child at age 5-10 (N = 1,638)	Child at age 11-17 (*N* = 1,283)	Child at age 18+ (*N* = 4,683)
Mental health-related quality of life, *M* (*SD*)	66.44 (18.23)	73.08 (13.12)	72.07 (13.29)	70.52 (15.12)	69.87 (15.98)
Confounders					
Age, *M* (*SD*)	64.53 (15.18)	36.64 (5.63)	41.81 (5.92)	47.00 (5.79)	64.08 (10.93)
Co-residence: current partner, (%)	99%	99%	99%	99%	99%
Co-residence: child, (%)	2%	98%	99%	99%	6%
1 year before and after birth, (%)	0%	43%	1%	---	---
Remarriage, (%)	---	---	---	---	---
Additional information					
Marital duration, *M (SD)*	36.36 (17.57)	8.24 (4.38)	12.42 (4.89)	18.83 (5.26)	38.06 (11.49)
Two and more children, (%)	---	76%	82%	84%	71%
	MEN WITH TRANSITION TO MARITAL SEPARATION (at baseline: -3 and before)				
	Childless (*N* = 60)	Child at age 0-4 (N = 32)	Child at age 5-10 (N = 67)	Child at age 11-17 (*N* = 67)	Child at age 18+ (*N* = 72)
Mental health-related quality of life, *M* (*SD*)	68.88 (15.62)	67.40 (14.56)	69.82 (14.32)	65.91 (15.48)	69.38 (14.36)
Confounders					
Age, *M* (*SD*)	45.72 (16.07)	34.53 (6.73)	37.96 (5.23)	43.49 (5.64)	54.61 (11.18)
Co-residence: current partner, (%)	100%	100%	100%	99%	100%
Co-residence: child, (%)	17%	91%	100%	100%	29%
1 year before and after birth, (%)	0%	75%	0%	---	---
Remarriage, (%)	---	---	---	---	---
Additional information					
Marital duration, *M (SD)*	14.20 (17.28)	6.84 (6.95)	9.69 (4.54)	16.19 (4.97)	28.35 (11.79)
Two and more children, (%)	---	59%	73%	75%	64%
	MEN WITH TRANSITION TO MARITAL SEPARATION (first available observation as separated)				
	Childless (*N* = 60)	Child at age 0-4 (N = 32)	Child at age 5-10 (N =67)	Child at age 11-17 (*N* = 67)	Child at age 18+ (*N* = 72)
Mental health-related quality of life, *M* (*SD*)	60.53 (19.94)	61.49 (16.36)	66.27 (15.81)	62.22 (18.22)	65.01 (17.75)
Confounders					
Age, *M* (*SD*)	49.02 (16.00)	38.09 (6.65)	41.63 (5.13)	47.16 (5.49)	58.12 (11.13)
Co-residence: current partner, (%)	28%	19%	22%	45%	39%
Co-residence: child, (%)	3%	12%	33%	36%	0%
1 year before and after birth, (%)	0%	6%	4%	---	---
Remarriage, (%)	0%	3%	0%	1%	0%
Additional information					
Marital duration, *M (SD)*	16.90 (17.42)	9.25 (6.92)	12.16 (4.50)	18.76 (4.88)	30.89 (11.80)
Two and more children, (%)	0%	69%	73%	75%	64%

Notes: Symbol "---" in place of percentage indicates no valid observations for a given variable at a given time point or at any time point.

For the two comparison groups, the descriptives show the highest levels of mental health for mothers and fathers of children at age 0-4 and 5-10 (69.95 and 69.50 as well as 73.08 and 72.07, respectively). In contrast, childless women and men, and mothers and fathers of adult children report the lowest levels of mental health (67.63 and 66.44 as well as 67.48 and 69.87, respectively). All subgroups of individuals who experienced a transition to marital dissolution, except for childless men, showed lower levels of mental health already three years before marital dissolution compared to the respective comparison group. The average mental health decreases after marital dissolution by about 3 to 4 scale points for women and by 3 to 8 scale points for men. Lowest levels of mental health after marital dissolution are reported by women with adult children (58.62) and childless men (60.53), whereas separated fathers of children at age 5-10 and also fathers of adult children report the highest levels of mental health (66.27 and 65.01, respectively).

With regard to age, comparison subgroups matched individuals with transitions well. Parents who experienced marital dissolution are of similar age as continuously married parents in the respective child's age group. The only exception are childless individuals with transition who are on average 12 to 15 years younger immediately after the event than those in the comparison group. Similar patterns were observed for marital duration: the groups of parents differ little, whereas the duration of marriage of childless individuals in intact marriages is on average longer than that of the childless who experienced dissolution.

The pre-dissolution rate of co-residence with spouse is similar across all groups: 98%-100% of married individuals live with a partner, no matter whether they will separate or not. After dissolution, the percentage of those living with some partner (new partner or ex-spouse) shrinks to 17% for childless women, to 19% for fathers of children at age 0-4 and to 22% for fathers of children at age 5-10. In contrast, 55% of mothers and 45% of fathers of adolescent children remain co-resident with their ex-spouse or live together with a new partner.

In Germany, children of separated parents are much more likely to stay in the maternal household than in the paternal one: About 88% of fathers live apart from their children after marital dissolution (Federal Statistical Office 2018). In the comparison group, over 98% of parents live with a child in the household, except for parents of adult children (only 6%). Pre-dissolution percentages are similar: More than 94% of mothers with children at age 10 years or younger live with children before and after marital dissolution. For fathers with children in the same age group, the percentage decreases from 91% to 12% in the age group 0-4 and from 100% to 33% in the age group 5-10. Adolescent children stay in about 67% with mothers and in about 36% with fathers after marital dissolution. These percentages mirror the well-known gendered co-residence patterns in postdivorce families in Germany (Arránz Becker, Lois & Salzburger 2015). Co-residence with adult children is more common before marital dissolution (about 30%) and rare after marital dissolution (1% or less) which indicates that in this age group marital dissolution often goes along with moving out of the youngest child (empty nest syndrome). The respective percentage is 6% in the comparison group.

The great majority of parents in our sample has two or more children (also before marital dissolution). The share of parents having two or more children is higher among continuously married parents (71% to 84%) than among parents who experienced marital dissolution (59% to 75%).

Overall, the descriptive statistics show that individuals in the comparison group are similarly distributed to individuals who experienced a transition, in particular with regard to age and marital duration (especially among parents) as well as co-residence with a partner. However, individuals who separate have poorer mental health than the comparison group already before marital dissolution, have fewer children and depict a distinctive pattern of co-residence after dissolution.

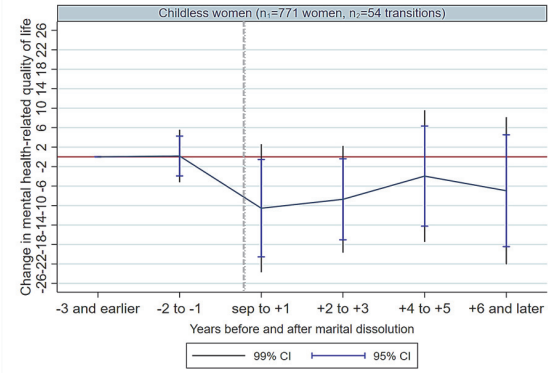
2.7.2 Distributed Fixed-Effects (FE) Models

Table M2.3 and **Figure M2.1** illustrate the results from distributed fixed-effects (FE) models, separately for women and men depending on their parental status and the age of the youngest child.

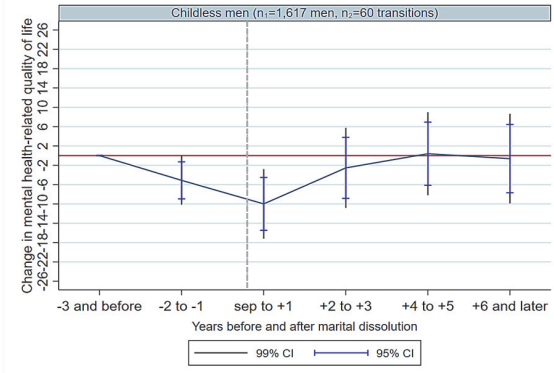
Table M2.3: Distributed Fixed-Effects by Age of the Youngest Child for Men and Women

			WOMEN		
	Model 1 (Figure M2.1a) Childless $\hat{b}$ $(\widehat{SE})$	**Model 2 (Figure M2.1c)** Child: age 0-4 $\hat{b}$ $(\widehat{SE})$	**Model 3 (Figure M2.1e)** Child: age 5-10 $\hat{b}$ $(\widehat{SE})$	**Model 4 (Figure M2.1g)** Child: age 11-17 $\hat{b}$ $(\widehat{SE})$	**Model 5 (Figure M2.1i)** Child: age 18+ $\hat{b}$ $(\widehat{SE})$
D1: -2 to -1	0.18 (2.09)	-7.62 (2.73)**	-0.21 (1.72)	-1.50 (1.57)	-3.98 (1.49)**
D2: sep to +1	-10.55 (5.09)*	-6.70 (3.32)*	-6.13 (2.55)*	-5.07 (2.30)*	-5.10 (2.30)*
D3: +2 to +3	-8.72 (4.24)*	-8.90 (3.27)**	-2.33 (2.88)	0.73 (2.03)	-3.80 (2.21)
D4: +4 to +5	-3.95 (5.24)	-13.11 (3.86)***	-6.67 (3.01)*	-0.27 (2.56)	0.84 (2.97)
D5: +6 and later	-6.96 (5.85)	-11.96 (3.95)**	-4.69 (2.98)	-0.52 (3.16)	-2.70 (3.83)
Age (linear)	0.26 (0.36)	-0.35 (1.40)	-0.98 (0.63)	0.18 (0.42)	0.81 (0.15)***
Age (quadratic)	-0.00 (0.00)	0.01 (0.02)	0.01 (0.01)	-0.00 (0.00)	-0.01 (0.00)***
Co-residence: current partner	-5.29 (4.27)	-3.16 (2.33)	-3.21 (1.96)	-1.72 (1.75)	-1.21 (2.01)
Co-residence: child	1.80 (5.53)	2.86 (1.58)	-3.90 (1.66)*	1.65 (1.66)	0.73 (0.37)*
1 year before and after birth	-1.23 (4.30)	0.51 (0.77)	0.20 (0.70)	---	---
Remarriage	8.28 (6.72)	9.62 (11.6)	3.21 (5.25)	-1.43 (3.00)	-16.13 (7.45)*
Number of cases					
Number of person-years	N = 2,901	N = 1,767	N = 4,581	N = 5,141	N = 24,080
Number of individuals	N = 771	N = 860	N = 1,892	N = 1,476	N = 5,441
			MEN		
	Model 6 (Figure M2.1b) Childless $\hat{b}$ $(\widehat{SE})$	**Model 7 (Figure M2.1d)** Child: age 0-4 $\hat{b}$ $(\widehat{SE})$	**Model 8 (Figure M2.1f)** Child: age 5-10 $\hat{b}$ $(\widehat{SE})$	**Model 9 (Figure M2.1h)** Child: age 11-17 $\hat{b}$ $(\widehat{SE})$	**Model 10 (Figure M2.1j)** Child: age 18+ $\hat{b}$ $(\widehat{SE})$
D1: -2 to -1	-5.12 (1.95)**	0.86 (2.36)	0.12 (1.74)	-1.79 (1.72)	-1.77 (1.37)
D2: sep to +1	-9.63 (2.71)***	-3.59 (5.66)	-1.21 (3.01)	-7.33 (2.90)**	-5.85 (2.61)*
D3: +2 to +3	-2.19 (3.23)	0.86 (4.14)	-0.19 (3.04)	-1.63 (2.43)	-0.24 (2.21)
D4: +4 to +5	0.93 (3.39)	3.60 (3.71)	0.77 (2.29)	-4.89 (3.33)	1.73 (1.85)
D5: +6 and later	0.16 (3.68)	1.37 (4.31)	3.03 (2.63)	1.58 (2.97)	-2.83 (2.04)
Age (linear)	1.51 (0.26)***	-0.26 (0.92)	-0.87 (0.62)	-0.10 (0.40)	1.10 (0.17)***
Age (quadratic)	-0.01 (0.00)***	0.00 (0.01)	0.01 (0.01)	-0.00 (0.01)	-0.01 (0.00)***
Co-residence: current partner	4.12 (3.18)	3.63 (2.61)	3.89 (1.95)*	-1.17 (2.26)	1.30 (1.77)
Co-residence: child	-2.57 (2.01)	-0.08 (1.14)	-0.26 (1.29)	-1.83 (1.77)	0.73 (0.39)
1 year before and after birth	-8.78 (6.92)	-0.45 (0.67)	-0.03 (0.66)	---	---
Remarriage	1.75 (6.24)	-1.27 (3.62)	8.77 (3.36)**	-3.02 (4.24)	11.10 (5.17)*
Number of cases					
Number of person-years	N = 7,054	N = 1,535	N = 4,132	N = 4,736	N = 20,785
Number of individuals	N = 1,617	N = 754	N = 1,705	N = 1,350	N = 4,755

Notes: *p < .05. **p < .01. ***p < .001.



(a)



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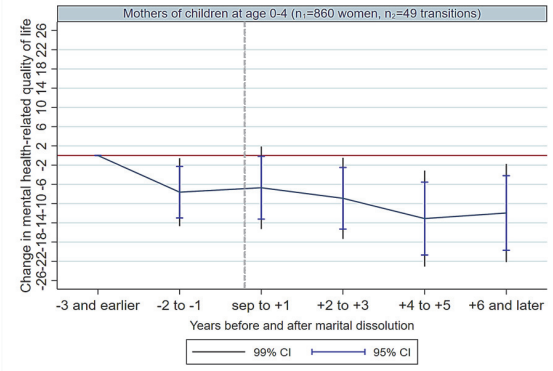

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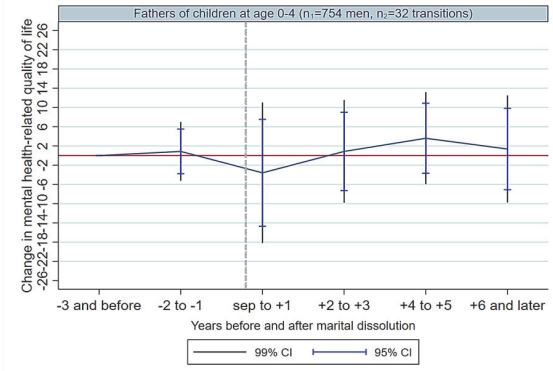

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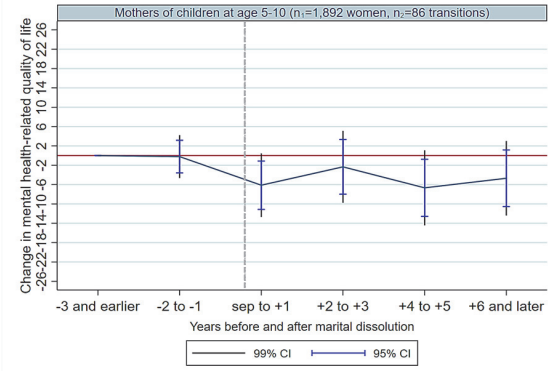

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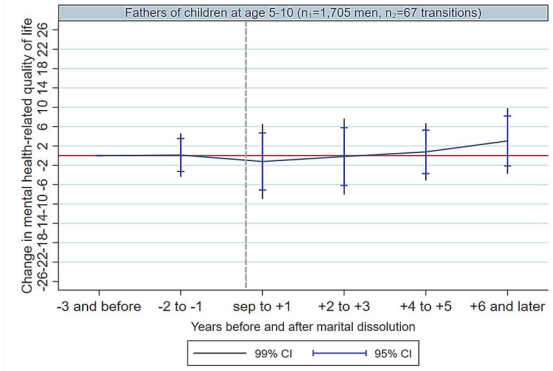

(f)

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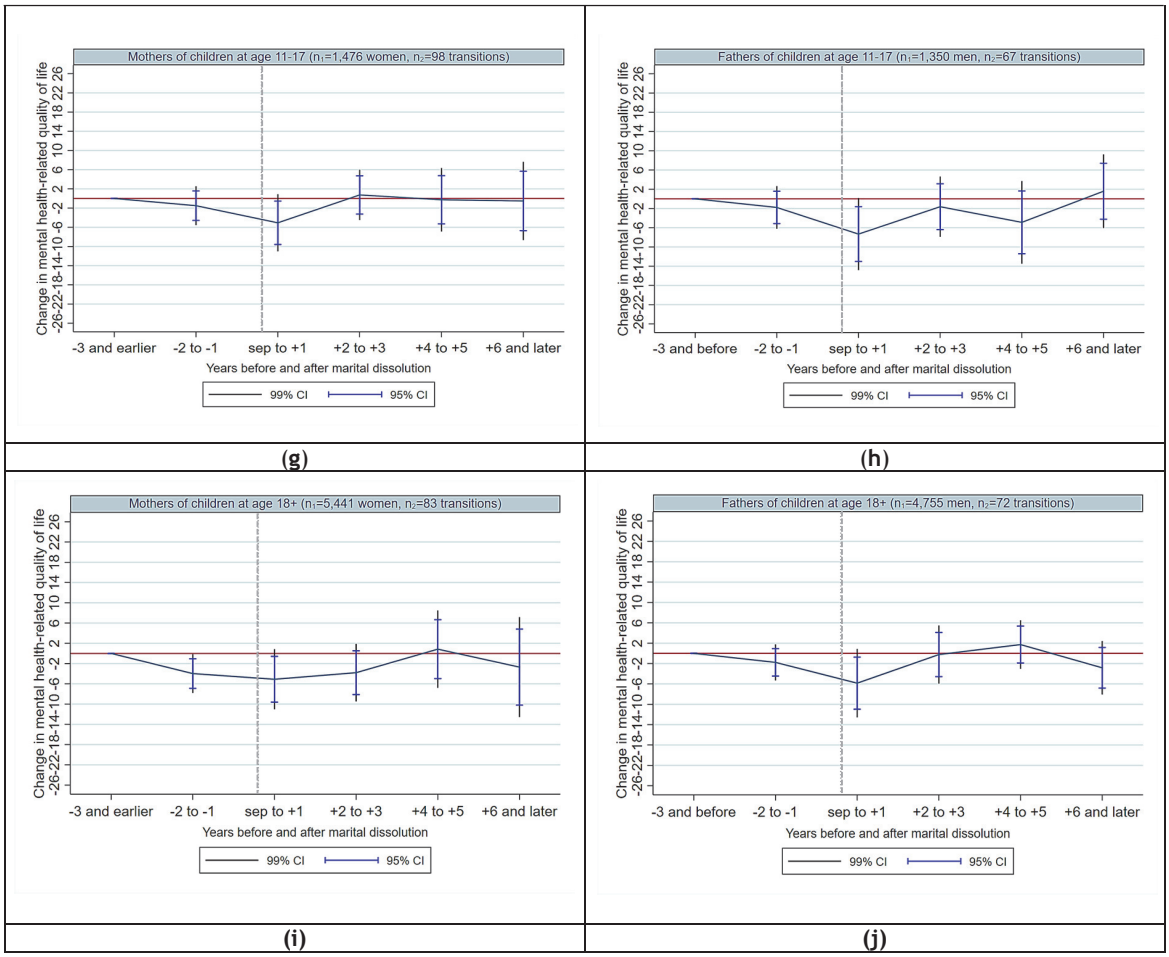

Figure M2.1: Distributed Fixed-Effects by Age of the Youngest Biological Child for Women and Men

The regression coefficients for all ten models can be found in **Table M2.3**. Because we did not record any valid observations for the dummy capturing the time around pregnancy and birth for parents of adolescent and adult children, we excluded this variable from analysis in these two groups. The coefficients of time dummies in **Table M2.3** (D1: "-2 to -1" to D5: "+6 and later") correspond to the intra-individual time path of mental health around marital dissolution and are illustrated via co-efficient plots (addon coefplot, Jann 2014) in **Figure M2.1**. To begin with, mental health trajectories of childless men and women around marital dissolution (Model 1 and 6 in **Table M2.3**) are not only similar with regard to the overall pattern of decline and recovery but also with regard to the size of shifts (the maximal negative change in mental health is as large as 10 scale points for each group). Yet, whereas childless women's health starts to deteriorate immediately after dissolution and the recovery is rather slow and only partial (their mental health remains below the baseline for as long as 6 years after dissolution), childless men begin to suffer mentally already two to one year before dissolution and recover fully four years after it at the latest (**Figure M2.1**a-b).

Trajectories for mothers of infants and toddlers at age 0-4 and pre- and primary school children at age 5-10 differ fundamentally from the respective results for fathers. The group of mothers with infants and toddlers deserves particular attention because this is the only group with a pronounced negative anticipation effect (the decline in mental health two to one year before marital dissolution is larger than 7 scale points and significant) being exacerbated continuously up to six years after dissolution, with -13 as the greatest decline at time point "+4 to +5" (**Table M2.3**: Model 2). Interestingly, this decline does not seem to be triggered either by birth-related events or co-residence issues. Also, mental health of mothers of pre- and primary school children at age 5-10 years remains basically below the baseline (with one short-term, slight increase two to three years after dissolution), though the decline does not exceed 7 scale points (**Table M2.3**: Model 3). In contrast, fathers of infants and toddlers (**Table M2.3**: Model 7) and fathers of pre- and primary school children (**Table M2.3**: Model 8) do not show any significant change in mental health at any time before and after marital dissolution compared to the baseline (**Figure M2.1**c-f).

Both parents of adolescent children (**Table M2.3**: Model 4 and 9) and fathers of adult children (**Table M2.3**: Model 10) experience negative mental health consequences immediately after dissolution but recover to the baseline within two to three years (**Figure M2.1**g-h). In contrast, mothers of adult children (**Table M2.3**: Model 5) suffer mentally already prior to dissolution (the decline is not larger than 4 scale points though) and recover fully (but slower over time than men) within four to five years afterwards (**Figure M2.1**i-j).

In our estimation sample, mental health systematically changes with (increasing) age for childless men and parents of adult children, indicating a reversed U-shape pattern. The effect of co-residence with current partner is negative for women and predominantly positive for men, with a significant positive effect for fathers of pre- and primary school children. The effect of co-residence with child(ren) is negative for mothers of pre- and primary school children and positive for mothers of adult children (5% level of significance). Further, although non-significant, the effect of co-residence with child(ren) on mental health is positive in all other women's groups and negative in all men's groups, except for fathers with adult children. Furthermore, we do not observe any significant effects related to the period surrounding pregnancy and birth. Finally, the effect of remarriage on mental health is strongly negative for mothers of adult children but positive for fathers of children at age 5-10 and fathers of adult children. Therefore, older fathers seem to benefit from remarriage whereas older mothers do not.

2.8 Discussion

This paper examines trajectories of mental health around marital dissolution among childless and parents of children of various ages. We overcome several methodological limitations of past research by employing a within-subject design, by reducing estimation bias from confounders and by including

a comparison group to the estimation sample (e.g., to adjust correctly the age-related dynamics of mental health of those who experienced a transition). Moreover, and unlike most previous studies, we consider the age of the youngest child at the time point of marital dissolution and differentiate between parents of adult children and childless individuals. We also systematically distinguish between men and women as we expect that they experience different effects of dissolution on mental health.

The results indicate that childless women exhibit a considerable long-term impairment in mental health after marital dissolution, experiencing a markedly slower recovery afterwards than childless men. In contrast, childless men begin to suffer mentally before marital dissolution and, thus, earlier than childless women but recover faster and completely. One supposable reason for the significant negative anticipation for childless men might be that they are more sensitive to negative spousal dynamics (e.g., marital conflicts or sexual abstinence) than childless women (Keizer & Ivanova 2017). According to our findings, childless individuals, especially childless women, turn out to be one of the most vulnerable groups struggling mentally with dissolution, just alongside mothers with infants and toddlers. This is a new insight emphasizing the necessity of differentiating between real childlessness and parenting of adult children, even if they have already moved out of the parental household (empty nest). Hence, our results do not support the first hypothesis that the (negative) effect of marital dissolution should be more evident among parents than among childless individuals. At this point, we can only speculate about the reasons for this finding. On the one hand, if a childless marriage is not working, it should be easier for the spouses (legally, financially, and even emotionally) to split up because there is no child motivating them to stay together (Lyngstad & Jalovaara 2010). On the other hand, childless might struggle with loneliness after marital dissolution that afflicts childless women less than men, however men are more likely to remarry faster (Zhang & Hayward 2001). There are two other important aspects we may only speculate about, namely, involuntary childlessness and postponing the decision about parenthood. As has been shown in **Table M2.1**, childless women who experienced a transition to marital dissolution were on average about 40 years old. This age corresponds for several women to the beginning of a menopause transition and thus to the end of the reproductive phase with little chance to get pregnant. There should be a difference in coping with marital dissolution in case of a—deliberately or involuntarily—childless marriage (Lyngstad & Jalovaara 2010). First, unsuccessful attempts to get pregnant may force spouses to use alternative methods like adoption, surrogates or in vitro fertilization which can lead to mental distress, marital conflicts and in consequence to marital dissolution. Second, if only one spouse wants to have children and the other does not, the age of 40 would be the very last chance to get pregnant. Hence, the decline in mental health after marital dissolution may signal, in particular among childless women, stress and fear of not only staying lonely after a broken up marriage but also staying involuntarily childless permanently.

Our next clear-cut result is the downward trajectory of mental health among mothers of infants and toddlers at age 0-4. For this group, the decline in mental health starts before dissolution

and enlarges continuously up to the next six years afterwards. For mothers of pre- and primary school children at age 5-10, we also observe continuous drops of mental health after dissolution compared to the baseline, but not as markedly as for mothers with younger children. Contrary to the findings for mothers of children at age 0-10, we cannot observe any significant effect of marital dissolution on mental health of fathers of children belonging to the same age group. In general, for parents with adolescent and adult children, the negative effect of marital dissolution on mental health is rather short-term and limited to the first observation after dissolution (which suggests fast adaptation and the typical V-shaped temporary "shock"), except for mothers of adult children who begin to suffer mentally before dissolution and experience relatively slow recovery afterwards.

As for mothers, these findings fully support our second hypothesis that the negative moderating effect of parenthood around dissolution should be more visible among parents of younger children than among parents of older ones. Interestingly, for fathers, we cannot find any support for this hypothesis. According to our results, mothers of infants and toddlers are the most vulnerable and disadvantaged group during the process of marital dissolution. Based on our estimation sample, the majority of these mothers was married for eight years on average and has more than one child. We can only speculate about the reason for the negative anticipation prior to marital dissolution in this group. It might be that these marriages were of bad quality and a dissolution was the only way out of it, despite having an infant or toddler. In such case, marital quality might have been responsible for the initial downward slope before dissolution. Unfortunately, we cannot disentangle these effects, because GSOEP does not contain questions on partnership quality. It might also be that some couples tried to salvage their marriage by having another child and this attempt failed contributing to a decrease in mental health prior to marital dissolution. Yet, we can exclude prenatal and postnatal depression as a possible explanation because the effect of time around another pregnancy and birth was not significant in any group. The downward trajectory after marital dissolution might be produced by difficulties of combining childcare responsibilities with breadwinning, by time constraints, stress, overfatigue, and anxiety about the future as a lone mother (Fokkema 2002). Aside from that, one possible factor responsible for the prolonged negative consequences of dissolution for mental health in this group may be difficulties in repartnering faced by these mothers (de Graaf & Kalmijn 2003; de Jong Gierveld & Merz 2013). Arguably, time pressures may prevent them from searching for a new partner, and potential partners may find them less attractive than childless women or mothers of older children. Moreover, the reason why mothers of children at age 5-10 are less vulnerable than mothers with younger children may be the fact that children at this age are more autonomous and can express empathy which may help these mothers to cope better mentally after marital dissolution.

Interestingly, parents with younger children at age 0-10 are the only two groups for which we observe strong gender-specific differences in the temporal shape of mental health around dissolution. Mothers of these children suffer mentally, fathers do not. This is perhaps not surprising, considering that, first, early parenthood remains probably the most gendered life course stage in

contemporary societies, with sharp differences with regard to women's and men's time use patterns, division of household labour, different employment perspectives, etc. (Mattingly & Bianchi 2003). Second, despite the common use of shared custody, about 95% of children stay in the maternal household after marital dissolution. It is surprising, however, that fathers of children at age 0-10 do not suffer mentally at all. This could be due to selection: Although marital dissolution may lead to paternal role strain and distress, those fathers who are more distressed may be more likely to divorce and overcome divorce faster (Umberson & Williams 1993).

While parenting of younger children seems to make a dissolution more difficult for mothers, the period of adolescence proves to be difficult for both mothers and fathers. Among parents whose youngest child was at age 11-17 in the year of marital dissolution, a significant decrease in mental health is visible up to one year after dissolution. This may reflect the usual mental coping with dissolution but also peculiarities of adolescence and behavioural problems triggered by dissolution (Strohschein 2005).

In our estimation sample, parents of adult child(ren) who decided to separate are older than 50 and have been married for 30 years, on average. Previous research on adaptation to divorce after a long-term marriage identified personality, repartnering, and financial situation as the main determinants of adaptation (Perrig-Chiello, Hutchison & Morselli 2015). For fathers of adult children, we observe a similar V-shaped short-term pattern as for parents of adolescent children, whereas mothers of adult children begin to suffer mentally earlier and recover slowly afterwards. On the one hand, older mothers who experience marital dissolution are less likely to suffer from loneliness than older fathers because of gender-specific support provided by children (Kalmijn 2007) but they are more likely to fare worse economically (Carr 2004). On the other hand, if they remarry, the new marriage would perhaps affect the contact with children and also the support from children in a negative way (Kalmijn 2007). Our results support these arguments: The effect of remarriage is positive for older fathers and strongly negative for older mothers. Finally, it is likely that (especially) mothers may suffer more from empty nest prior to dissolution, realize that without the buffer of resident children the marriage does not work anymore and make the decision to separate (Hiedemann, Suhomlinova & O'Rand 1998).

This study has limitations. First, it does not focus on mechanisms mediating the nexus between marital dissolution and mental health. Our intention was to specify parsimonious models to estimate the time path of mental health around marital dissolution while reducing the risk of overcontrol bias. In consequence, the role played by potential mediators, such as family relations and negative interactions with the ex-spouse after divorce (Afifi, Cox & Enns 2006), economic deprivation (Colletta 1983), or stressful life events (Lorenz et al. 2006) remains unclear and investigating them seems to be a promising task for future studies. Second, even if we use the longest panel data set for Germany, our data are limited. First, our outcome of interest is available biennially which produces

gaps in the data. Second, information on partnership quality, involuntarily childlessness, miscarriages, or stillbirths has not been collected, so we miss potentially important antecedents for our analysis.

To sum up, our study provides new longitudinal evidence on mental health dynamics around marital dissolution in Germany and raises the awareness of mental distress, loneliness, and potential social exclusion faced by childless and parents, in particular mothers of infants and toddlers. Because consequences of dissolution may vary across legal and welfare regimes, further research studying other societal contexts is indispensable to provide comprehensive knowledge on mental health dynamics around marital dissolution.

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Manuskript 3: Personal Growth Following Marital Dissolution: Examining Gender and Reasons for Gray Divorce[1]

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Abstract

Rates of midlife and gray divorce are on the rise, yet research on more positive outcomes of marital dissolution, such as the stimulation of personal growth (PG), remains sparse. Because understanding why couples in midlife and old age decide to split up may inform how they cope subsequently, our study focused on tracing trajectories of PG and its subdimensions following marital dissolution by gender and their reasons for it. We expected both women and individuals reporting spousal infidelity to develop more PG following marital dissolution compared to men and those citing reasons other than spousal infidelity. In order to disentangle possible dependencies between gender and reasons for marital dissolution, we also considered the interactions between them. Data were derived from a Swiss panel on marital dissolution among adults aged 45 years and older (N = 575; 62.1% female). About 48% of the sample, and more women than men, cited spousal infidelity as a reason for marital dissolution. We estimated group-specific growth curves of PG by gender and grouped reasons for marital dissolution to trace the trajectories of PG. Trajectories of PG were rather stable over time, but we observed both gender- and reason-specific differences in its levels. Findings are discussed in light of gender-specific patterns of resilience and the adjustment to marital dissolution in later life.

3.1 Introduction

Rates of divorce have increased substantially among adults in their second half of life (hereafter, 'midlife' and 'gray divorce') in the U.S. and other Western nations since the 1980s (Brown & Lin 2012; Carr & Utz 2020; Perrig-Chiello, Knöpfli & Gloor 2013). This trend is, in part, related to women's growing economic independence from a male breadwinner, a stronger cultural emphasis on personal fulfillment and high-quality marriages, as well as eroding social norms and stigma associated with divorce (e.g., De Graaf & Kalmijn 2006; Killewald 2016; Strizzi et al. 2020). Yet despite these changes, going through a divorce still represents a stressful life event with far-reaching ripple effects for individuals' physical, mental, and often financial well-being (e.g., Crowley 2019a; Pudrovska & Carr 2008; Tosi & van den Broek 2020), and may be particularly detrimental for older adults (Liu & Waite 2014).

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However, marital dissolution has also the potential of stimulating personal growth (hereafter, 'PG'; Helgeson, Reynolds & Tomich 2006; Tedeschi & Calhoun 2004). Yet prior studies on marital breakup and PG did not primarily focus on adults in their second half of life, often relied on either small qualitative samples (e.g., Lloyd, Sailor & Carney 2014; Thomas & Ryan 2008) or applied a cross-sectional lens (Samios, Henson & Simpson 2014). As a consequence, they do not allow to examine the distinct effects of post-breakup adjustment among adults in middle and older age (Crowley 2019a) or to track meaningful and persisting changes (Jayawickreme & Infurna 2021).

To fill these gaps, our study focuses on PG following midlife and gray divorce and separation by tracing subsequent trajectories of PG with biennial panel data. We examine how these trajectories vary by reasons for marital dissolution and gender. In fact, previous studies suggested gendered patterns of reported reasons that were associated with high levels of emotional strain (e.g., women's reports of spousal infidelity; Fincham & May 2017; Strizzi et al. 2020), and were likely to trigger PG (e.g., Armstrong & Shakespeare-Finch 2011).

3.2 Rise of and Reasons for Midlife and Gray Divorce

U.S. statistics document a dramatic increase in gray divorce rates since 1980 while the overall divorces rate has remained stable (Brown & Lin 2012; Montenegro, 2004). Brown and Lin (2012) estimated that the rates of gray divorce in the U.S. doubled from 4.9 divorced persons per 1,000 married persons in 1990 to 10.1 in 2010. Precise estimates of the prevalence of gray divorce in European countries are sparse. However, Perrig-Chiello and colleagues (2013) reported that in Switzerland, which has one of the highest overall divorce rates in Europe, the share of divorces among older women (aged 50-54) and men (aged 70-74) grew particularly since 1969 and often represents the dissolution of long-term marriages. More specifically, the share of divorces where at least one spouse was aged 50 years or older grew from about 15% in 1984 to about 49% in 2020 (The Swiss Federal Statistical Office 2021).

Prior research identified two main clusters of perceived reasons for divorce across all age groups (e.g., Thomas & Ryan 2008; Amato & Previti 2003; Hawkins, Willoughby & Doherty 2012). The first one comprises high-level conflict and problematic behaviors, such as the spouses' infidelity, substance abuse, or domestic violence. Within this cluster, spousal infidelity has shown to be the most commonly reported reason for divorce (Amato & Previti 2003; Gravningen et al. 2017; Strizzi et al. 2020). For example, marital dissolution due to spousal infidelity was cited by about 18% of men and about 24% of women, whereas addiction or domestic violence were less prevalent reasons for union dissolution among a sample of 16-74 year-olds (about 2-3%, and about 4-16% among men and women, respectively; Gravningen et al. 2017). Spousal infidelity is further likely to be the most relevant reason for midlife and gray divorce in this cluster because rates of infidelity have shown the largest increase among older cohorts of men (Fincham & May 2017), while the incidence of intimate partner violence has been shown to decline with age (Rennison & Rand 2003). The second cluster

represents concerns about lower levels of commitment to the marital union and complaints about marital quality, such as incompatibility, alienation, or communication problems (Amato & Previti 2003; De Graaf & Kalmijn 2006; Strizzi et al. 2020). Reasons within this cluster have gained importance over the last decades, which could be related to shifting cultural norms and expectations concerning personal fulfillment, high-quality social relationships that meet one's emotional and psychological needs, and the permissibility of divorce in general (De Graaf & Kalmijn 2006; Diefenbach & Opp 2007; Strizzi et al. 2020). For instance, Gravningen and colleagues (2017) reported that about 39% of men and about 36% of women cited complaints related to marital quality as reasons for union dissolution.

There are some studies, which focused on reasons for midlife and gray divorce specifically. In line with these two clusters, a larger U.S. survey of divorced individuals aged 40 to 79 found that respondents' top three reasons for divorcing were verbal, physical, or emotional abuse, different lifestyles or values, and infidelity (Montenegro 2004). Qualitative studies on smaller samples of midlife and gray divorcées further showed that a lack of emotional mutuality and communication problems (Ages 46-59; Rokach, Cohen & Dreman 2004), as well as emotional baggage and flawed reasons for marrying in the first place (Ages 58-68; Canham et al. 2014), were, among others, cited as reasons for divorce. Moreover, gender differences for reported reasons for divorce emerged in some studies. Falling out of love without a specific further cause was the most commonly cited reason among men, whereas women were more likely to report high-conflict and problematic behaviors (e.g., mental and physical abuse and infidelity; Montenegro 2004; Thomas & Ryan 2008). Analyzing in-depth interviews of 80 divorcées aged 50 and over, Crowley (2019b) found that both genders shared common reasons from both clusters (e.g., having grown apart, sexual infidelity, spouses' mental health problems), but that there were also significant gender-specific reasons (e.g., financial differences among men, and emotional or verbal abuse among women).

3.3 Divorce and PG

The link between critical life events, such as union dissolution, and adverse mental and physical health outcomes is well-established (e.g., Burger et al. 2020; Carr & Utz 2020; Lin et al. 2019; Tosi & van den Broek 2020). Yet going through a critical life event can also trigger experiences of positive adjustment that transcend the normative recovery process (Helgeson, Reynolds & Tomich 2006; Tedeschi & Calhoun 2004; Samios, Henson & Simpson 2014). This phenomenon has been captured in the concept of PG, which describes self-perceived positive changes as a result of coping with a critical life event or trauma (e.g., Barskova & Österreich 2009; Studley & Chung 2015), and its development can be idiosyncratic (i.e., some individuals may experience growth quickly after the critical life event and it may be delayed for others; Jayawickreme et al. 2021). Because of the lack of longitudinal studies on PG, however, it is still unclear when the development of growth actually begins (Infurna & Jayawickreme 2019; Mangelsdorf, Eid & Luhmann 2019). Tedeschi and Calhoun (2004) defined five

subdimensions of PG, which comprises changes in one's self-perception, namely: appreciation of life, personal strengths, new possibilities, as well as improvements in one's ability to experience spiritual change and to relate to others.

Some studies have identified predictors of PG and its subdimensions, such as gender, social support, and the severity or expectedness of critical life events (e.g., Armstrong & Shakespeare-Finch 2011; Barskova & Österreich 2009). For example, women seemed to experience more PG in terms of appreciation of life and spiritual change compared to men following the onset of an illness (Barskova & Österreich 2009), as well as individuals who sought out more support to cope with adverse events (Lee et al. 2018; Recksiedler et al. 2018). Severe and unexpected events have further been shown to trigger more PG compared to more gradual or expected ones (Studley & Chung 2015). The latter finding could be particularly relevant for spousal infidelity. Compared to other reasons for divorce, spousal infidelity has been shown to have a higher emotional toll for the betrayed spouse and was linked to poorer post-divorce adjustment (Hall & Fincham 2005).

Adapting to new social roles after union dissolution may also lead to considerable gains in one's reorientation in life and stimulate one's personal development (Määttä 2011). Potential positive consequences following midlife and gray divorce, however, are understudied since research in PG has typically focused on bereavement (e.g., Carr 2004; Recksiedler et al. 2018) or non-marital relationship breakup among convenience samples of younger age groups (e.g., Armstrong & Shakespeare-Finch 2011; Samios, Henson & Simpson 2014). Reviewing studies on PG following non-marital relationship breakup and divorce among younger age groups, Tashiro and colleagues (2006) found that PG can be experienced through two major pathways. First, PG through stress-relief can be triggered in cases of particularly conflictual reasons for marital dissolution, or after enduring lower commitment and marital problems over an extended time period, where one may choose to end a marriage deliberately. Second, through the crisis-growth pathway, which may be more salient in the case of an unexpected or involuntary breakup and if it is perceived to be particularly painful, individuals seem to be able to capitalize on the circumstance of having to weather this stressful transition by strengthening their social networks or gaining autonomy. Reasons for divorce that are perceived as more socially acceptable have further shown to increase the social support divorcées receive (Jensen & Bowen 2015), which has in turn been linked to more PG (Recksiedler et al. 2018).

Supporting both the stress-relief and crisis-growth pathways, prior research showed that contextual factors, such as the pre-loss quality of relationships, were linked to their appraisal of and their subsequent ability to cope with spousal loss (Carr 2004). Qualitative studies on the experience of union dissolution highlighted the salience of both the stress-relief and crisis-growth pathways to PG as well, despite the emotional pain, feelings of failure, and loneliness associated with gray divorce (Crowley 2019a; Lloyd, Sailor & Carney 2014; Burger et al. 2020). In line with the crisis-growth pathway, Thomas and Ryan (2008; Ages 21-66) found that female divorcées reported experiencing PG through focusing on their future, building up confidence, and taking on new social roles (e.g., finding

new employment and making financial decisions independently). Sakaraida (2005) further reported that women (Ages 34-54) experienced a sense of inner strength after union dissolution. Other themes that emerged for both genders were developing a new sense of self that is not tied to the former spouse (Ages 42-66; Lloyd, Sailor & Carney 2014) and feelings of relief and independence (Ages 50 and older; Crowley 2019a). Consistent with the stress-relief pathways, this was particularly the case after ending more troubled marriages (Ages 24-76; Määttä 2011).

3.4 The Present Study

This study aims to trace trajectories of PG following marital dissolution among Swiss adults in their second half of life. Switzerland, like most Western nations, implemented a "no-fault" divorce system in 2000, which resulted in a more equal division of the marital assets and was supposed to reduce economic disparities between divorced men and women (Perrig-Chiello, Knöpfli & Gloor 2013). Furthermore, improvements in social security—especially for divorced and widowed women— contributed to a shorter negative effect on and faster recovery of Swiss women's income following a divorce compared to women in other OECD countries (De Vaus et al. 2017). Legal divorces are typically finalized either within months (by mutual agreement) or two years after the couple's physical separation (in a disputed case) and the wealthier spouse can be obliged to pay spousal support, depending on the financial need of the other spouse (for more information on the Swiss divorce law see Perrig-Chiello, Knöpfli & Gloor 2013; Schwenzer 2011). Yet despite these efforts to reduce economic disparities between ex-spouses, later-life divorces can have severe and adverse psychosocial—and for women nevertheless often financial—consequences in Switzerland (Kessler, Potarca & Bernardi 2021; Knöpfli, Morselli & Perrig-Chiello 2016).

In line with prior research, we expect the trajectories of PG to vary by gender and reasons for marital dissolution. We expect more PG for women compared to men (**Hypothesis 1**) because of prior studies documenting gender differences in PG (e.g., Barskova & Österreich 2009). Based on the crisis-growth pathway and the heightened toll mostly associated with spousal infidelity (Hall & Fincham 2005; Tashiro, Frazier & Berman 2006), we expect more PG among individuals reporting spousal infidelity as a reason for marital dissolution compared to those who cite other marital problems (e.g., lack of communication or commitment; **Hypothesis 2**). Lastly, we expect PG to be particularly pronounced among women citing spousal infidelity as a reason for marital dissolution (**Hypothesis 3**). Because spousal infidelity is more often reported by women (Gravningen et al. 2017) and is commonly perceived as a socially acceptable reason for marital dissolution (Diefenbach & Opp 2007), it may be more likely to trigger social support (Jensen & Bowen 2015). In turn, receiving social support has been linked to more PG (Lee et al. 2018; Recksiedler et al. 2018).

3.5 Method

3.5.1 Data

Data were derived from a longitudinal Swiss survey on intimate relationships and marital dissolution or loss in midlife and old age, which was conducted in 2012, 2014, and 2016 (N = 2,857). Long-term married, widowed, and separated or divorced participants were recruited using a random sample stratified by age, gender, and marital status supplied by the Swiss Federal Office of Statistics. We focused on the subsample of previously married individuals who separated or divorced at age of 45 and later (see **Figure M3.A1** in the supplemental online appendix for a flowchart on the construction of the analytical sample). In sum, our final analytical sample consisted of 575 separated or divorced individuals who had experienced marital dissolution either before entry into the study (N = 552) or between Wave 1 and 2 (N = 23). Note that 30.8% of the respondents were separated (but not yet divorced) at study entry (and decreased to 12.3% at study end), which is likely due to the prerequisite of having to live apart for two years prior to the legal divorce. Because most of the consequential life changes should be mastered during the lengthy separation period, rather than the subsequent court decision to finalize a divorce, we also include separated respondents who are still in the process of filing for divorce under the broad label of midlife and gray divorce.

Note that no approval from an institutional or national review committee was required for this study. This retrospective review of participant data did not require ethical approval in accordance with local/national guidelines. Written informed consent from participants was not required for secondary data analyses in accordance with local/national guidelines.

3.5.2 Measures

3.5.2.1 Dependent Variables

PG was assessed with the short form of the posttraumatic growth inventory (PTGI), which consists of 10 items constituting five subdimensions of PG: relating to others, new possibilities, personal strength, appreciation of life, and spiritual change (two items each; Cann et al. 2010). Participants were instructed to assess "whether certain things in their life changed due to the separation/divorce" (for items wording, see supplementary online appendix **Table M3.A1**) on a 6-point scale (0 = not due to the separation/divorce, to 5 = to a very high degree due to the separation/divorce).

The PTGI scale was validated for the U.S. population and studies from other countries often reached different factorial solutions (see Mordeno et al. 2016 for the Philippines; Lamela et al. 2014 for Portugal; Recksiedler et al. 2018 for Switzerland). To test the dimensional invariance of PG across waves, we conducted, in a first step, an exploratory factor analysis (EFA) for ordinal indicators. In line with Recksiedler et al. (2018), EFA revealed three (i.e., appreciation of life, personal strength,

and spiritual change), rather than five, subdimensions of PG that were comparable across waves (for factor loadings, see **Table M3.A1**). In a second step, we proceeded with these three subdimensions and tested the measurement invariance of PG across waves using a multiple-group confirmatory factor analysis. We found an indication for metric invariance, which means that the factor loadings were equal across waves (see **Table M3.A2** in the supplemental online appendix). Lastly, we computed an overall mean composite score for PG across all three subdimensions and mean composite scores for each subdimension individually.

3.5.2.2 Reasons for Marital Dissolution

Based on a list of multiple reasons for marital dissolution, respondents were asked to assess "What was the reason for the separation from your point of view?" (0 = no, 1 = yes). In Wave 1, reasons were: sexual infidelity of the ex-spouse (about 33%); my sexual infidelity (about 6%); ex-spouse fell in love with another person (about 37%); I fell in love with another person (about 11%); we drifted apart (about 67%); and we simply did not fit together anymore (50%). In Wave 2, respondents were asked to rate the six reasons from Wave 1 again, and in addition to this: communication problems (about 57%); health of ex-spouse (about 13%); my health (about 9%); financial reasons (about 9%); and occupational reasons (about 8%). Reasons for marital dissolution were not assessed in Wave 3. For each reason, regardless of whether it was assessed in both waves or Wave 2 only, we created a dichotomous, time-invariant indicator that was used in subsequent analyses (0 = not mentioned at all, 1 = mentioned in Wave 1 and/or Wave 2; see **Table M3.A3** in the supplemental online appendix for the distribution of reasons for marital dissolution by gender). Note that respondents were also able to state additional reasons (that were not included in the provided list of reasons) as an open answer in Wave 1. A few open answers included descriptions of more high-conflict and traumatizing events (e.g., N = 12 for drinking problems and N = 15 for domestic violence). Because of small case numbers, we were not able to include these respondents in our analyses.

In line with prior studies on the increased prevalence of spousal infidelity among older individuals (particularly men; Fincham & May 2017) and its higher emotional toll compared to other and potentially less conflictual reasons for marital dissolution (e.g., Hall & Fincham 2005; Tshiro et al. 2006), we differentiated between two groups of reasons. First, we grouped respondents who reported their ex-spouses' sexual or emotional infidelity as reason into one category (i.e., Group 1: spousal infidelity)—regardless of their endorsement of other reasons. Those who did not report spousal infidelity, but mentioned any other reason (e.g., alienation or communication problems), were grouped into the other category (i.e., Group 2: no spousal infidelity).

3.5.2.3 Covariates

Our analyses accounted for several time-invariant and time-varying covariates commonly associated with the adjustment to union dissolution and potential gender differences in these patterns (e.g.,

Carr & Utz 2020; Lin et al. 2019). At study entry, those were: marital happiness before separation (0 = very unhappy, to 9 = very happy); whether this marriage was a higher-order marriage (0 = no, 1 = yes); whether the union dissolution came unexpectedly (0 = expected, 1 = not completely unexpected, 2 = unexpected); whether respondents ever received help from someone to cope with the separation/divorce (0 = no, 1 = yes); whether respondents had biological or adopted children with their ex-spouse (0 = no, 1 = yes); and respondents' educational attainment (0 = primary education, 1 = secondary education, 2 = tertiary education).

At each wave, those were: respondents' linear age (mean-centered); who initiated the divorce (0 = ex-spouse, 1 = both, 2 = me, 3 = not divorced yet); whether respondents have overcome the breakup yet (0 = no, 1 = yes); whether they repartnered (0 = no, 1 = yes); their financial situation (0 = not enough money to support myself, 1 = enough money to support myself, 2 = more than enough money to support myself); and self-rated health (0 = bad, to 3 = very good).

3.5.2.4 Longitudinal Data Structure

Our final analytical sample consists of 1,408 observations on N = 575 respondents (unbalanced panel with a maximum of three observations per person). The dropout rate was 18.8% between Wave 1 and Wave 2, and 17.2% between Wave 2 and 3. We ran a series of logistic regressions to test whether our data were affected by panel attrition bias (0 = no panel dropout, 1 = dropped out of the panel as dependent variable) and found no indication of serious panel attrition on socio-demographic indicators, except for those affected by a precarious financial situation compared to those who reported having enough money (OR = 1.81, $p < 0.05$).

The average duration of being separated was about 4.5 years at entry into the sample, and the available observations accumulate between the 2nd and 10th year after the marital separation. Most observations occur between Years 4 up to 6 (N = 318) and the fewest were available between Years 0 up to 2 (N = 169 with only 23 observations corresponding to the first six months of this time span) as well as Years 10 up to 12 (N = 151 with only 30 observations corresponding to the last six months of this time span). In order to successfully detect medium-sized effects with a statistical power of at least 80% at 5% level of significance, we collapsed the monthly process time variable (x-axis: time since marital separation) into six time intervals consisting of two years each (0 up to 2 years, 2 up to 4 years, 4 up to 6 years, 6 up to 8 years, 10 up to 12 years). This simple transformation helped us also to reduce recall bias regarding the month of marital separation and to minimize potential bias in curve parameter estimates due to outliers at the very beginning and at the very end of the distribution of PG over time (see **Table M3.A5** in the supplemental online appendix for the number of respondents at each measurement time point).

3.5.3 Analytical Strategy

To address our hypotheses, we estimated group-specific growth curves of PG and its subdimensions by gender and reasons for marital dissolution using random-effects models (Singer & Willett 2003). This allowed us to assess average group differences in the level of PG for the time span of up to 12 years after marital dissolution. As process time, we used midpoint values of each 2-year interval since marital separation (i.e., 1, 3, 5, 7, 9, 11). The number of observations ranged at each 2-year interval from N = 16 to N = 123 (see **Table M3.A5** in the supplemental online appendix for the number of respondents at each 2-year interval).

First, we conducted a comprehensive descriptive analysis (see **Table M3.1** and **Table M3.A4**). Second, we estimated a series of gender- and reason-specific growth curves (see **Tables M3.2-3** and **Figures M3.1-3**). All models were estimated with the xtreg, re option, and robust standard errors in Stata (v17.0). In each model, we included threefold interaction terms between gender (women vs. men), reasons for marital dissolution (spousal infidelity vs. no spousal infidelity), and process time (time since separation) as a quadratic polynomial. In order to reduce the number of tables and to ease the interpretability of the results, we reported nested interactions that illustrate the functional form of the trajectories in terms of their linear and quadratic components, separately for each possible combination of gender and reasons for marital dissolution. This specification allowed us to generate not only gender-specific or reason-specific trajectories of PG and its subdimensions but also a combination of both from only one model. The linear and quadratic components of the growth curves shown in **Tables M3.2-3** refer to the time period from the 2nd to the 4th year of separation (the reference category) and correspond to a snapshot from a longitudinal model at a given time point (i.e., 2 up to 4 years after marital separation).

We built the growth curve models sequentially. In the first step, we estimated parsimonious growth curves without any covariates except for the interaction term between gender and reasons (see **Table M3.2**). In the second step, we estimated growth curves with all time-invariant covariates (see **Table M3.3**: Step 1); in the third step, we added time-varying covariates to the model (see **Table M3.3**: Step 2). The main effect of group (G2 through G4) corresponded to group mean deviations (at 2 up to 4 years after marital separation) from the average in the reference group (i.e., women who reported spousal infidelity, G1), for each of the four respective outcomes i.e., PG and its subdimensions (Models 1 to 4). The effects of the covariates corresponded to the average impact (of each covariate) on PG during the whole observational period. We also tested whether the shape of PG trajectories was similar across groups (i.e., Wald test for equal linear and quadratic time paths). To assess the model fit, we reported within, between, and overall R-squared values, as well as Akaike's information criterion (AIC) for model comparisons (see **Tables M3.2-3**). AIC was the lowest for the model without time-varying covariates, except for the subdimension spiritual change.

Finally, we provide three figures (see **Figures M3.1-3**) to visualize the results from the growth curves longitudinally. The illustrated group-specific trajectories of PG and its subdimensions correspond to predictive margins with 95% confidence bands; the double-headed arrows mark the time period in which the tested group-specific differences were significant at 95% and 99% level of confidence. Additionally, we also provided time point-specific tests of pairwise mean differences in PG and its subdimensions across groups (i.e., average marginal effects extracted from the growth curves using the delta method) to ease the interpretability of **Figures M3.1-2** (see **Figure M3.A2-A3** in the online supplemental appendix).

Figure M3.1 illustrates gender-specific (upper panel) and reason-specific (lower panel) trajectories of the overall PG score based on parsimonious growth curves without any covariates (left plot), growth curves with time-invariant covariates (middle plot), and growth curves with both time-invariant and time-varying covariates (right plot), in order to emphasize sequential model building. **Figure M3.2** demonstrates gender-specific trajectories of three subdimensions of PG in the upper panel (i.e., addressing Hypothesis 1), and reason-specific differences in the lower panel (i.e., addressing Hypothesis 2). **Figure M3.3** shows a combination of both (i.e., addressing Hypothesis 3).

3.6 Results

3.6.1 Descriptive Results

Descriptive statistics illustrating the composition of the final analytical sample across all respondents (N = 575) and observations over time (N = 1,408), stratified by gender and reasons are displayed in **Table M3.1** (for the composition of the sample by gender and reasons for marital dissolution, see **Table M3.A4** in the supplemental online appendix).

Table M3.1: Sample Composition Stratified by Gender and Spousal Infidelity Across All Respondents (N=575) and Observations Over Time (N=1,408)

Group-specific indicators	Spousal infidelity (*N* = 274)		No spousal infidelity (*N* = 301)		Overall
	Women	Men	Women	Men	
Number of respondents	*N* = 196	*N* = 78	*N* = 161	*N* = 140	*N* = 575
Number of observations	507	189	387	325	1,408
Dependent variables					
Personal growth [a], *M* (*SD*)	2.60 (1.23)	2.01 (1.24)	2.26 (1.27)	1.87 (1.30)	2.26 (1.29)
	$diff = 0.55^{***}$		$diff = 0.36^{**}$		
Appreciation of life	3.11 (1.47)	2.75 (1.58)	2.83 (1.68)	2.55 (1.67)	2.85 (1.60)
	$diff = 0.32$		$diff = 0.24$		
Personal strength	3.20 (1.52)	2.30 (1.67)	2.85 (1.75)	2.21 (1.77)	2.75 (1.72)
	$diff = 0.86^{***}$		$diff = 0.60^{***}$		
Spiritual change	1.40 (1.67)	0.94 (1.41)	1.04 (1.43)	0.78 (1.34)	1.10 (1.52)
	$diff = 0.47^{**}$		$diff = 0.25$		

Continuation of Table M3.1:

Explanatory variables					
Age, *M* (*SD*)	57.35 (6.07)	59.62 (6.93)	58.05 (6.20)	60.08 (6.58)	58.48 (6.44)
Age at separation, %					
45 up to 50 years	43.4	37.2	44.7	32.1	40.2
50 up to 55 years	28.1	32.0	30.4	33.6	30.6
55 up to 60 years	16.8	18.0	16.2	17.9	17.0
60 and more	11.7	12.8	8.7	16.4	12.2
Duration of being separated in years, *M (SD)*	5.47 (3.36)	6.38 (3.20)	6.23 (3.56)	6.63 (3.58)	6.07 (3.48)
Duration of being separated in Wave 1, %					
0 up to 2 years	36.7	20.5	27.3	22.1	28.3
2 up to 4 years	19.4	18.0	18.6	15.7	18.1
4 up to 6 years	19.9	23.1	19.3	16.4	19.3
6 up to 8 years	11.2	25.6	16.2	20.0	16.7
8 years and more	12.8	12.8	18.6	25.7	17.6
Marital happiness before separation [b], *M* (*SD*)	5.11 (1.98)	5.81 (2.01)	4.45 (1.92)	5.21 (1.98)	5.05 (2.01)
Higher-order marriage, %	7.1	7.7	9.9	10.7	9.7
Expectedness of loss, %					
Expected	15.3	17.9	47.2	34.3	29.2
Not completely	34.2	37.2	39.8	48.6	39.7
Unexpected	50.5	44.9	13.0	17.1	31.1
Initiator of divorce, %					
Ex-spouse	32.1	23.1	19.9	21.4	24.9
Both	26.0	38.5	26.7	50.7	33.9
Me	29.1	29.5	36.6	19.3	28.9
Not divorced yet	12.8	9.0	16.8	8.6	12.3
Common children, %	85.2	87.2	88.2	80.7	85.2
(Ever) received help, %	93.4	71.8	86.3	77.9	84.7
(Ever) overcame loss, %	65.3	74.4	83.8	85.7	76.7
(Ever) repartnered, %	30.6	61.5	44.7	62.9	46.6
Education, %					
Primary	5.6	5.1	9.9	2.1	5.9
Secondary	57.1	44.9	51.6	33.6	48.2
Tertiary	37.3	50.0	38.5	64.3	45.9
Financial situation, %					
Not enough money	14.3	14.1	13.7	15.7	13.7
Enough money	74.5	75.6	78.9	67.9	73.4
More than enough money	11.2	10.3	7.4	16.4	12.9
Health, %					
Bad	5.3	5.8	4.1	2.5	4.4
So-so	21.5	15.3	21.5	19.4	20.2
Good	48.7	47.6	43.7	54.1	48.4
Very good	24.5	31.2	30.7	24.0	27.0

Notes: Values are presented as mean (M) and standard deviation (SD). [a] Higher values indicate more growth; range of values: 0-5 [b] Higher values indicate better relationship quality; range of values: 0-9. *p < .05. **p < .01. ***p < .001.

About 40% of the sample, and a higher percentage of women compared to men, experienced marital separation between the ages 45 to 50. At study entry (i.e., Wave 1), marital separation had occurred within the last two years for more than one-fourth of the sample, whereas another one-third of the sample was already in the sixth year or later of being separated. The overall mean scores of PG and its subdimensions differed significantly between women and men, with women reporting on average more PG, personal strength, and spiritual change (see **Table M3.1**). Furthermore, respondents who experienced spousal infidelity reported, on average, greater marital happiness prior to

separation, particularly the men; also, a larger share of those respondents reported that the separation came unexpectedly compared to those who did not report spousal infidelity.

The majority of our sample consisted of individuals who separated from their first, long-term spouse (i.e., only 9.7% were in higher-order marriages, see **Table M3.1**). Most respondents reported having common children with their ex-spouse and enough money to support themselves, as well as to be gainfully employed and in good health. Men, however, were older at marital separation, better educated, and, on average, reported having been happier in their marriages compared to women. They also reported receiving less help to cope with the separation. A larger share of men was repartnered at the end of the study (i.e., Wave 3), irrespective of the reason for marital dissolution, and a larger share of those citing no spousal infidelity (vs. infidelity) reported overcoming separation by the end of the study. Lastly, the share of women who reported being repartnered and having overcome the separation from their ex-spouse by the end of the study was lowest among those who experienced spousal infidelity (30.6% and 65.3%, respectively). Nevertheless, most of those women reported receiving help to cope with the separation (93.4%).

3.6.2 Group-Specific Trajectories of the Overall PG Score

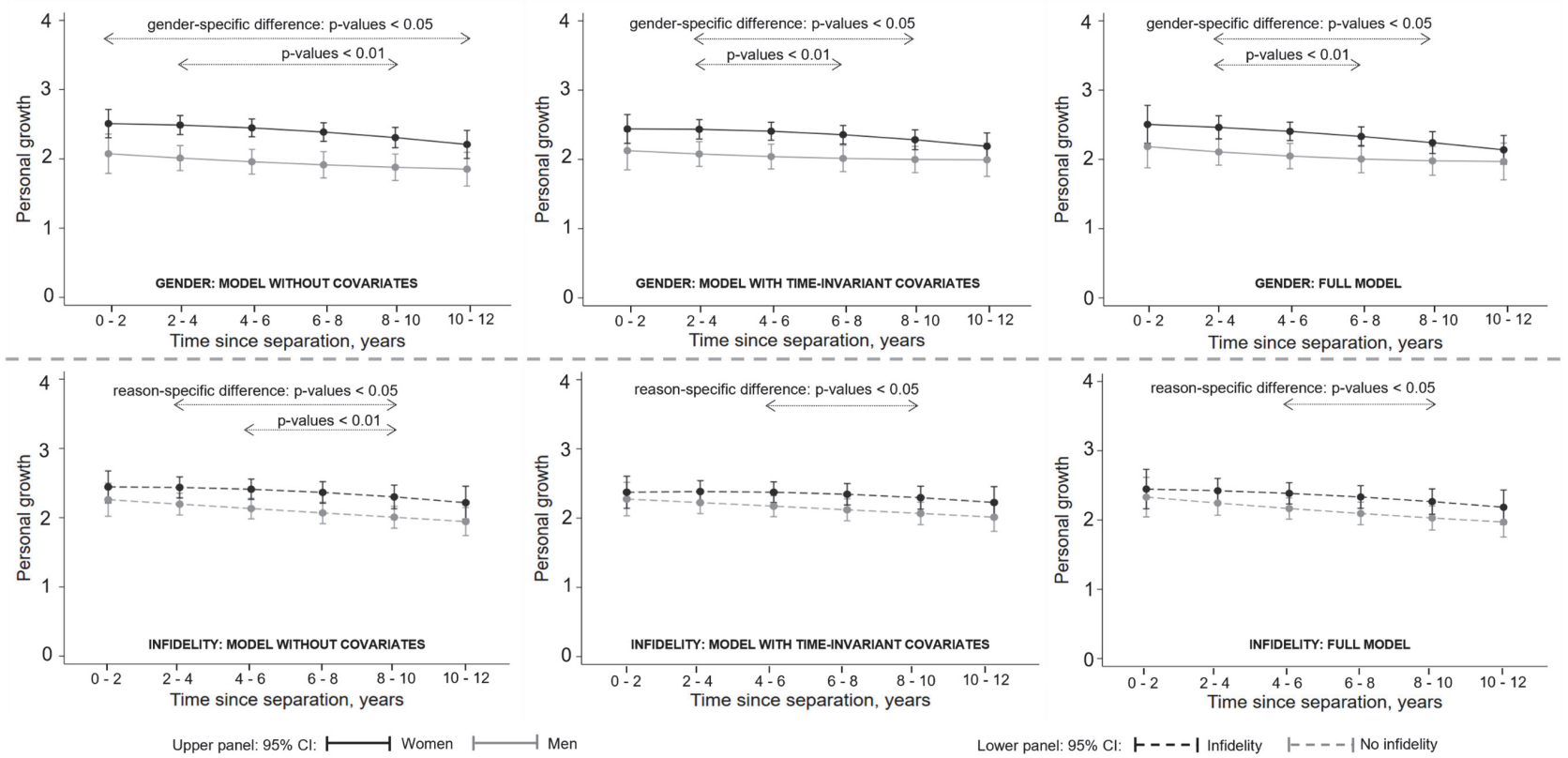
Results for the group-specific overall trajectories of PG are shown in **Figure M3.1** and **Tables M3. 2-3**. In general, trajectories of PG after marital dissolution indicated small to moderate degrees of change over time (see threefold interactions between the groups and process time).

The low within-subject R-squared values, mostly non-significant interactions for linear and quadratic effects, and the non-significant Wald tests for path differences (i.e., differences in the functional form of the trajectories) suggested little systematic variation for PG over time.

3.6.2.1 Group Differences in the Level of Trajectories of the Overall PG score

However, our results revealed significant differences in the level of PG at several time points by gender (see **Figure M3.1**, upper panel) and reasons (see **Figure M3.1**, lower panel). Please note that slightly overlapping and non-overlapping confidence bands indicate unambiguously significant differences between trajectories at a minimum 5% level of significance (Cumming & Finch 2005). In order to identify time points with significant group differences, we indicated time intervals in which the pairwise group mean differences were significant ($p < 0.05$ and $p < 0.01$) with double-headed arrows in the figures.

Figure M3.1 demonstrates the robustness of PG trajectories across the sequentially built models. The left plot corresponds to **Table M3.2**, the middle and right plot to **Table M3.3** (Step 1 and Step 2 respectively).



Notes. Predictive margins with 95% confidence intervals. The standard errors were estimated using the delta method dx/dy and refer to group-specific differences in the mean score of PG at each 2-year interval. The double-headed arrows mark a time interval in which the tested differences were significant at 95% and 99% level of confidence. The 2-year intervals are left-closed (i.e., 0 up to 2 years, 2 up to 4 years, (…), 10 up to 12 years).

Figure M3.1: Gender-Specific and Reason-Specific Differences in the Trajectories of Personal Growth Following Marital Dissolution. Model Comparison: Parsimonious Model, Model With Time-Invariant Covariates, and Full Model With Time-Varying Covariates

Table M3.2: Group-Specific Trajectories of Personal Growth by Gender and Reasons for Marital Dissolution: Parsimonious Model

Parsimonious model (without any covariates)	**Model 1** Personal growth		**Model 2** Appreciation of life		**Model 3** Personal strength		**Model 4** Spiritual change	
Coefficients refer to the period between the 2nd to 4th year of marital separation	$\hat{b}\ (SE)$	*p-value*	$\hat{b}\ (SE)$	*p-value*	$\hat{b}\ (SE)$	*p-value*	$\hat{b}\ (SE)$	*p-value*
Women # Spousal infidelity (two-fold interaction)	---		---		---		---	
G2: Women # No spousal infidelity (two-fold interaction)	**-0.33 (0.14)**	$p = 0.021$	-0.14 (0.17)	$p = 0.409$	**-0.46 (0.18)**	$p = 0.013$	**-0.40 (0.17)**	$p = 0.018$
G3: Men # Infidelity of spouse (two-fold interaction)	**-0.59 (0.17)**	$p = 0.001$	-0.27 (0.21)	$p = 0.186$	**-0.97 (0.23)**	$p = 0.000$	**-0.55 (0.22)**	$p = 0.011$
G4: Men # No spousal infidelity (two-fold interaction)	**-0.69 (0.14)**	$p = 0.000$	**-0.50 (0.18)**	$p = 0.006$	**-1.01 (0.20)**	$p = 0.000$	**-0.62 (0.18)**	$p = 0.001$
Threefold interactions as nested effects								
Linear:								
Time # G1	-0.18 (0.28)	$p = 0.520$	-0.26 (0.39)	$p = 0.504$	-0.09 (0.38)	$p = 0.824$	-0.18 (0.33)	$p = 0.587$
Time # G2	-0.13 (0.41)	$p = 0.756$	-0.99 (0.56)	$p = 0.075$	1.00 (0.59)	$p = 0.093$	0.11 (0.47)	$p = 0.820$
Time # G3	0.08 (0.65)	$p = 0.897$	-1.22 (0.67)	$p = 0.067$	0.65 (0.96)	$p = 0.496$	**1.39 (0.69)**	$p = 0.043$
Time # G4	-0.65 (0.42)	$p = 0.120$	-0.82 (0.59)	$p = 0.160$	-0.18 (0.59)	$p = 0.766$	-0.53 (0.55)	$p = 0.332$
Quadratic:								
Time² # G1	-0.18 (0.38)	$p = 0.639$	-0.19 (0.51)	$p = 0.707$	-0.27 (0.47)	$p = 0.572$	0.15 (0.49)	$p = 0.761$
Time² # G2	-0.31 (0.52)	$p = 0.555$	0.16 (0.69)	$p = 0.813$	-0.89 (0.63)	$p = 0.156$	0.13 (0.58)	$p = 0.826$
Time² # G3	-0.34 (0.83)	$p = 0.680$	1.27 (0.92)	$p = 0.167$	-0.54 (1.10)	$p = 0.621$	**-1.92 (0.80)**	$p = 0.017$
Time² # G4	0.55 (0.49)	$p = 0.260$	0.56 (0.67)	$p = 0.403$	-0.07 (0.58)	$p = 0.902$	0.68 (0.62)	$p = 0.274$
Model-Fit & Paths differences								
Number of respondents, *N*	575		574		575		572	
Number of observations, *N*	1,408		1,403		1,406		1,358	
R-squared (within)	0.01		0.02		0.01		0.01	
R-squared (between)	0.06		0.03		0.06		0.03	
R-squared (overall)	0.05		0.03		0.06		0.03	

Notes: The process time variable duration of separation in years was divided by 10 to avoid 0.00 coefficients for quadratic terms. Unstandardized coefficients. All effects that are significant at 5% level of significance are marked in bold.

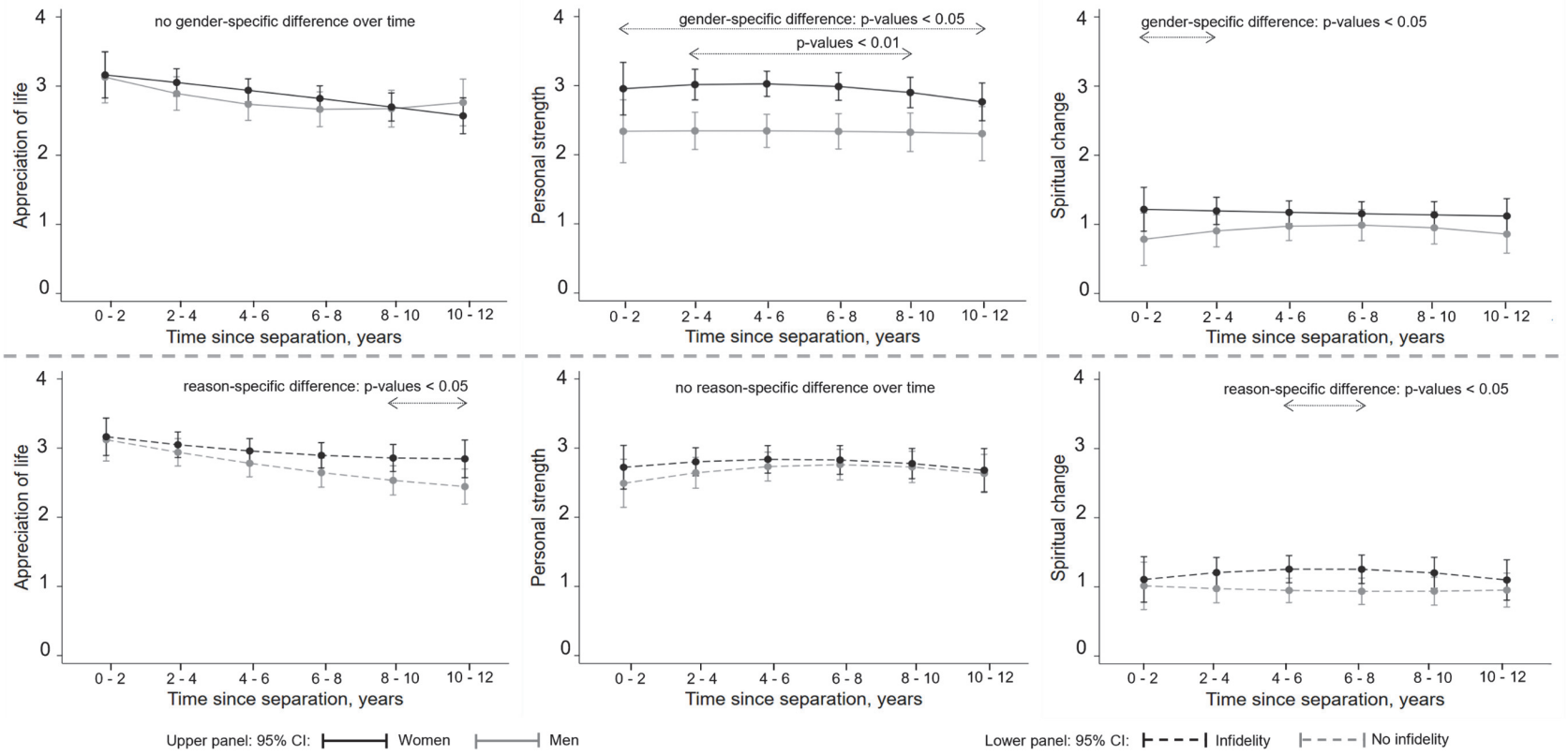
Table M3.3: Group-Specific Trajectories of Personal Growth by Gender and Reasons for Marital Dissolution: Full Model

Full Model (built in two steps)	**Model 1** Personal growth		**Model 2** Appreciation of life		**Model 3** Personal strength		**Model 4** Spiritual change	
Coefficients refer to the period between the 2nd to 4th year of marital separation	$\hat{b}\ (SE)$	*p-value*	$\hat{b}\ (SE)$	*p-value*	$\hat{b}\ (SE)$	*p-value*	$\hat{b}\ (SE)$	*p-value*
Step 1: Model with time-invariant covariates								
G1: Women # Spousal infidelity (two-fold interaction)	---		---		---		---	
G2: Women # No spousal infidelity (two-fold interaction)	-0.23 (0.15)	$p = 0.124$	-0.07 (0.17)	$p = 0.660$	-0.30 (0.19)	$p = 0.127$	-0.34 (0.18)	$p = 0.062$
G3: Men # Spousal infidelity (two-fold interaction)	**-0.45 (0.17)**	$p = 0.009$	-0.11 (0.21)	$p = 0.615$	**-0.82 (0.23)**	$p = 0.000$	**-0.46 (0.22)**	$p = 0.040$
G4: Men # No spousal infidelity (two-fold interaction)	**-0.49 (0.15)**	$p = 0.001$	-0.28 (0.19)	$p = 0.146$	**-0.75 (0.20)**	$p = 0.000$	**-0.54 (0.20)**	$p = 0.008$
Threefold interactions as nested effects								
Linear:								
Time # G1	-0.13 (0.28)	$p = 0.637$	-0.21 (0.39)	$p = 0.585$	-0.01 (0.38)	$p = 0.985$	-0.15 (0.32)	$p = 0.652$
Time # G2	-0.03 (0.42)	$p = 0.662$	-0.85 (0.56)	$p = 0.127$	1.04 (0.60)	$p = 0.081$	0.20 (0.47)	$p = 0.668$
Time # G3	0.23 (0.63)	$p = 0.926$	-1.03 (0.65)	$p = 0.114$	0.79 (0.94)	$p = 0.399$	**1.50 (0.67)**	$p = 0.026$
Time # G4	-0.64 (0.43)	$p = 0.178$	-0.86 (0.60)	$p = 0.150$	-0.17 (0.61)	$p = 0.781$	-0.47 (0.55)	$p = 0.389$
Quadratic:								
Time^2 # G1	-0.19 (0.38)	$p = 0.605$	-0.22 (0.50)	$p = 0.665$	-0.36 (0.52)	$p = 0.491$	0.16 (0.49)	$p = 0.739$
Time^2 # G2	-0.36 (0.51)	$p = 0.482$	0.08 (0.68)	$p = 0.911$	-1.35 (0.72)	$p = 0.061$	0.15 (0.58)	$p = 0.795$
Time^2 # G3	-0.34 (0.81)	$p = 0.675$	1.25 (0.89)	$p = 0.159$	-0.87 (1.27)	$p = 0.495$	**-1.89 (0.79)**	$p = 0.017$
Time^2 # G4	0.60 (0.50)	$p = 0.231$	0.66 (0.69)	$p = 0.336$	0.24 (0.65)	$p = 0.704$	0.68 (0.63)	$p = 0.277$
Time-invariant covariates								
Age at separation (only step 1)	0.00 (0.01)	$p = 0.793$	-0.00 (0.01)	$p = 0.595$	-0.00 (0.01)	$p = 0.820$	0.01 (0.01)	$p = 0.271$
Marital happiness before separation	-0.04 (0.02)	$p = 0.136$	**-0.07 (0.03)**	$p = 0.022$	-0.01 (0.03)	$p = 0.658$	-0.03 (0.03)	$p = 0.435$
Higher-order marriage	-0.15 (0.16)	$p = 0.332$	-0.19 (0.20)	$p = 0.349$	-0.33 (0.22)	$p = 0.131$	0.03 (0.20)	$p = 0.865$
Unexpected separation [a]	**0.26 (0.13)**	$p = 0.046$	0.25 (0.16)	$p = 0.104$	**0.35 (0.17)**	$p = 0.045$	0.15 (0.16)	$p = 0.345$
Not completely unexpected [a]	0.01 (0.11)	$p = 0.960$	-0.01 (0.14)	$p = 0.921$	-0.01 (0.15)	$p = 0.923$	0.03 (0.13)	$p = 0.799$
Common children	-0.04 (0.13)	$p = 0.793$	0.11 (0.17)	$p = 0.491$	-0.12 (0.17)	$p = 0.477$	-0.15 (0.16)	$p = 0.365$
Received help	**0.57 (0.13)**	$p = 0.000$	**0.63 (0.17)**	$p = 0.000$	**0.56 (0.18)**	$p = 0.002$	**0.52 (0.12)**	$p = 0.000$
Secondary education [b]	-0.30 (0.19)	$p = 0.123$	-0.25 (0.23)	$p = 0.278$	-0.41 (0.25)	$p = 0.106$	-0.15 (0.25)	$p = 0.544$
Tertiary education [b]	-0.36 (0.20)	$p = 0.071$	-0.32 (0.24)	$p = 0.181$	**-0.56 (0.26)**	$p = 0.029$	-0.10 (0.26)	$p = 0.686$

Continuation of **Table M3.3:**

Full Model (built in two steps)	**Model 1** Personal growth		**Model 2** Appreciation of life		**Model 3** Personal strength		**Model 4** Spiritual change	
Model-Fit & Paths differences								
Number of respondents, *N*	575		574		575		572	
Number of observations, *N*	1,408		1,403		1,406		1,358	
R-squared (within)	0.01		0.02		0.01		0.01	
R-squared (between)	0.10		0.07		0.09		0.05	
R-squared (overall)	0.09		0.07		0.09		0.05	
Step 2: Model with time-varying covariates								
Age (mean-centered)	0.01 (0.01)	$p = 0.343$	0.00 (0.01)	$p = 0.767$	0.01 (0.01)	$p = 0.692$	0.01 (0.01)	$p = 0.159$
Age^2 (mean-centered)	**-0.00 (0.00)**	$p = 0.018$	**-0.00 (0.00)**	$p = 0.030$	-0.00 (0.00)	$p = 0.151$	-0.00 (0.00)	$p = 0.079$
Both initiated divorce [c]	-0.13 (0.13)	$p = 0.281$	-0.30 (0.16)	$p = 0.060$	-0.01 (0.17)	$p = 0.918$	-0.07 (0.15)	$p = 0.655$
I initiated divorce [c]	0.02 (0.12)	$p = 0.902$	-0.08 (0.16)	$p = 0.596$	0.13 (0.17)	$p = 0.468$	0.05 (0.16)	$p = 0.732$
Ex-spouse initiated divorce [c]	-0.10 (0.12)	$p = 0.370$	-0.23 (0.16)	$p = 0.147$	0.03 (0.16)	$p = 0.873$	-0.04 (0.15)	$p = 0.780$
Overcame loss	0.10 (0.09)	$p = 0.257$	0.09 (0.11)	$p = 0.418$	0.13 (0.13)	$p = 0.313$	0.01 (0.11)	$p = 0.896$
Repartnered	0.01 (0.07)	$p = 0.917$	0.16 (0.10)	$p = 0.101$	0.08 (0.11)	$p = 0.445$	**-0.20 (0.09)**	$p = 0.020$
Enough money [d]	-0.15 (0.10)	$p = 0.125$	-0.11 (0.14)	$p = 0.438$	-0.16 (0.15)	$p = 0.292$	-0.22 (0.12)	$p = 0.059$
More than enough money [d]	**-0.32 (0.14)**	$p = 0.021$	-0.19 (0.19)	$p = 0.307$	-0.29 (0.20)	$p = 0.157$	**-0.38 (0.16)**	$p = 0.018$
Bad health [e]	**-0.31 (0.14)**	$p = 0.026$	-0.19 (0.21)	$p = 0.355$	-0.37 (0.20)	$p = 0.059$	**-0.41 (0.15)**	$p = 0.007$
So-so health [e]	-0.04 (0.08)	$p = 0.635$	0.03 (0.10)	$p = 0.790$	-0.12 (0.11)	$p = 0.269$	-0.12 (0.11)	$p = 0.259$
Very good health [e]	-0.02 (0.09)	$p = 0.833$	0.06 (0.11)	$p = 0.567$	-0.06 (0.11)	$p = 0.593$	-0.05 (0.10)	$p = 0.594$
Model-Fit & Paths differences								
Number of respondents, *N*	575		574		575		572	
Number of observations, *N*	1,408		1,403		1,406		1,358	
R-squared (within)	0.03		0.03		0.02		0.02	
R-squared (between)	0.10		0.07		0.09		0.07	
R-squared (overall)	0.10		0.07		0.09		0.06	
Test for path differences (all) (p-value):	$p = 0.807$		$p = 0.494$		$p = 0.565$		$p = 0.225$	
AIC (parsimonious model, mle)	4336.24		5073.45		5177.69		4617.60	
AIC (model with time-invariant covariates, mle)	4324.25		5061.64		5171.63		4620.60	
AIC (full model, mle)	4333.25		5072.86		5186.13		4626.36	

Notes: G1, G2, G3, G4: Group 1 to 4. Reference categories: [a] Expected separation; [b] Primary education; [c] Not yet divorced; [d] Not enough money; [e] Good health. The process time *duration of separation in years* was divided by 10 to avoid 0.00 coefficients for quadratic terms. Unstandardized coefficients. All effects that are significant at 5% level of significance are marked in bold. Between step 1 and step 2 the significance of all time-invariant covariates remained unchanged.



Notes. Predictive margins with 95% confidence intervals. The standard errors were estimated using the delta method dx/dy and refer to group-specific differences in the mean score of PG at each 2-year interval. The double-headed arrows mark a time interval in which the tested differences were significant at 95% and 99% level of confidence. The 2-year intervals are left-closed (i.e., 0 up to 2 years, 2 up to 4 years, (…), 10 up to 12 years).

Figure M3.2: Gender-Specific and Reason-Specific Differences in the Trajectories of Subdimensions of Personal Growth Following Marital Dissolution

Figure M3.1 shows that some of the time-invariant covariates—particularly receiving help and the expectedness of the loss (see the respective regression coefficients in **Table M3.3**: Step 1)—reduced group-specific differences in the overall PG score significantly (left plot vs. middle plot). The models with and without time-varying covariates (middle plot vs. right plot) yielded similar results. In line with our two first hypotheses on gender-and reason-specific differences, our results yielded significantly higher levels of PG between Years 2-10 for women compared to men, and between Years 4-10 for respondents who reported spousal infidelity compared to those who did not, even after all covariates have been included in the model. With regard to the covariates, receiving help and an unexpected separation were associated with a higher level of the overall PG score (**Table M3.3**: Step 1), whereas reporting bad health and having more than enough money were associated with a lower level of the overall PG score (**Table M3.3**: Step 2).

3.6.2.2 Group Differences in the Level of Trajectories of the PG subdimensions

Figure M3.2 demonstrates gender-specific trajectories of the three subdimensions of PG in the upper panel (i.e., addressing Hypothesis 1), and reason-specific differences in the lower panel (i.e., addressing Hypothesis 2).

Regarding Hypothesis 1, women showed significantly higher levels of personal strength over the whole observational period (between Years 0-12) and slightly higher levels in spiritual change in the short run (between Years 0-4) compared to men (see **Figure M3.2** (upper panel); as well as **Figure M3.A2** for time point-specific group differences across gender, and **Table M3.3** for the regression coefficients). The results did not reveal significant gender differences in the domain appreciation of life over time. Regarding Hypothesis 2, respondents who reported spousal infidelity showed higher levels of appreciation of life in the long run (between Years 8-12), and spiritual change in the middle run (between Years 4-8) compared to those who did not report spousal infidelity (see **Figure M3.2** (lower panel); as well as **Figure M3.A3** for time point-specific group differences across gender, and **Table M3.3** for the regression coefficients). The results did not reveal significant gender differences in the domain personal strength over time. With regard to the time-invariant covariates, receiving help to cope with the separation was associated with higher levels of all three PG subdimensions (see **Table M3.3**). Higher levels of marital happiness prior to marital dissolution were related to a decrease in appreciation of life. An unexpected separation was linked to an increase in personal strength, tertiary education was linked to a decrease in personal strength. Being repartnered, having more than enough money, and being in bad health were associated with a significant decrease in spiritual change.

3.6.2.3 Differences in the Level of Trajectories of PG Stratified by the Interaction Between Gender and Reasons

Figure M3.3 shows the trajectories of PG and its subdimensions stratified by the interaction between gender and infidelity (i.e., addressing Hypothesis 3). To examine the third hypothesis, we tested all pairwise mean differences between women who reported spousal infidelity (G1) and the remaining three groups (i.e., G2-G4) at each time point (i.e., 2-year interval).

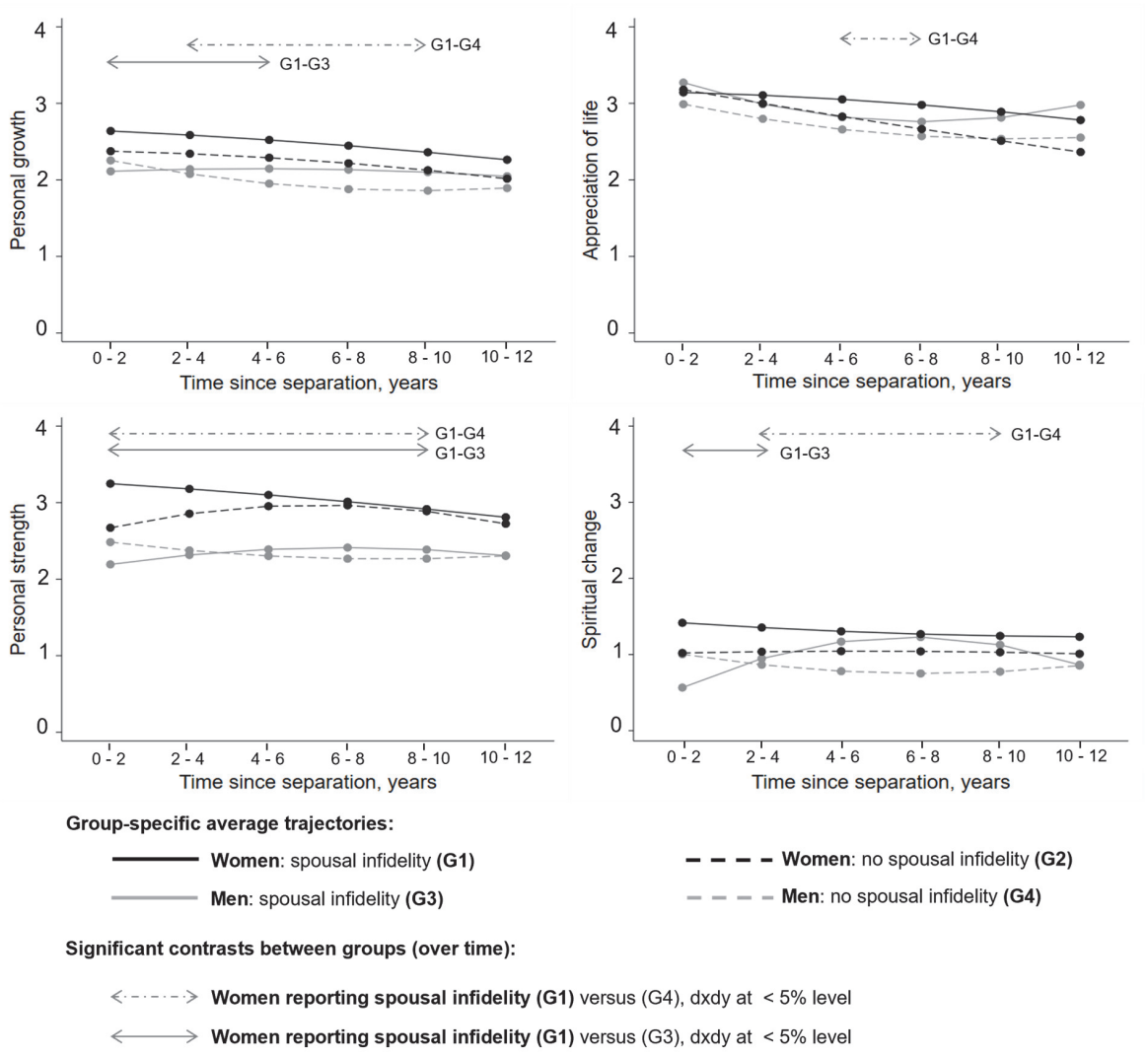


Figure M3.3: Differences Between Women Reporting Spousal Infidelity (Reference Category) and the Other Three Combinations of Gender and Reasons in the Trajectories of Personal Growth Following Marital Dissolution

Significant differences between the groups were indicated by double-headed arrows at the top of each graph. Women who cited spousal infidelity (G1) showed, on average, the highest level of PG and its subdimensions over the whole observational period, whereas men who cited spousal infidelity (G4) showed the lowest level of PG, particularly in the middle and long run after marital separation (see **Figure M3.3**; significant differences between G1 vs. G4 are marked with gray dashed double-headed arrows). Our results further revealed that men who reported spousal infidelity (G3) compared to women who reported spousal infidelity (G1), showed significantly lower levels of PG (between Years 0-6), particularly because of their lower levels of personal strength (between Years 0-10), and less spiritual change in the short run (between Years 0-4; see gray solid double-headed arrows for G1 vs. G3). The differences between women who did not report spousal infidelity (G2) and those who cited spousal infidelity (G1) were not significant. Appreciation of life, with a small exception for G1 vs. G4, was the only subdimension of PG with similar levels of PG across all four groups over time.

3.7 Discussion

Understanding why adults in their second half of life decide to split up may be informative about how they cope with marital dissolution subsequently (e.g., Hall & Fincham 2005; Määttä 2011). This is why our study examined how post-divorce trajectories of PG varied by gender and reasons for marital dissolution among Swiss divorcées.

The vast majority of self-reported reasons that respondents indicated to have led to marital dissolution were in line with previous findings that identified two predominant clusters of reasons (Amato & Previti 2003; Hawkins, Willoughby & Doherty 2012; Strizzi et al. 2020). These were the spouses' sexual and emotional infidelity and other reasons related to the marital quality (e.g., communication problems or incompatibility). The sizable share of respondents reporting spousal infidelity in our sample is at odds with findings by de Graaf and Kalmijn (2006) that suggested reasons related to more conflictual behaviors, such as infidelity, to be less prevalent compared to lower-level complaints about the marital quality among more recent cohorts of divorcées. Other qualitative studies also found that midlife and gray divorcées often cited lower-level complaints about the marital quality, such as having grown apart (Crowley 2019b; Rokach, Cohen & Dreman 2004). Yet the clear gender divide we observed in the share of men and women who reported spousal infidelity as a reason for marital dissolution is widely supported by previous research (e.g., Gravningen et al. 2017; Montenegro 2004; Strizzi et al. 2020). Relatedly, rates of infidelity have shown the largest increase among cohorts of older men, arguably because of the extended time period spared from severe health impairments in later life, as well as the spread and availability of treatments for erectile dysfunction (Fincham & May 2017).

Weathering a stressful transition has been shown to trigger self-perceived positive changes and a renewed outlook on life for some individuals, which is described as PG (Tedeschi & Calhoun 2004). We observed PG following marital dissolution in our sample of midlife and older Swiss adults as well. However, our results revealed that the levels of PG and its subdimensions were rather constant and showed little systematic change in the trajectories over time. With regard to our first hypothesis, we observed that women consistently reported higher levels on the overall PG score, personal strength, and spiritual change in the short run, compared to men. Moreover, respondents who reported marital dissolution due to spousal infidelity generally showed higher levels of overall PG, appreciation of life, and spiritual change, especially in the middle and long run, which partially supported our second hypothesis. The associations between PG and the two main reasons for marital dissolution (i.e., infidelity vs. other reasons related to the marital quality) were also in line with the crisis-growth pathway of PG (Tashiro, Frazier & Berman 2006) and findings from qualitative studies on positive byproducts of midlife and gray divorce. These showed that leaving a more troubled marriage triggered feelings of relief and independence (e.g., Määttä 2011). Lastly and partly in support of our third hypothesis, women who experienced spousal infidelity reported, on average, the highest values of PG, particularly on personal strength over time. However, they did not differ significantly from women who did not report spousal infidelity, but they differed significantly in personal strength and spirituality from men who experienced spousal infidelity. Men reporting marital dissolution due to reasons other than spousal infidelity, in contrast, showed significantly lower levels of PG compared to women reporting spousal infidelity.

There are multiple explanations why women, and particularly those reporting spousal infidelity as a reason for marital dissolution, seem to be able to draw some psychological benefit from these experiences. In line with the stress-relief pathway (Tashiro, Frazier & Berman 2006), women may develop more PG because they have been found to evaluate romantic relationships more critically (Amato & Previti 2003) and are more likely to initiate divorces compared to men (Montenegro 2004; Perrig-Chiello, Knöpfli & Gloor 2013; Rokach, Cohen & Dreman 2004). Changes in the Swiss divorce law that aimed at reducing economic disparities between ex-spouses (Schwenzer 2011), which can arise because Swiss women tend to reduce their time in paid labor in order to fulfill childcare-related tasks (Le Goff & Levy 2017), are further likely to have enabled women to leave troubled marriages later-on (Killewald 2016). It could therefore be the case that women as the decision-makers to actively end a long-term marriage—regardless of the reasons for marital dissolution—may feel empowered, which can boost the development of PG subsequently (Tashiro, Frazier & Berman 2006; Sakraida 2005).

Furthermore, Jensen and Bowen (2015) found that respondents' adult children were more likely to be supportive toward their parents if the parental divorce was because of conflictual or problematic behaviors of the other parent, such as some form of abuse. This could, in turn, boost women's levels of PG because women are more likely to report these problematic behaviors of their

spouses as the reason for marital dissolution (Gravningen et al. 2017; Rokach, Cohen & Dreman 2004). Other kin, friends, and acquaintances may also be more likely to side with the spouse who is perceived to have contributed less to the end of a marriage, as well as with those who cite more socially acceptable reasons for marital dissolution (Diefenbach et al. 2007). It is also possible that women are generally more resilient in coping with marital dissolution because they tend to cultivate stronger social ties and larger networks independently of their marriages compared to men (e.g., Dykstra & Fokkema 2007). These networks could then serve as social support in times of emotional strain. This explanation is supported by our observation that the share of women, compared to men, receiving help to cope with the marital breakup is higher for both reasons of marital dissolution. Receiving social support when coping with adversity in life has further been linked to higher levels of PG (Lee et al. 2018; Recksiedler et al. 2018).

3.8 Limitations and Conclusion

Our study has several limitations. First, our results revealed rather flat trajectories of PG with little systematic change over time. This could be the case because we started to observe the majority of respondents two years after the separation, which may indicate that the initial and potentially critical period for increases in PG may already have faded. For instance, Lin and colleagues (2019) found that recovery from gray divorce to pre-loss levels in depressive symptoms took about four years, which could explain the rather high and stable levels of PG and most of its subdimensions at the beginning of the observation period and over time. Because PG is by definition triggered by a critical life event and can therefore not be developed or observed before the onset of this event, our data do not include any pre-separation measurement of PG and possible anticipation effects (e.g., Tosi & van den Broek 2020) in the development of PG cannot be tested. We did also not examine other aspects that could be related to the development of PG and individuals' adaptation to divorce (i.e., personality traits; Jayawickreme et al. 2021; Sodermans et al. 2017) because these factors were beyond the scope of our study. However, linking personality traits and related factors, such as interpersonal relationship dynamics (Carr 2004), to both positive and negative consequences of later-life marital dissolution represent promising avenues for future research.

Lastly, potential retrospective recall biases concerning the ratings of PG cannot be entirely ruled out (Jayawickreme & Infurna 2021). Second, the factorial structure of PG showed three rather than five subdimensions for our sample (cf. Cann et al. 2010). This finding is in line with prior research that yielded a three-factor solution for PG consisting of the subdimensions appreciation of life, personal strength, and spiritual change for late-life widowers in Switzerland (Recksiedler et al. 2018). It seems to be the case that in some contexts, certain subdimensions of PG may not be as relevant. It is also possible that certain subdimensions of PG, such as new possibilities, are of less significance among older compared to younger age groups because previous studies on PG often used college-aged

convenience samples (e.g., Samios, Henson & Simpson 2014). Future studies should further validate the factorial structure of PG for different contexts and subpopulations rather than treating it as a universally applicable construct.

Despite these limitations, our study contributes to the still relatively sparse literature on more positive outcomes of midlife and gray divorce in Europe using rich panel data and suitable longitudinal analytic methods. Our results indicated that the most commonly cited reasons for marital dissolution across all age groups were also highly salient among our sample of Swiss adults in their second half of life. Women, who reported spousal infidelity more frequently compared to men, also consistently showed higher levels of PG compared to men—particularly when they were affected by spousal infidelity. These gendered patterns in the adjustment to marital dissolution seem to indicate that women cope differently than men in light of separation and divorce, which could be related to their ability to build stronger networks across the life course that serve as social support in times of emotional strain. Future studies should examine data from both ex-spouses to get a better understanding of partner dynamics in the adjustment to marital dissolution and to have perceptions from multiple, potentially contradicting perspectives, which would be in line with a linked-lives perspective (e.g., Carr 2018).

Appendix M3.A

Content:

Additional information on the sample selection and measurement invariance:

- **Table M3.A1:** EFA Results Probing the Dimensional Invariance of PG
- **Table M3.A2:** Measurement (Metric) Invariance of Personal Growth Across Waves
- **Figure M3.A1:** Flowchart of the Analytical Sample Selection Process

Additional information on descriptive and regression results:

- Results: Descriptive Results Concerning the Distribution of Reasons for Marital Dissolution
- **Table M3.A3:** Percentage Distribution of Reasons for Marital Dissolution by Gender
- **Table M3.A4:** Sample Composition Stratified by Gender and by Spousal Infidelity Across All Respondents (N=575) and Observations Over Time (N=1,408)
- **Table M3.A5:** Number of Respondents at Each Measurement Time Point
- **Figure M3.A2:** Time Point-Specific Tests of Pairwise Mean Differences of PG and Its Subdimensions Following Marital Dissolution: Average Marginal Effects With 95% CIs for the Gender-Specific Difference: Women vs. Men
- **Figure M3.A3:** Time Point-Specific Tests of Pairwise Mean Differences of PG and Its Subdimensions Following Marital Dissolution: Average Marginal Effects With 95% CIs for the Reason-Specific Difference: Spousal Infidelity vs. No Spousal Infidelity

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Cann, Arnie, Calhoun Lawrence G., Tedeschi, Richard G., Taku, Kanako, Vishnevsky, Tanya, Triplett, Kelli N., & Danhauer, Suzanne C. (2010). A short form of the Posttraumatic Growth Inventory. *Anxiety, Stress, & Coping*, 23 (2): 127-137.

Table M3.A1: EFA Results Probing the Dimensional Invariance of PG

Items	Factor 1 Appreciation of life	Factor 2 Personal strength	Factor 3 Spiritual change	Factor 4 New possibilities	Factor 5 Relating to others
New perspectives on priorities	t1, t2, t3				
New sense of importance of life	t1, t2, t3				
Greater understanding of spirituality			t1, t2, t3		
Stronger religious/ spiritual beliefs			t1, t2, t3		
I know I can deal with difficulties		t1, t2, t3			
I am stronger than I thought		t1, t2, t3			
I'm doing more with my life.	t1			t2, t3	
I've taken a new path in my life.					
I developed a sense of connectedness with others.					t1, t2, t3
I learned a lot about how good people are.		t3			t2

Notes: Only substantial factor loadings greater than 0.5 are presented; t1 corresponds to Wave 1, t2 and t3 to Waves 2 and 3, respectively. Blue areas indicate the factorial structure of the original PTGI scale by Cann et al. (2010).

Table M3.A2: Measurement Invariance of Personal Growth Across Waves

Items	Factor 1 Appreciation of life	Factor 2 Personal strength	Factor 3 Spiritual change
New perspectives on priorities	0.83 (t1) 0.86 (t2) 0.83 (t3)		
New sense of importance of life	0.91 (t1) 0.93 (t2) 0.91 (t3)		
Greater understanding of spirituality			0.96 (t1) 0.98 (t2) 0.97 (t3)
Stronger religious or spiritual beliefs			0.90 (t1) 0.94 (t2) 0.92 (t3)
I know I can deal with difficulties		0.89 (t1) 0.91 (t2) 0.91 (t3)	
I am stronger than I thought		0.85 (t1) 0.87 (t2) 0.86 (t3)	
Configural model: Chi-square value = 42.43 (df=18), RMSEA = 0.053, CFI = 0.999, TLI = 0.997			
Metric invariance model: Chi-square value = 38.38 (df=24) RMSEA = 0.035, CFI = 0.999, TLI = 0.999			
Chi-square test for difference testing (metric invariance): Chi-square value = 3.43 (df=6), p-value = 0.754			

Notes. CFA for ordinal items indicating factorial invariance with item factor loadings constrained to be equal across waves, factor variances free in the metric invariance model; oblimin rotation, standardized model results. All R-squared values for the observed variables were greater than 0.70 (with the lowest R-squared of 0.70 for "new perspectives on priorities" and the highest of 0.95 for "greater understanding of spirituality"); N = 575.

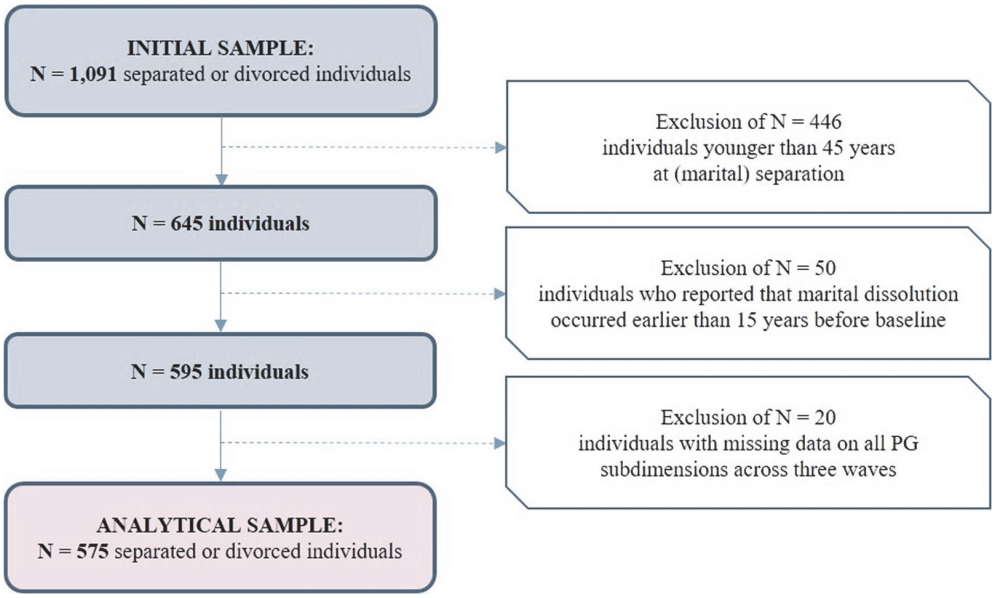


Figure M3.A1: Flowchart of the Analytical Sample Selection Process

Descriptive Results Concerning the Distribution of Reasons for Marital Dissolution

Regarding the distribution of reasons for marital dissolution by gender, women reported both the sexual and emotional infidelity of their ex-spouse, communication problems in the marriage, and their own health issues more frequently than men (see **Table M3.A3**). The most frequently mentioned reasons by both genders were alienation (62.5% of women and 73.4% of men), followed by communication problems (62.0% of women and 48.3% of men), and incompatibility (48.2% of women and 52.3% of men). The relatively low percentage of respondents citing their own infidelity as reason for marital dissolution could be a sign of social desirability bias in the response to those more sensitive questions.

Table M3.A3: Distribution of Reasons for Marital Dissolution by Gender

	Women (*N* = 357)	Men (*N* = 218)
Reasons for marital dissolution, %		
Sexual infidelity of ex-spouse	41.2	19.3
Ex-spouse fell in love with another person	41.2	30.3
My sexual infidelity	3.9	9.6
I fell in love with another person	9.2	14.7
Alienation	62.5	73.4
Incompatibility	48.2	52.3
Communication problems	62.0	48.3
Ex-spouse's health problems	13.5	11.9
Own health: physical or mental	11.4	5.1
Financial causes	8.8	10.7
Occupational causes	6.8	9.0

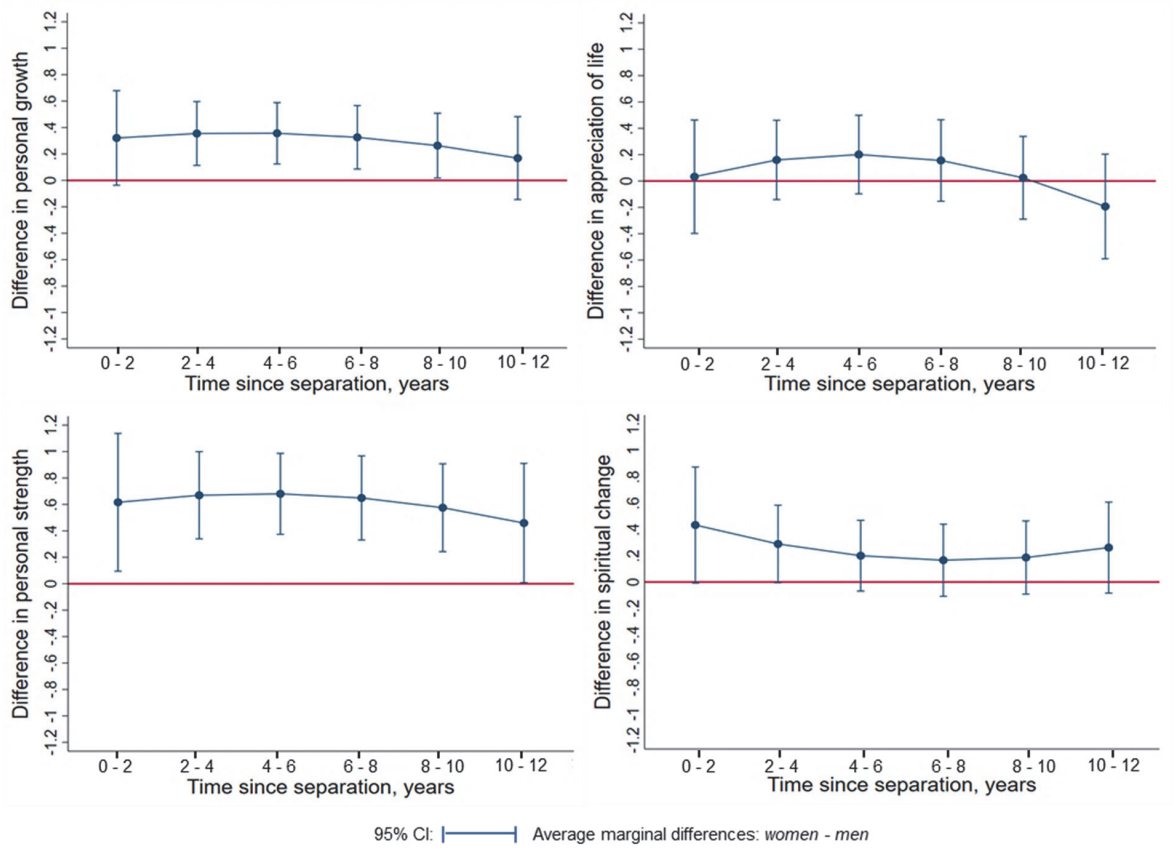
Table M3.A4: Sample Composition Stratified by Gender and by Spousal Infidelity Across All Respondents (N=575) and Observations (N=1,408)

Group-specific indicators	Gender		Reason for Marital Dissolution		Overall
	Women	Men	Spousal infidelity	No spousal infidelity	
Number of respondents	*N* = 357	*N* = 218	*N* = 274	*N* = 301	*N* = 575
Number of observations	894	514	696	712	1,408
Dependent variables					
Personal growth [a], *M* (*SD*)	2.45 (1.26)	1.92 (1.28)	2.44 (1.26)	2.08 (1.30)	2.26 (1.29)
	$diff = 0.50^{***}$		$diff = 0.36^{***}$		
Appreciation of life	2.99 (1.57)	2.62 (1.64)	3.01 (1.51)	2.70 (1.68)	2.85 (1.60)
	$diff = 0.33^{**}$		$diff = 0.34^{**}$		
Personal strength	3.05 (1.63)	2.24 (1.73)	2.95 (1.61)	2.56 (1.79)	2.75 (1.72)
	$diff = 0.76^{***}$		$diff = 0.39^{**}$		
Spiritual change	1.25 (1.58)	0.84 (1.36)	1.28 (0.06)	0.92 (0.05)	1.10 (1.52)
	$diff = 0.40^{***}$		$diff = 0.36^{**}$		
Explanatory variables					
Age, *M* (*SD*)	57.65 (6.14)	59.91 (6.71)	57.96 (6.39)	58.98 (6.45)	58.48 (6.44)
Age at separation, %					
45 up to 50 years	44.0	33.9	41.6	38.9	40.2
50 up to 55 years	29.1	33.0	29.2	31.9	30.6
55 up to 60 years	16.5	17.9	17.2	16.9	17.0
60 and more	10.4	15.2	12.0	12.3	12.2
Duration of being separated in years, *M (SD)*	5.80 (3.47)	6.54 (3.44)	5.72 (3.34)	6.41 (3.57)	6.07 (3.48)
Duration of being separated at Wave 1, %					
0 up to 2 years	32.5	21.6	32.1	24.9	28.3
2 up to 4 years	19.0	16.5	19.0	17.3	18.1
4 up to 6 years	19.6	18.8	20.8	17.9	19.3
6 up to 8 years	13.5	22.0	15.3	18.0	16.7
8 years and more	15.4	21.1	12.8	21.9	17.6
Marital happiness before separation [b], *M* (*SD*)	4.81 (1.98)	5.43 (2.00)	5.31 (2.00)	4.81 (1.98)	5.05 (2.01)
Higher-order marriage, %	8.4	9.6	7.3	10.3	9.7
Expectedness of loss, %					
Expected	29.7	28.4	16.1	41.2	29.2
Not completely	36.7	44.5	35.0	43.8	39.7
Unexpected	33.6	27.1	48.9	15.0	31.1
Initiator of divorce, %					
Ex-spouse	26.6	22.0	29.6	20.6	24.9
Both	26.3	46.3	29.6	37.8	33.9
Me	32.5	22.9	29.2	28.6	28.9
Not divorced yet	14.6	8.7	11.7	13.0	12.3
Common children, %	86.6	83.0	85.8	84.7	85.2
(Ever) received help, %	90.2	75.7	87.2	82.4	84.7
(Ever) overcame loss, %	73.7	81.6	67.9	84.7	76.7
(Ever) repartnered, %	37.0	62.4	39.4	53.2	46.6
Education, %					
Primary	7.6	3.2	5.5	6.3	5.9
Secondary	54.6	37.6	53.6	43.2	48.2
Tertiary	37.8	59.2	40.9	50.5	45.9
Financial situation, %					
Not enough money	13.8	13.6	13.2	14.2	13.7
Enough money	74.9	70.6	74.0	72.7	73.4
More than enough money	11.3	15.8	12.8	13.1	12.9
Health, %					
Bad	4.8	3.7	5.5	3.4	4.4
So-so	21.5	17.9	19.8	20.5	20.2
Good	46.5	51.8	48.4	48.4	48.4
Very good	27.2	26.7	26.3	27.7	27.0

Notes: Values are presented as mean (M) and standard deviation (SD). [a] Higher values indicate more growth; range of values: 0-5. [b] Higher values indicate better relationship quality; range of values: 0-9. *p < .05. **p < .01. ***p < .001.

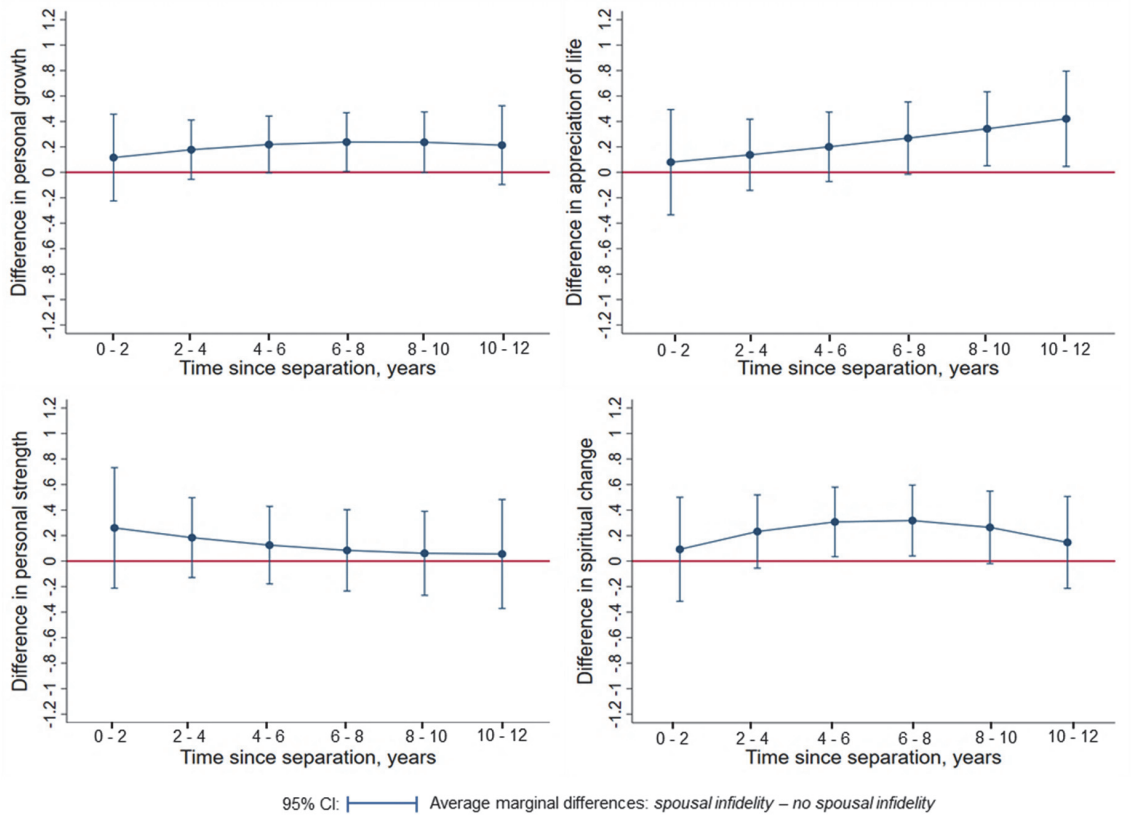
Table M3.A5: Number of Respondents at Each Measurement Time Point

	Infidelity of spouse		No infidelity of spouse	
Years since marital separation	Women	Men	Women	Men
0 up to 2 (coded 1)	76	16	46	31
2 up to 4 (coded 3)	110	34	69	53
4 up to 6 (coded 5)	123	40	88	67
6 up to 8 (coded 7)	92	50	79	66
8 up to 10 (coded 8)	62	32	63	60
10 up to 12 (coded 11)	44	17	42	48



Notes. Predictive margins with 95% confidence bands for time-point specific group differences. The standard errors were estimated using the delta method dx/dy and refer to time point-specific tests of pairwise mean differences of PG and its subdimensions across gender following marital dissolution. The red reference line is a threshold for significant differences at 95% level of confidence. The 2-year intervals are left-closed (i.e., 0 up to 2 years, 2 up to 4 years, (...), 10 up to 12 years)

Figure M3.A2: Time Point-Specific Tests of Pairwise Mean Differences of PG and Its Subdimensions Following Marital Dissolution: Average Marginal Effects With 95% CIs for the Gender-Specific Difference: Women vs. Men



Notes. Predictive margins with 95% confidence bands for time-point specific group differences. The standard errors were estimated using the delta method dx/dy and refer to time point-specific tests of pairwise mean differences of PG and its subdimensions across infidelity following marital dissolution. The red reference line is a threshold for significant differences at 95% level of confidence. The 2-year intervals are left-closed (i.e., 0 up to 2 years, 2 up to 4 years, (...), 10 up to 12 years)

Figure M3.A3: Time Point-Specific Tests of Pairwise Mean Differences of PG and Its Subdimensions Following Marital Dissolution: Average Marginal Effects With 95% CIs for the Reason-Specific Difference: Spousal Infidelity vs. No Spousal Infidelity

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Manuskript 4: Social Dimensions of Personal Growth Following Widowhood: A Three-Wave Study[1]

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Abstract

Background: Losing one's spouse is one of the most stressful life events in old age, yet research on positive consequences of overcoming critical life events describes experiences of personal growth for survivors. Objective: Because prior studies conceptualized personal growth as a stable accomplishment of an individual, our study challenges this assumption by examining trajectories of personal growth and its links to two aspects of social support. We assume that personal growth is boosted by heightened levels of loss-related social support seeking during early years of widowhood. However, toward the later stages in the bereavement process, we expect personal growth to be fostered by perceived social embeddedness. Data and Method: Data stem from a survey on relationships in later life conducted in 2012, 2014, and 2016 in Switzerland. The final analytical sample consisted of 508 individuals aged 50+ years, who were on average 73 years old and widowed for about 3 years at baseline. Longitudinal exploratory factor analyses yielded a 3-factorial solution for personal growth. Random-effects group-specific growth curves were used to examine the trajectories of personal growth and its subdimensions, by different levels of loss-related social support seeking and embeddedness in a supportive network, over the first 8 years of widowhood. Our analyses included time-invariant and time-varying covariates. Results: On average, our findings point to a stable trajectory of personal growth after having become widowed in later life. Group-specific analyses, however, showed different courses in the trajectories for specific subdimensions of personal growth—particularly for spiritual change and appreciation of life. Average marginal effects also yielded group differences by loss-related support seeking in the level of personal growth over time, which highlights the importance of social support seeking rather than social embeddedness, at all stages of the bereavement process. Conclusion: Findings underline the importance of a longitudinal and linked-lives perspective on personal growth and point to different pathways regarding its various subdimensions. Future research should further examine the validity of personal growth scales for other populations and consider the possibility to experience personal growth already during the anticipation of a traumatic event (e.g., in the case of long-term caretaking).

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4.1 Introduction

Losing one's spouse is one of the most stressful life events, which has been linked to detrimental effects on physical and mental health for the spouse that is left behind (Bennett & Soulsby 2012; Zivin & Christakis 2007). Yet, potential positive consequences following widowhood are understudied. For some individuals, the redefinition of identity and the adaptation to the new social role as widow(er) may lead to considerable gains in one's reorientation in life and a stimulation of personal development. This has been captured in the concept of personal growth (PG) or related constructs such as benefit finding, posttraumatic growth, or meaning making (Helgeson, Reynolds & Tomich 2006; Stanton, Bower & Low 2006). At their core, all of these constructs operationalize PG as an individual achievement due to the critical life event, which is linked to successful coping and well-being during and after the event (Studley & Chung 2015).

Prior studies have focused on individuals' characteristics and circumstances of a critical life event involved in the development of PG (Armstrong & Shakespeare-Finch 2011; Tashiro & Frazier 2003; Zoellner & Maercker 2006). The factors contributing to PG on the contextual level, such as the availability of social support, and how this relationship develops over time, are less clear. Because being embedded in a supportive social network is an essential element of psychological adaptation to spousal bereavement (Bookwala, Marshall & Manning 2014; Hollstein 2002; Li 2007), our study aims to integrate social dimensions in the understanding of PG after spousal loss from a longitudinal perspective. Specifically, we examine how trajectories of PG vary by social support seeking and perceived social embeddedness among a sample of widowed individuals aged 50 years and older.

4.2 Spousal Bereavement as Critical Life Event

Spousal loss is one of the most stressful life events throughout the life course due to the loss of companionship, intimacy, and daily routines (Zivin & Christakis 2007; Hollstein 2002; Utz et al. 2004). Subsequently, experiencing widowhood takes a toll on the physical health, emotional well-being, social integration, and the survivor's financial situation (Bennett & Soulsby 2012; Zivin & Christakis 2007; Hollstein 2002; Stevens, Martina & Westerhof 2006). Nonetheless, the majority of bereaved individuals successfully adapt to spousal loss, and only a minor group suffers from enduring psychological impairment (Spahni et al. 2015; Mancini, Bonanno & Clark 2011). The effects of becoming widowed, however, are not uniform across sociodemographic subgroups. For instance, the fact that widowhood is a more normative life event for older women (Martin 2011), combined with the fact that they tend to cultivate stronger social ties, may explain that women seem better equipped to face this transition than men (Settersten & Trauten 2009).

Social ties have proven to be a safety net of support in the adaptation to the new role as a widow(er) (Cheng & Chan 2006) and may ease the adaptation to the transition (Li 2007; Rossi, Bisconti

& Bergeman 2007). Even though networks are able to compensate the loss of a spouse to some degree with regard to emotional and instrumental support (Hollstein 2002), the intimacy felt within a long-term marriage cannot be substituted (Zettel & Rook 2004). Thus, the unique characteristics of the respective marital relationship and the circumstances surrounding the loss, such as the expectancy of the loss in case of long-term caretaking (Infurna et al. 2016) or prior relationship quality (Spahni et al. 2015), may influence individuals' adaptation to this new role.

4.3 The Concept of PG

Despite the long list of negative effects associated with spousal bereavement, there are also incidences of positive adjustment that transcend the normative recovery process (Helgeson, Reynolds & Tomich 2006; Zoellner & Maercker 2006). Terms and definitions may vary across authors and disciplines (e.g., benefit finding, posttraumatic growth, or meaning making) (Stanton, Bower & Low 2006; Armstrong & Shakespeare-Finch 2011), yet the core concept of PG describes self-perceived positive changes related to struggling with a critical life event or a trauma. According to Tedeschi and Calhoun (Tedeschi & Calhoun 2004), PG comprises five subdimensions: changes in individuals' self-perception ("personal strengths"), philosophy of life ("appreciation of life"), improvements in personal relationships ("relating to others"), future outlook ("new possibilities"), and increased spirituality ("spiritual change").

Several predictors of PG have been identified in the literature including individual characteristics such as gender and personality (Tashiro & Frazier 2003) or the severity, type, and expectedness of the critical life event (Armstrong & Shakespeare-Finch 2011; Currier, Holland & Neimeyer 2012; Caserta et al. 2009). More specifically, age and gender differences emerged for changes in subdomains of PG following the onset of an illness (Barskova & Oesterreich 2009). Women seemed to report more growth on the factors "appreciation of life" and "spiritual change" compared to men, whereas younger respondents scored higher on "new possibilities" in contrast to older patients. Some studies investigating PG following cancer found that higher levels of education and income were related to higher levels of growth; however, findings have been inconsistent so far (Bower et al. 2008). Lastly, there has been some evidence for a positive link between higher levels of growth and a range of patients' physical health outcomes, such as a more favorable disease progression. On the contrary, it is possible that more advanced stages of a disease can hinder the search for meaning, especially in domains of PG that concern future orientation.

Some scholars conceptualize PG as a process of coping with a difficult transition (Studley & Chung 2015), whereas others see it as an outcome of dealing with a critical life event or both (Tedeschi & Calhoun 2004). Most studies examining PG have adopted a cross-sectional study design or followed participants over a relatively short time span after the event. It is therefore unclear if levels of perceived PG during and after the event continue to increase, remain stable, or decrease over

time. Across studies, results seem to suggest that the more severe the trauma is perceived, the higher the potential for PG seems to be (Armstrong & Shakespeare-Finch 2011). Currier, Holland, and Neimeyer (2012), however, reported a curvilinear relationship between the strength of prolonged grief symptoms and PG, indicating that participants with intermediate grief symptoms were most likely to experience the highest levels of PG 2 years after the event.

4.4 Widowhood, PG, and Social Support

Prior research has shown that having a strong interpersonal support network is an essential protective factor in coping with bereavement (Bookwala, Marshall & Manning 2014; Li 2007; Stevens, Martina & Westerhof 2006). The amount of social support following widowhood, however, seems to follow a clear progression over time. Guiaux, van Tilburg, and Broese van Groenou (2007) reported that bereaved individuals received strong support in the early phases of the transition. Yet, after 2–3 years of widowhood, individuals' social support networks shrunk to their pre-loss size. Furthermore, the death of a spouse is often associated with significant changes in the surviving spouses' friendships and social ties, which may result in reduced social networks and contacts (Bennett & Soulsby 2012). Hollstein (2002) showed that widowers who proactively expand and enrich their social networks through the engagement in novel activities and contacts reported higher levels of life satisfaction. Relatedly, Bookwala et al. (2014) showed that widowers who had access to a friend as a confidante, to discuss private concerns, suffered less from depressive symptoms and displayed better physical health—comparable to those of continuously married individuals. The ability to mobilize new and existing social ties could, in turn, enhance the emergence of PG.

In a systematic review on bereavement and PG, Michael and Cooper (2013) identified social support and demographic characteristics (e.g., gender) as moderators of PG. Particularly, social support is considered an important factor associated with PG, but results are mixed (Bower et al. 2008; Schaefer & Moos 1998; Prati & Pietrantoni 2009; Park, Cohen & Murch 1996), Certain types and aspects of support, such as emotional support and support satisfaction, seem to be more relevant for PG than others (Park, Cohen & Murch 1996). A meta-analysis by Prati and Pietrantoni (2009) found further that both social support and social support seeking contribute to the development of PG independently, yet potentially at different phases of the process. The underlying processes and the relationship between support seeking, social support, and PG, however, are complex and understudied. Evidence on the effects of gender on PG is also mixed. While some studies found that female respondents reported more growth (Helgeson, Reynolds & Tomich 2006), others suggested the contrary or no differences (Caserta et al. 2009; Milam, Ritt-Olson & Unger 2004; Polatinsky & Esprey 2000). This study aims to address the research gaps concerning the scarce empirical evidence on long-term trajectories of PG among older individuals experiencing spousal bereavement, and the lack of studies accounting for group-specific trajectories by social support and embeddedness.

4.5 The Present Study

This study contributes to prior research on spousal bereavement and PG in later life in two ways. First, in contrast to the majority of prior empirical studies, we examine longitudinal trajectories of PG and its subdimensions up to 8 years after the loss. Based on existing research, we expect that PG increases significantly during the early years of the bereavement process and then starts to decrease slowly (**Hypothesis 1**). Second, we link PG to two aspects of social support—loss-related support seeking and perceived social embeddedness—that are expected to impact PG differently over time. We expect that actively seeking loss-related support within the social network impacts PG positively, especially at early stages of the grief process. In the first years after the event, individuals need help to cognitively work through the event and to rearrange their lives. Hence, seeking for loss-related support aiming at overcoming the immediate consequences of the loss should contribute to PG. We, therefore, hypothesize that PG is only temporarily boosted by different levels of loss-related support seeking (**Hypothesis 2a**). In the subsequent waves, loss-related support seeking should become less relevant with regard to PG. In turn, a general sense of social embeddedness, as the perceived extent of potentially available social support, is thought to provide persons with possibilities to maintain the perceptions of positive changes and meaning in the long term. Hence, PG should then be influenced by different levels of social embeddedness into personal relationships, such as family ties, friendships, and acquaintances (**Hypothesis 2b**).

4.6 Method

4.6.1 Data and Sample

Data were derived from a longitudinal survey conducted in 2012, 2014, and 2016 (n = 2,857), which aimed at gaining insights into intimate relationships and marital dissolution or loss in middle and old age in Switzerland. Participants were recruited using a random sample stratified by age, gender, and marital status supplied by the Swiss Federal Office of Statistics. In this study, we focused on the subsample of bereaved participants (n = 633).

Out of this sample, we selected individuals aged 50 years or older, who were widowed for no longer than 8 years at Wave 1 of the survey and who lost their spouse after a marriage of 15 years and longer. The 517 widowers had experienced the loss of their spouse before 2012 (n = 492) or entered the survey in 2012 as a long-term married participant and experienced spousal loss in between subsequent waves (n = 25). Nine participants were excluded because of missing values on repartnering status and their perception of whether they had overcome the loss already in all three waves. The final sample consisted of 508 participants.

4.6.2 Measures

4.6.2.1 Dependent Variables

PG was assessed with the short form of the Posttraumatic Growth Inventory (PTGI), consisting of 10 items loading on five factors relating to others, new possibilities, personal strengths, appreciation of life, and spiritual change (two items each) (Cann et al. 2010). Participants were instructed as follows: "These questions assess whether certain things in your life changed due to the loss" (see **Table M4.1** for items wording). Answers were given on a 6-point scale (0 = not due to the loss I experienced, to 5 = to a very high degree due to the loss I experienced).

Table M4.1: Longitudinal Factor Structure of Personal Growth

Items	Factor 1 Appreciation of life	Factor 2 Personal strength	Factor 3 Spiritual change
New perspectives on priorities	**0.79**	0.02	0.01
New sense of importance of life	**0.92**	0.00	0.01
Greater understanding of spirituality	0.06	-0.06	**0.97**
Stronger spiritual beliefs	-0.05	0.09	**0.90**
I know I can deal with difficulties	0.10	**0.77**	-0.04
I am stronger than I thought	-0.03	**0.90**	0.04

Note: Bold face indicates factor loadings of the respective factor.

Because the PTGI scale was validated for a US population, we verified the factorial structure of PG for the current sample using longitudinal exploratory factor analyses (EFA) in Mplus (Version 7.4). In all EFA models, we clustered by the person identifier (ID), specified oblimin rotation, and used a full information maximum likelihood estimator (FIML). The results yielded three, rather than five, subdimensions of PG: appreciation of life, personal strength, and spiritual change (**Table M4.1**). We removed the items of the unfitting subdimensions relating to others and new possibilities from our analyses and computed an overall mean score with the remaining six items, as well as mean scores for each subdimension of PG (see Cronbach's alpha for each subdimension in **Table M4.2**). We used all four mean scores ranging from 0 to 5 as continuous dependent variables in our subsequent analyses.

4.6.2.2 Grouping Variables

Because we were interested in group-specific differences in trajectories of PG and its subdimensions, we constructed distinct groups for two specific types of social support—loss-related support seeking and social embeddedness—that did not overlap and remained fairly stable over time.

Loss-related support seeking was assessed by asking the respondents "What did you do (over the last 2 years) to cope with the new situation after the loss of your partner?". Participants could choose one or multiple of the following answers: "I tried to cope alone", "I sought support and comfort from the family", "I sought support and comfort from friends and acquaintances", "I sought

support and comfort through spiritual guidance", or "I sought professional help (e.g., doctor or psychologist)". Based on the distinction between social versus solitary coping (Skinner et al. 2003), we grouped the participants into three distinct categories of social support, namely: coped alone at all stages of the bereavement process (Group 0; n = 102); network support seeking (either family, friends, professional help including spiritual guidance, or all of those) at all stages of the bereavement process (Group 1; n = 117); and mixed support seeking (both coped alone and sought support within the social networks) at all stages of the bereavement process (Group 2; n = 289).

A general sense of social embeddedness was measured using the 3-item social loneliness subscale from the De Jong Gierveld Loneliness Scale. The scale assesses individuals' evaluation of their social participation (or the lack thereof), which captures the degree to which respondents have a broader supportive network available that they can utilize and engage with (Gierveld & Van Tilburg 2006). The items were worded as follows: "There are enough people on whom I can rely in case of problems", "I know many people whom I can depend on", and "There are plenty of people with whom I feel closely connected". Answers were given on a 5-point Likert scale (0 = no, 1 = rather no, 2 = more or less, 3 = rather yes, 4 = yes) with more than 75% saying "yes" or "rather yes" at all waves. Because there was only little variation in individuals' perception of social embeddedness over time, we computed mean scores over all three waves and used a median split (at 3.33) to classify the respondents into 2 distinct groups with either strong (n = 248) or weak social embeddedness (n = 260).

4.6.2.3 Time-Invariant and Time-Varying Covariates

Our analyses accounted for time-invariant covariates at event entry: age at widowhood (two indicators: metric, and two groups: 0 = younger than 75 years [young-old adults], 1 = 75+ years [old-old adults]), gender (0 = male, 1 = female), marital satisfaction (0 = very unhappy, to 9 = very happy), expectedness of the loss (0 = expected, 1 = unexpected), educational attainment (0 = primary education, 1 = secondary education, 2 = tertiary education). We also included time-varying covariates: linear age, financial situation (0 = not enough money to support myself, 1 = enough money to support myself, 2 = more than enough money to support myself), self-rated health (0 = very bad/bad, 1 = so-so, 2 = good, 3 = very good), repartnering (0 = single, 1 = repartnered), and current grief (0 = I am still coping with the loss, 1 = I mentally overcame the loss).

4.6.2.4 Longitudinal Character of the Data

The dropout rate between Wave 1 (2012) and Wave 2 (2014) was 14.9% and 18.5% between Wave 2 (2014) and Wave 3 (2016). We ran logistic regressions to test whether our panel data were affected by attrition bias. There were no significant differences between drop-outs and participants of the three waves with regard to all subdimensions of PG, gender, self-rated health, financial situation, education, marital satisfaction before the loss, and whether one has overcome the loss or not. In contrast, compared to baseline, older respondents (OR = 1.05, $p < 0.001$) and those who were widowed

for a longer period (OR = 1.03, $p < 0.001$) were more likely to drop out from the sample. There was also an attrition bias with regard to coping strategies. Respondents who coped alone and those who coped with their network were more likely to drop out from the sample than those who coped both alone and with their network (OR = 1.93, $p < 0.05$, and OR = 3.26, $p < 0.001$, respectively).

The amount of valid values of PG and its subdimensions ranged from 428 to 448 in Wave 1, from 373 to 384 in Wave 2, and from 285 to 294 in Wave 3, with the lowest response rate for spiritual change. Because both the exact date of partner loss and the interview date were available in the data, we created the event time variable (widowhood duration) on a monthly basis first and then converted it to years following widowhood to ease interpretation. Our final dataset was in long format and consisted of 1,119 observations (unbalanced panel with a maximum of three observations per person) that were distributed as follows over time: 5% in the first widowhood year (up to 12 months), 5% in the second year (13–24 months), 17% in the third year (25–36 months), 16% in the fourth year (37–48 months), 22% in the fifth year (49–60 months), 13% in the sixth year (61–72 months), 14% in the seventh year (73–84 months), and 7% in the eighth year (85–96 months). Because we had fewer observations for the first 2 years as well as for the eighth year after the event, we advise caution while interpreting the results at the very beginning and the very end of the observed period. We highlighted this fact in our plots by adding two reference lines at Years 2 and 7.

4.6.3 Analytical Plan

We used group-specific growth curve models to examine trajectories of PG over time by support seeking and embeddedness and to assess group differences in the level of PG at all stages of the bereavement process (Singer & Willett 2003). All models were estimated with the xtreg commands in Stata (Version 14.2). For theoretical reasons, a cubic specification of event time was used that corresponds to the duration of widowhood in years. We also used bootstrapped standard errors from 500 bootstrap samples in all of our models.

Our analytical strategy consisted of four steps. First, we examined the overall trajectory of PG with and without a constraint regarding the starting point of the process (Hypothesis 1). To decide whether to use fixed-effects or random-effects, we conducted and reported the Hausman test (**Table M4.4**). Second, we estimated a series of "empty" (i.e., unadjusted) random-effects group-specific growth curves with random intercepts for PG and its subdimensions (**Table M4.5**) including interaction terms between event time and time-invariant group indicators to model group-specific differential trajectories. We entered all group*(duration) interaction terms not as "standard effects" (e.g., i.group##(time)), but as "nested effects" (e.g., i.group#(time)). We then tested whether the shape of PG trajectories was similar across groups (Wald test for equal linear, quadratic, and cubic time paths) and whether the group differences in PG were significant at each widowhood year via post-estimation tools (average marginal effects, AME). Third, we added time-invariant covariates to the

models and, fourth, time-varying covariates to trace final group-specific trajectories by three types of loss-related support seeking (**Table M4.6**) and two types of social embeddedness (**Table M4.7**; Hypotheses 2a and 2b). Because Akaike's (AIC) and Schwarz's Bayesian (BIC) information criteria are not provided after the xtreg commands with random effects, we reported within and between R-squared values as the goodness of fit, which is common practice. R-squared within corresponds to the amount of explained variance of PG and its subdimensions with regard to intraindividual change over time, whereas R-squared between captures the amount of explained variance due to the differences between the respondents (e.g., due to different types of loss-related support).

4.7 Results

4.7.1 Descriptive Statistics

Table M4.2 provides sample characteristics from a longitudinal perspective, and **Table M4.3** gives an overview of the sample composition by loss-related support seeking and embeddedness at baseline.

Table M4.2: Sample Description From a Longitudinal Perspective

	Widowers in particular waves		
	Wave 1: 2012 (N = 483)	**Wave 2: 2014 (N = 427; 16 new)**	**Wave 3: 2016 (N = 357; 9 new)**
Dependent variables			
Amount of valid values	<428-447>	<373-380>	<285-292>
Personal growth, *M (SD)*	2.54 (1.29)	2.40 (1.27)	2.18 (1.23)
Cronbach's α (*N*)	0.847 (441)	0.828 (384)	0.818 (294)
Appreciation of life	3.01 (1.47)	2.63 (1.56)	2.58 (1.55)
Cronbach's α (*N*)	0.802 (443)	0.820 (380)	0.847 (285)
Personal strength	2.86 (1.59)	2.90 (1.54)	2.55 (1.60)
Cronbach's α (*N*)	0.829 (448)	0.766 (377)	0.813 (292)
Spiritual change	1.73 (1.67)	1.65 (1.66)	1.40 (1.55)
Cronbach's α (*N*)	0.907 (428)	0.892 (373)	0.890 (286)
Time-varying measures			
Age, years *M (SD)*	72.84 (8.23)	74.48 (8.29)	75.81 (8.11)
Duration of widowhood in months, *M (SD)*	36.85 (15.65)	56.88 (17.92)	71.71 (19.02)
Financial situation, (%)			
Not enough money	5%	5%	4%
Enough money	82%	81%	79%
More than enough money	12%	14%	17%
Health, (%)			
Bad	3%	3%	3%
So-so	26%	25%	27%
Good	57%	57%	54%
Very good	14%	15%	16%
Overcame loss, (%)	49%	62%	64%
Repartnered, (%)	11%	20%	18%

Notes: Values are presented as mean (M) and standard deviation (SD) unless indicated otherwise. Personal growth was rated on a scale from 0 to 5 with higher values indicating more growth.

Values of PG seemed to decrease over time, whereby the amount of decline varied across the subdimensions of PG. Average ratings were lowest for spiritual change and highest for appreciation of life

(**Table M4.2**). Because we analyzed the same sample of older widowers at all three waves, we had a consistent sample with a rather little variation in age, financial situation, and even self-rated health over time. However, we observed more within-variation in current grieving and repartnering. Nearly half of the respondents reported having already overcome the loss of their spouse at baseline. Within the next 4 years, this percentage increased to 64%. Only 11% had a new partner at baseline; this percentage was higher at Waves 2 and 3 with 20 and 18%, respectively (**Table M4.2**).

Table M4.3: Sample Composition by Social Support and Embeddedness at Entry Into the Sample (N = 508)

Group-specific indicators:	**Loss-related support seeking**			**Social embeddedness**	
	G0: Coped alone (*N* = 102)	**G1: Network support seeking (*N* = 117)**	**G2: Mixed support seeking (*N* = 289)**	**G0: Weakly embedded (*N* = 260)**	**G1: Strongly embedded (*N* = 248)**
Dependent variables					
Personal growth, *M* (*SD*)	2.20 (1.40)	2.82 (1.15)	2.54 (1.27)	2.46 (1.25)	2.62 (1.32)
Appreciation of life	2.52 (1.58)	3.34 (1.33)	3.04 (1.44)	2.88 (1.39)	3.14 (1.53)
Personal strength	2.44 (1.73)	3.17 (1.38)	2.88 (1.59)	2.76 (1.54)	2.96 (1.62)
Spiritual change	1.45 (1.65)	2.03 (1.64)	1.77 (1.67)	1.68 (1.54)	1.85 (1.78)
Explanatory variables					
Age, years *M* (*SD*)	75.27 (8.07)	72.73 (8.95)	72.73 (8.16)	72.92 (8.40)	73.54 (8.36)
Age at partner loss, (%)					
50-74 years	63%	68%	71%	69%	69%
75 years and older	37%	32%	29%	31%	31%
Female, (%)	52%	68%	57%	56%	62%
Duration of widowhood in months, *M (SD)*	37.24 (15.15)	35.47 (17.00)	35.07 (16.40)	35.43 (16.29)	35.75 (16.32)
Duration of widowhood in months, (%)					
0-24 months	21%	23%	24%	25%	22%
25-48 months	53%	56%	53%	52%	54%
49-60 months	21%	14%	20%	18%	20%
61-96 months	5%	7%	3%	5%	4%
Quality of marriage, *M* (*SD*)	7.25 (2.06)	7.60 (1.89)	7.35 (1.88)	7.15 (2.06)	7.61 (1.75)
Loss came unexpected, (%)	37%	37%	41%	41%	38%
Education, (%)					
Primary	12%	14%	13%	11%	16%
Secondary	58%	58%	55%	57%	55%
Tertiary	30%	28%	32%	32%	29%
Financial situation, (%)					
Not enough money	6%	4%	7%	6%	5%
Enough money	84%	80%	81%	81%	82%
More than enough money	10%	16%	12%	13%	13%
Health, (%)					
Bad	8%	1%	3%	4%	2%
So-so	30%	29%	23%	30%	22%
Good	43%	59%	61%	56%	59%
Very good	18%	11%	13%	10%	17%
Overcame loss, (%)	53%	50%	47%	42%	55%
Repartnered, (%)	10%	9%	12%	12%	10%

Continuation of **Table M4.3:**

Additionally (for descriptive purpose)					
Duration of marriage, years, *M* (*SD*)	42.27 (11.14)	43.13 (11.54)	43.42 (10.32)	41.75 (11.31)	44.43 (10.07)
Retired, (%)	88%	78%	82%	82%	83%

Notes: Values are presented as mean (M) and standard deviation (SD) unless indicated otherwise. Quality of marriage was rated on a scale from 0 to 9 with higher values indicating a higher relationship quality. Personal growth was rated on a scale from 0 to 5 with higher values indicating more growth.

Table M4.3 shows that respondents who coped alone were on average 2.5 years older than those who sought network or mixed support, and they lost their partner more frequently in older age, i.e., 75+ years (37% vs. 32% and 29%). Individuals with good self-rated health sought primarily network support rather than coping alone (61% and 59% vs. 42%). However, solitary copers reported being both more often in bad health (8% vs. 1% and 3%) and in very good health (18% vs. 11% and 13%) compared to those who sought network support. The associations between the three types of support seeking and educational attainment, their financial situation, marital quality, repartnering, and grieving were not significant and indicated homogeneous groups. Similar health patterns emerged for perceived social embeddedness: strongly embedded respondents were more likely to be healthier (17% vs. 10%) than their counterparts. They were also more likely to have mentally overcome the loss (55% vs. 42%) and reported to have had a higher-quality marriage before the loss (7.61 vs. 7.15). We observed no differences in age, whether the loss was expected or not, education, financial situation, and repartnering between these two groups. Finally, widows reported more frequently to be strongly embedded (62%) and to seek network support (68%) than men.

4.7.2 Overall Trajectory of PG

Conceptually, PG is triggered by an event and its initial level is supposed to be zero. Our data, however, provided neither a comparison group (i.e., a group of married individuals without the experience of widowhood), nor any information about the very beginning of the process. Thus, we estimated two possible trajectories of PG over time—one with and one without a constraint regarding the beginning of the process (**Figure M4.1**). The unconstrained model corresponds to our data, which indicated a moderate PG level already at event entry. The constrained model was an attempt to estimate the trajectory of PG according to the natural assumption of a zero level at event entry based on an extended data set, which included an artificially added "Wave 0" (see also **Table M4.4**). Although the shape varied from a linear function to a sickle function, the trajectory after the first widowhood year was almost identical to a very stable, moderate level of PG (on average, 2.5 scale points). Due to data limitations concerning the sparse number of observations on the tail ends of our observation window, we will subsequently focus on the time span between 2 and 7 years after partner loss when interpreting our results.

Table M4.4: Personal Growth Trajectories Over Widowhood Duration: Empty Models

Unconstrained model: Initial growth level unknown (data)	**Model 1** Personal growth	**Model 2** Appreciation of life	**Model 3** Personal strength	**Model 4** Spiritual change
Unstandardized coefficients	FE	FE	RE	RE
Duration of widowhood (years):				
Linear time effect (time)	-0.23 (0.10)*	-0.30 (0.12)*	-0.14 (0.11)	-0.20 (0.10)
Quadratic term (time^2)	0.05 (0.03)	0.05 (0.04)	0.05 (0.03)	0.05 (0.03)
Cubic term (time^3)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.01 (0.00)
Intercept (first year)	2.77 (0.11)***	3.28 (0.14)***	2.93 (0.12)***	1.92 (0.13)***
Model-Fit and Hausman Test				
Number of observations	N = 1,119	N = 1,108	N = 1,117	N = 1,087
R-squared (within)	0.037	0.030	0.021	0.020
Hausman p-value	p = .038	p = .001	p = .177	p = .715
Constrained model: Initial growth level set to zero	**Model 1** Personal growth	**Model 2** Appreciation of life	**Model 3** Personal strength	**Model 4** Spiritual change
Unstandardized coefficients	RE	RE	RE	RE
Duration of widowhood (years):				
Linear time effect (time)	2.74 (0.15)***	3.18 (0.19)***	3.29 (0.19)***	1.83 (0.20)***
Quadratic term (time^2)	-1.00 (0.09)***	-1.16 (0.11)***	-1.21 (0.11)***	-0.66 (0.11)***
Cubic term (time^3)	0.14 (0.02)***	0.17 (0.02)***	0.18 (0.02)***	0.09 (0.02)***
Quadric term (time^4)	-0.01 (0.00)***	-0.01 (0.00)***	-0.01 (0.00)***	-0.01 (0.00)***
Intercept	0.09 (0.02)***	0.10 (0.02)***	0.10 (0.02)***	0.07 (0.02)***
Model-Fit and Hausman Test				
Number of observations	N = 1,627	N = 1,616	N = 1,625	N = 1,595
R-squared (within)	0.647	0.620	0.617	0.372
Hausman p-value	p = .527	p = .098	p = .661	p = 0.792

Notes: * p < 0.05. ** p < 0.01. *** p < 0.001.

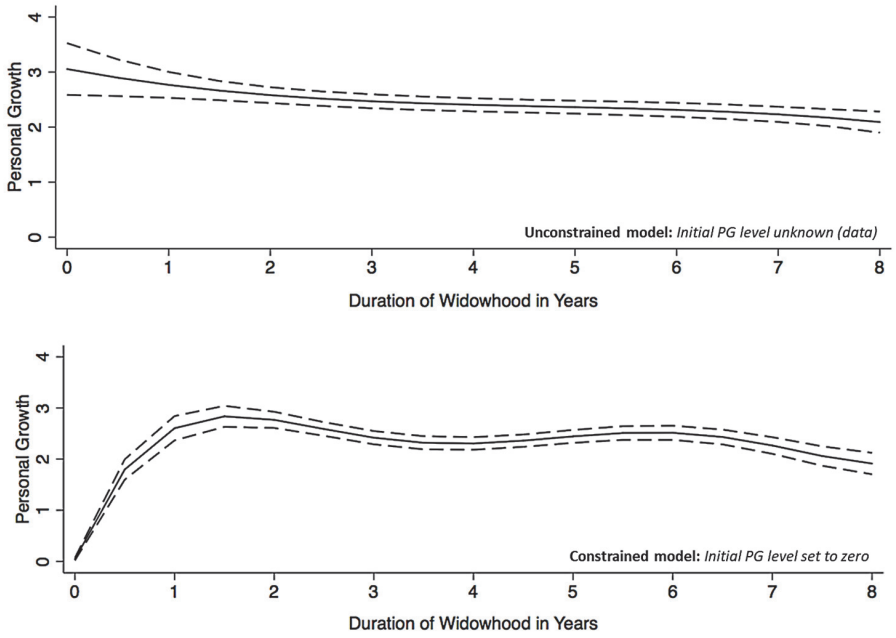

Figure M4.1: Personal Growth (PG) Trajectories: Unconstrained and Constrained Model

4.7.3 Group-Specific Trajectories of PG: Empty Models

R-squared within values for the group-specific trajectories of PG without any covariates (**Table M4.5**) indicated that individual changes within trajectories over time explained less than 5% of the variance of PG and its subdimensions, both in the models for loss-related support (2.6% for appreciation of life and 3.7% for spiritual change) and in the models for social embeddedness (2.4% for personal strength and 4.2% for spiritual change). Different types of loss-related support and social embeddedness (differences between individuals) explained up to 4.2% and 1.1% of the variance, respectively.

Table M4.5: Personal Growth Group-Specific Trajectories Over Widowhood Duration: Empty Models

Loss-related Support Seeking	**Model 1** Personal growth	**Model 2** Appreciation of life	**Model 3** Personal strength	**Model 4** Spiritual change
Unstandardized coefficients	*RE*	*RE*	*RE*	*RE*
Group 0: Coped alone (Ref.)	---	---	---	
Group 1: Network support	0.26 (0.34)	0.59 (0.39)	0.21 (0.45)	0.38 (0.39)
Group 2: Mixed support	0.22 (0.29)	0.69 (0.32)*	0.17 (0.40)	-0.08 (0.38)
Interactions as nested effects				
Time * Coped alone	-0.20 (0.18)	0.10 (0.25)	-0.41 (0.26)	-0.40 (0.26)
Time * Network support	0.08 (0.20)	0.18 (0.28)	0.24 (0.27)	-0.36 (0.26)
Time * Mixed support	-0.19 (0.13)	-0.18 (0.14)	-0.19 (0.15)	-0.13 (0.15)
$Time^2$ * Coped alone	0.02 (0.06)	-0.04 (0.09)	0.10 (0.08)	0.08 (0.08)
$Time^2$ * Network support	-0.02 (0.06)	-0.04 (0.08)	-0.05 (0.08)	0.12 (0.08)
$Time^2$ * Mixed support	0.05 (0.04)	0.03 (0.04)	0.07 (0.04)	0.03 (0.04)
$Time^3$ * Coped alone	-0.00 (0.00)	0.00 (0.00)	-0.01 (0.00)	-0.01 (0.00)
$Time^3$ * Network support	-0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	-0.01 (0.00)*
$Time^3$ * Mixed support	-0.00 (0.00)	-0.00 (0.00)	-0.01 (0.00)*	-0.00 (0.00)
Intercept (first year)	2.45 (0.26)***	2.43 (0.26)***	2.79 (0.34)***	1.90 (0.34)***
Model-Fit & Test for paths differences				
Number of observations	*N* = 1,119	*N* = 1,108	*N* = 1,117	*N* = 1,087
R-squared (within)	0.042	0.026	0.031	0.037
R-squared (between)	0.034	0.033	0.042	0.017
Test for paths differences (all)	*p* = .290	*p* = .756	*p* = .409	***p* = .021***
Social Embeddedness	**Model 1** Personal growth	**Model 2** Appreciation of life	**Model 3** Personal strength	**Model 4** Spiritual change
Unstandardized coefficients	*RE*	*RE*	*RE*	*RE*
Group 1: Strongly embedded	0.38 (0.21)	0.38 (0.23)	0.29 (0.25)	0.58 (0.26)*
Interactions as nested effects				
Time * Weakly embedded	0.03 (0.11)	0.07 (0.14)	-0.03 (0.14)	0.09 (0.15)
Time * Strongly embedded	-0.28 (0.14)*	-0.19 (0.16)	-0.23 (0.16)	-0.42 (0.17)**
$Time^2$ * Weakly embedded	-0.03 (0.03)	-0.06 (0.04)	0.00 (0.04)	-0.04 (0.04)
$Time^2$ * Strongly embedded	0.08 (0.04)	0.05 (0.05)	0.09 (0.05)	0.11 (0.05)*
$Time^3$ * Weakly embedded	0.00 (0.00)	0.01 (0.00)*	-0.00 (0.00)	0.00 (0.00)
$Time^3$ * Strongly embedded	-0.01 (0.00)*	-0.01 (0.00)	-0.01 (0.00)*	-0.01 (0.00)*
Intercept (first year)	2.44 (0.14)***	2.81 (0.15)***	2.77 (0.18)***	1.60 (0.18)***
Model-Fit				
Number of observations	*N* = 1,119	*N* = 1,108	*N* = 1,117	*N* = 1,087
R-squared (within)	0.047	0.039	0.024	0.042
R-squared (between)	0.003	0.002	0.011	0.002
Test for paths differences (all)	*p* = .056	***p* = .029***	*p* = .363	***p* = .042***

Notes: * p < 0.05. ** p < 0.01. *** p < 0.001.

Group-specific trajectories of PG and their subdimensions seemed to be rather stable over time for two reasons. First, there was little temporal variation according to relatively low R-squared within values. Second, most group*time interaction terms for linear, quadratic, and cubic effects were not significant (i.e., technically, indicating a horizontal line), except for spiritual change for strongly embedded individuals (all 3 interactions were significant) and some cubic terms for other subdimensions of PG (see Interactions as nested effects in **Table M4.5**). However, the Wald test for differences in time paths indicated that the trajectories of appreciation of life differed significantly for weakly and strongly embedded respondents (p = 0.029), whereas the trajectories of spiritual change differed significantly for both loss-related social support seeking (p = 0.021) and the social embeddedness groups (p = 0.042).

4.7.4 Trajectories of PG by Loss-Related Social Support Seeking

Table M4.6 summarizes the results for growth curves by support seeking accounting for time-invariant covariates (Step 1), and additionally, for time-varying covariates (Step 2). **Figure M4.2** and **Figure M4.3** illustrate the trajectories for each model.

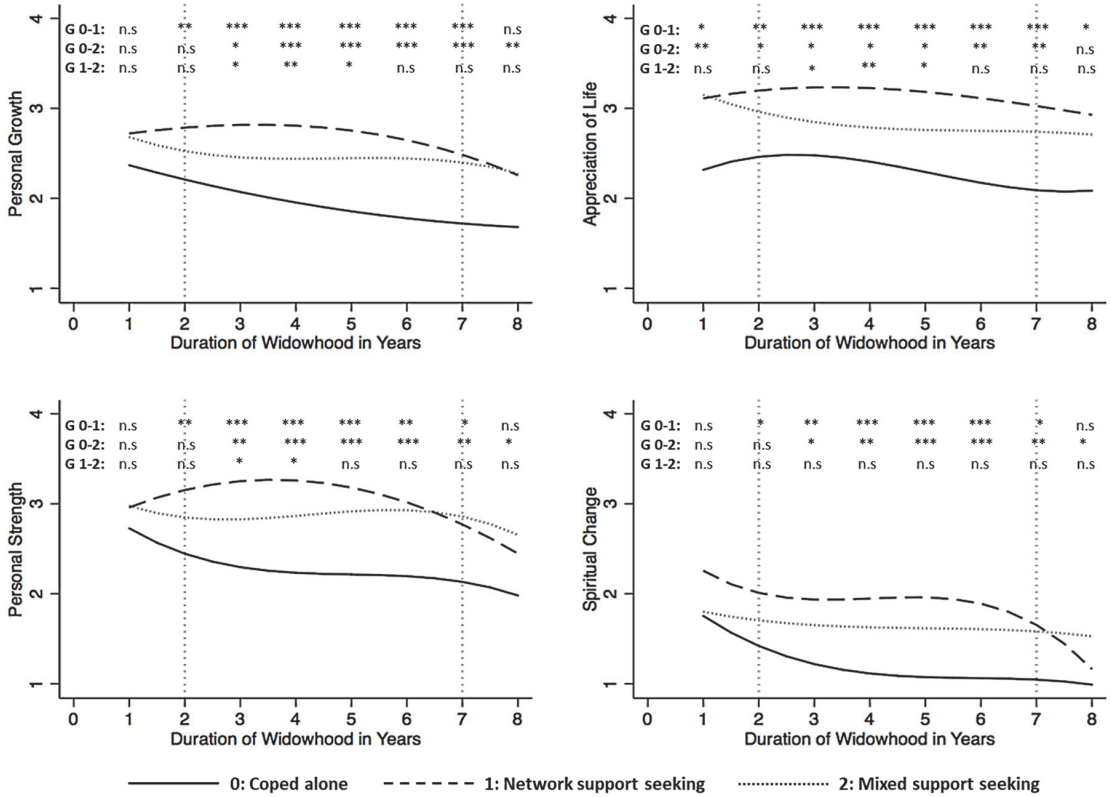

Figure M4.2: Personal Growth Trajectories by Social Support Over the Duration of Widowhood (Step 1: Time-Invariant Covariates)

Table M4.6: Personal Growth Group-Specific Trajectories by Loss-Related Support Seeking: Full Model

Step 1: ***Model with time-invariant covariates (duration=0)***	**Model 1** Personal growth	**Model 2** Appreciation of life	**Model 3** Personal strength	**Model 4** Spiritual change
Unstandardized coefficients	*RE*	*RE*	*RE*	*RE*
Group 1: Network support	0.35 (0.34)	0.79 (0.40)*	0.23 (0.41)	0.50 (0.44)
Group 2: Mixed support	0.31 (0.31)	0.83 (0.32)**	0.25 (0.37)	0.05 (0.41)
Interactions as nested effects				
Time * Coped alone	-0.17 (0.21)	0.22 (0.26)	-0.36 (0.27)	-0.41 (0.31)
Time * Network support	0.08 (0.21)	0.11 (0.27)	0.24 (0.25)	-0.36 (0.24)
Time * Mixed support	-0.21 (0.12)	-0.23 (0.14)	-0.20 (0.14)	-0.12 (0.16)
$Time^2$ * Coped alone	0.01 (0.06)	-0.08 (0.09)	0.09 (0.08)	0.08 (0.09)
$Time^2$ * Network support	-0.01 (0.07)	-0.03 (0.08)	-0.05 (0.08)	0.12 (0.07)
$Time^2$ * Mixed support	0.06 (0.04)	0.04 (0.04)	0.08 (0.04)	0.03 (0.05)
$Time^3$ * Coped alone	-0.00 (0.00)	0.01 (0.01)	-0.01 (0.00)	-0.01 (0.00)
$Time^3$ * Network support	-0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	-0.01 (0.00)*
$Time^3$ * Mixed support	-0.00 (0.00)	-0.00 (0.00)	-0.01 (0.00)*	-0.00 (0.00)
Time-invariant covariates				
Female	-0.02 (0.10)	-0.20 (0.12)	0.15 (0.12)	0.01 (0.14)
Age at widowhood (only step 1)	0.03 (0.11)	0.17 (0.13)	-0.06 (0.13)	0.36 (0.16)*
Marital satisfaction	-0.02 (0.02)	-0.04 (0.03)	0.00 (0.03)	0.03 (0.03)
Unexpected death	-0.20 (0.10)*	-0.18 (0.12)	-0.26 (0.12)*	-0.11 (0.14)
Primary education[a]	0.26 (0.17)	0.24 (0.18)	0.12 (0.18)	0.42 (0.21)*
Tertiary education[a]	-0.56 (0.11)***	-0.54 (0.13)***	-0.60 (0.14)***	-0.44 (0.15)*
Model-Fit & Test for paths differences				
Number of observations	*N* = 1,099	*N* = 1,088	*N* = 1,096	*N* = 1,067
R-squared (within)	0.042	0.022	0.030	0.040
R-squared (between)	0.112	0.092	0.100	0.069
Test for paths differences (all)	*p* = .470	*p* = .642	*p* = .317	***p* = .024***
Step 2: ***Model with time-varying covariates***				
Age (linear)	0.01 (0.00)	0.01 (0.01)	0.01 (0.01)	0.02 (0.00)**
Not enough money[b]	-0.06 (0.22)	-0.06 (0.26)	-0.33 (0.25)	-0.14 (0.28)
More than enough money[b]	-0.23 (0.10)*	-0.34 (0.13)**	-0.15 (0.14)	-0.22 (0.12)
Bad health[c]	-0.51 (0.23)*	-0.56 (0.27)*	-0.25 (0.32)	-0.54 (0.29)
So-so health[c]	-0.09 (0.09)	0.08 (0.12)	-0.26 (0.10)**	-0.08 (0.12)
Very good health[c]	0.02 (0.10)	-0.03 (0.15)	0.04 (0.14)	0.07 (0.13)
Overcame loss	-0.03 (0.09)	-0.13 (0.11)	0.02 (0.12)	-0.01 (0.12)
Repartnered	0.03 (0.12)	0.16 (0.15)	0.04 (0.15)	-0.01 (0.14)
Model-Fit & Test for paths differences				
Number of observations	*N* = 1,031	*N* = 1,021	*N* = 1,030	*N* = 1,003
R-squared (within)	0.051	0.026	0.046	0.048
R-squared (between)	0.111	0.101	0.099	0.071
Test for paths differences (all)	*p* = .781	*p* = .847	*p* = .081	***p* = .044***

Notes: All effects that change from significant into nonsignificant between step 1 and step 2 are marked grey. Reference categories: [a] secondary education; [b] enough money; [c] good health. * p < 0.05. ** p < 0.01. *** p < 0.001.

The Wald test also indicated significantly different time paths for spiritual change across support seeking groups, even when adjusting for time-invariant covariates (p = 0.024 and p = 0.044). This should, however, be interpreted with caution due to the strong concavity outside of the trustworthy interval from the second to the seventh year of widowhood. Although the shape of PG and its sub-dimensions remained mostly flat over time, differences across the 3 support-seeking groups yielded a clear pattern. First, respondents who did not seek social support (solitary copers) had consistently

the lowest scores and network support seekers the highest scores on all PG subdimensions. Second, the level differences in PG between those who coped alone and those who sought social support (network and mixed support seekers) were significant for almost all years. The differences between Group 1 (network support seekers) and 2 (mixed support seekers) were significant only at a middle stage of the bereavement process (about 3–5 years), except for spiritual change where there were no significant differences. Third, seeking solely network support appeared to foster PG (overall rating, personal strength, and appreciation of life) during the first 3 years after the loss of the spouse. However, this effect seemed to vanish in the long run, whereas the combination of network support seeking and coping alone (mixed support seekers) appeared to have the most stable effect on PG over time.

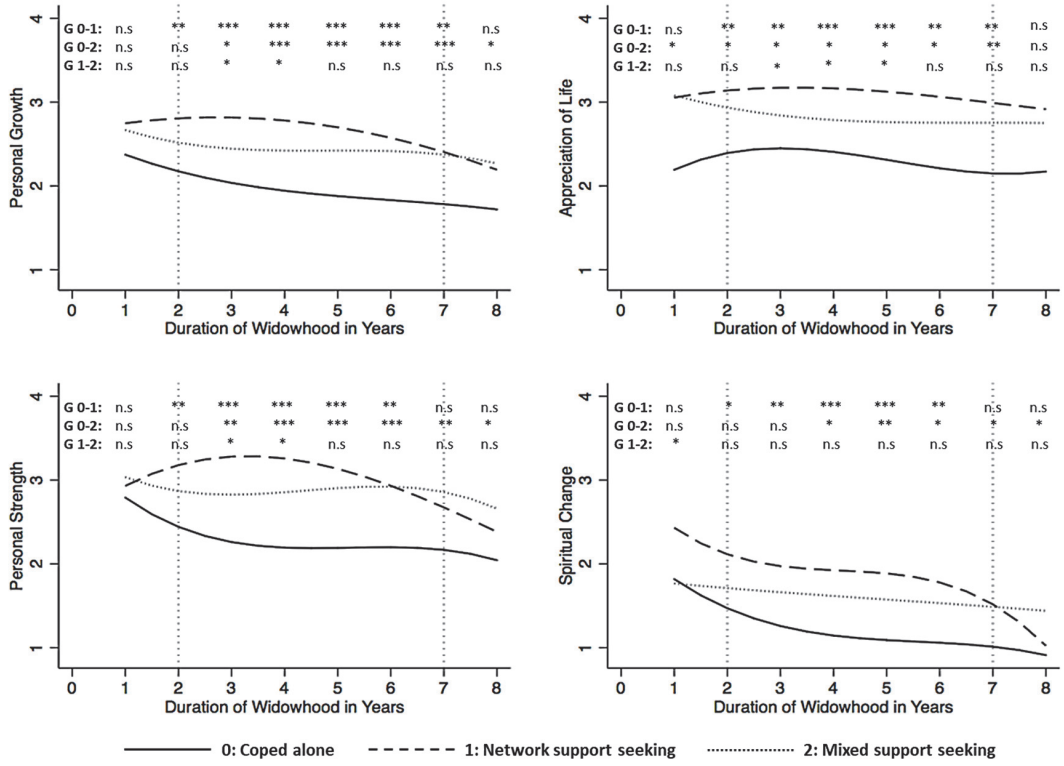

Figure M4.3: Personal Growth Trajectories by Social Support Over the Duration of Widowhood (Step 2: Full Model)

Trajectories by social support seeking did not change much after including time-varying covariates. Analyses revealed that tertiary education was an important predictor of PG and its subdimensions. Highly educated individuals were more likely to experience lower levels of PG than less educated individuals. Unexpected partner loss was associated with lower levels of PG and personal strength, whereas being older when becoming widowed and age were positively associated with spir-

itual change. Finally, self-rated health and respondents' financial situation seemed to play a key role in the bereavement process, especially for the appreciation of life and personal strength. Both health problems and, surprisingly, having more financial resources were associated with a decrease in PG.

4.7.5 Trajectories of PG by Social Embeddedness

Table M4.7 summarizes the results for growth curves by perceived social embeddedness accounting for time-invariant covariates (Step 1), and additionally, for time-varying covariates (Step 2; see **Figure M4.4** and **Figure M4.5**, respectively).

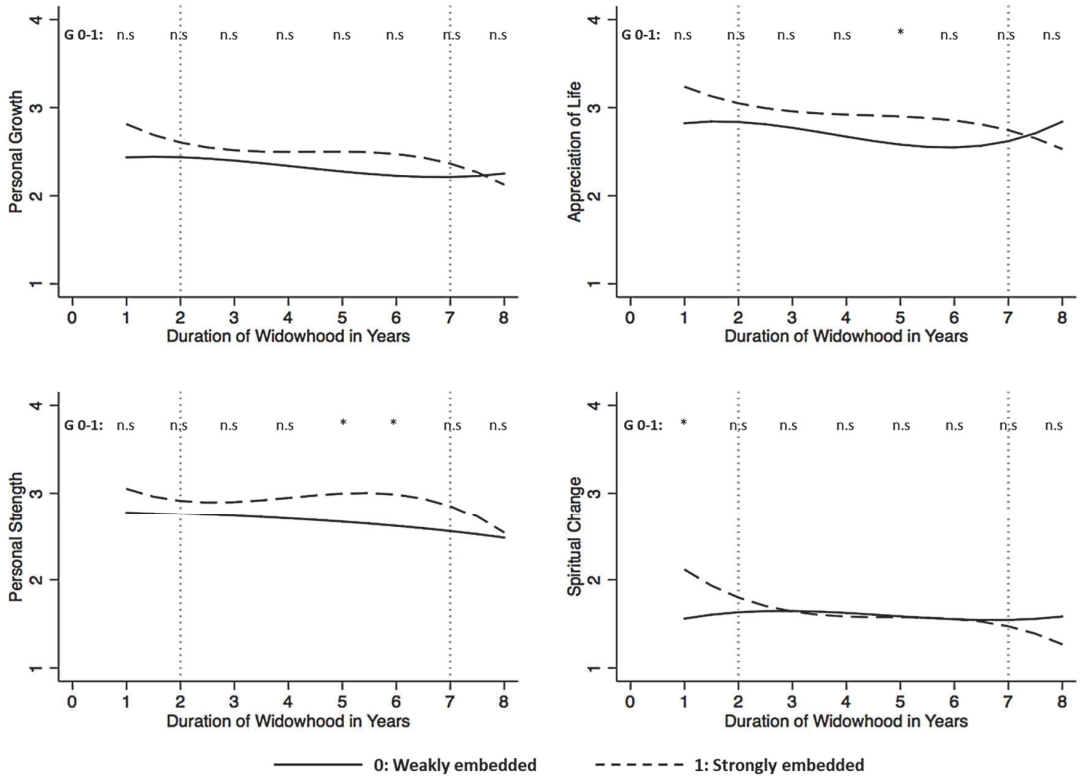

Figure M4.4: Personal Growth Trajectories by Social Embeddedness Over the Duration of Widowhood (Step 1: Time-Invariant Covariates)

The trajectories of PG and their subdimensions by social embeddedness did not differ much over time, even if the p-value of the Wald test was below 0.05 for appreciation of life in the full model. Further, the AME did not show any significant differences in PG and its subdimensions, except for appreciation of life at Years 5–6 and personal strength at Year 5. Thus, the progression of PG did not vary for weakly or strongly embedded participants.

Table M4.7: Personal Growth Group-Specific Trajectories by Social Embeddedness: Full Model

Step 1: ***Model with time-invariant covariates (duration=0)***	**Model 1** Personal growth	**Model 2** Appreciation of life	**Model 3** Personal strength	**Model 4** Spiritual change
Unstandardized coefficients	*RE*	*RE*	*RE*	*RE*
Group 1: Strongly embedded	0.38 (0.22)	0.41 (0.24)	0.27 (0.25)	0.56 (0.26)*
Interactions as nested effects				
Time * Weakly embedded	0.03 (0.13)	0.07 (0.13)	-0.02 (0.15)	0.11 (0.15)
Time * Strongly embedded	-0.29 (0.14)*	-0.25 (0.17)	-0.22 (0.17)	-0.41 (0.17)*
$Time^2$ * Weakly embedded	-0.03 (0.04)	-0.06 (0.04)	-0.00 (0.05)	-0.04 (0.05)
$Time^2$ * Strongly embedded	0.09 (0.04)*	0.07 (0.05)	0.09 (0.05)	0.11 (0.05)*
$Time^3$ * Weakly embedded	0.00 (0.00)	0.01 (0.00)*	-0.00 (0.00)	0.00 (0.00)
$Time^3$ * Strongly embedded	-0.01 (0.00)*	-0.01 (0.00)	-0.01 (0.00)*	-0.01 (0.00)*
Time-invariant covariates				
Female	0.01 (0.10)	-0.16 (0.12)	0.18 (0.13)	0.05 (0.14)
Age at widowhood (only step 1)	0.00 (0.11)	-0.20 (0.13)	-0.09 (0.13)	0.34 (0.16)*
Marital satisfaction	-0.01 (0.02)	-0.03 (0.03)	0.01 (0.03)	0.03 (0.03)
Unexpected death	-0.21 (0.10)*	-0.18 (0.12)	-0.25 (0.13)*	-0.13 (0.14)
Primary education[a]	0.24 (0.16)	0.22 (0.18)	0.11 (0.18)	0.40 (0.22)
Tertiary education[a]	-0.55 (0.12)***	-0.54 (0.14)***	-0.59 (0.15)***	-0.44 (0.16)**
Model-Fit & Test for paths differences				
Number of observations	*N* = 1,099	*N* = 1,088	*N* = 1,096	*N* = 1,067
R-squared (within)	0.045	0.036	0.023	0.043
R-squared (between)	0.070	0.053	0.068	0.044
Test for paths differences (all)	***p* = .045***	***p* = .038***	*p* = .299	***p* = .049***
Step 2: ***Model with time-varying covariates***				
Age (linear)	0.00 (0.01)	-0.02 (0.01)*	0.00 (0.01)	0.02 (0.01)**
Not enough money[b]	-0.03 (0.22)	-0.03 (0.29)	-0.28 (0.25)	-0.13 (0.27)
More than enough money[b]	-0.20 (0.10)*	-0.31 (0.14)*	-0.11 (0.15)	-0.21 (0.13)
Bad health[c]	-0.72 (0.21)***	-0.75 (0.24)***	-0.52 (0.33)	-0.69 (0.29)*
So-so health[c]	-0.10 (0.09)	0.05 (0.11)	-0.27 (0.11)*	-0.07 (0.11)
Very good health[c]	-0.01 (0.10)	-0.08 (0.14)	-0.01 (0.14)	0.10 (0.12)
Overcame loss	-0.03 (0.09)	-0.16 (0.11)	0.02 (0.12)	0.01 (0.13)
Repartnered	0.05 (0.11)	0.18 (0.15)	0.06 (0.15)	0.01 (0.14)
Model-Fit & Test for paths differences				
Number of observations	*N* = 1,031	*N* = 1,021	*N* = 1,030	*N* = 1,003
R-squared (within)	0.053	0.038	0.034	0.039
R-squared (between)	0.074	0.074	0.068	0.052
Test for paths differences (all)	*p* = .123	***p* = .033***	*p* = .307	*p* = .220

Notes: All effects that change from significant into nonsignificant between step 1 and step 2 are marked grey. Reference categories: [a] secondary education; [b] enough money; [c] good health. * p < 0.05. ** p < 0.01. *** p < 0.001.

Trajectories by social embeddedness became even more similar to each other after including time-varying covariates. The analyses for social embeddedness showed exactly the same pattern of significant covariates for PG and its subdimensions as reported for our models by loss-related social support. Gender, marital satisfaction, current grieving, and repartnering did not play a significant role for the trajectories of PG over time.

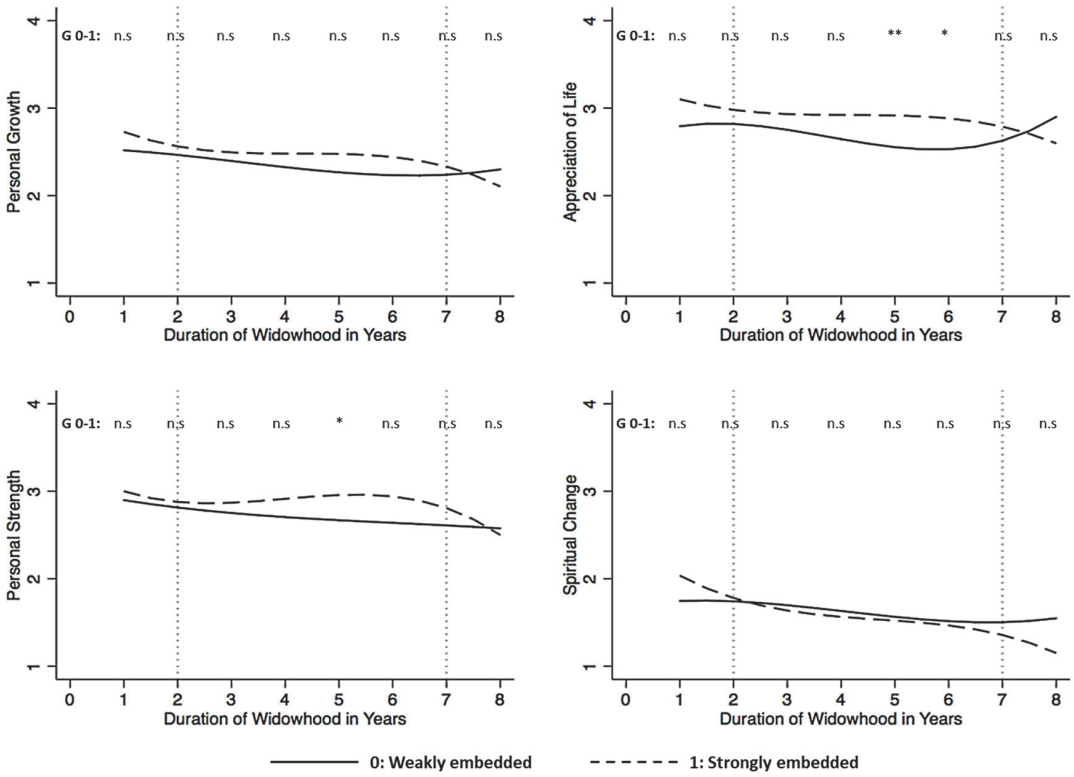

Figure M4.5: Personal Growth Trajectories by Social Embeddedness Over the Duration of Widowhood (Step 2: Full Model)

4.8 Discussion

Experiencing widowhood in old age is an age-normative, yet deeply disruptive transition that requires bereaved individuals to renegotiate social roles, restructure daily routines, and even recompose social networks (Bennett & Soulsby 2012; Hollstein 2002). Some studies, however, documented that overcoming critical transitions can stimulate PG in terms of gaining new perspectives on priorities in life or increased self-perceptions of strength (Helgeson, Reynolds & Tomich 2006; Tedeschi & Calhoun 2004; Currier, Holland & Neimeyer 2012). The present study contributes and extends this line of work by examining trajectories of PG among a sample of individuals who lost their spouse after an average of 43 years of marriage. We assessed individuals' ratings of PG after about 2–3 years of spousal loss and then tracked their ratings for 4 years into the adjustment process.

In general, the trajectory of PG was relatively flat and stable on a medium level, which was against our expectation that PG would be more pronounced in the beginning and decreases over time. This could indicate that PG after bereavement is not only a short-term coping strategy but rather an accomplishment that is achieved and stabilized over a longer time period of adjusting to the loss

(Studley & Chung 2015; Znoj 2006). Accounts of relatively stable trajectories in light of bereavement were also documented for other psychological constructs such as well-being for the majority of individuals (Mancini, Bonanno & Clark 2011), which mirrors our findings. Because most individuals adjust well to their new role as widow(er) (Spahni et al. 2015), particularly during a time in life where this transition is rather normative and supporting networks may be larger compared to those who experience widowhood off-time, the potential for PG may be limited (Armstrong & Shakespeare-Finch 2011).

Because social support is an essential element of adjusting to critical life transitions such as widowhood (Hollstein 2002; Stevens, Martina & Westerhof 2006; Currier, Holland & Neimeyer 2012), we further examined the link between two aspects of social support and PG over time. Loss-related social support seeking was expected to be more instrumental to PG at earlier stages of becoming widowed, whereas a general sense of social embeddedness as the perception of having a broad supportive network readily available would foster PG in the long run. Partly in line with these expectations, loss-specific support seeking did, indeed, seem to foster overall ratings of PG and its all three subdimensions. No differences in ratings of PG and its subdimensions emerged between individuals with weak and strong social embeddedness. One could argue that having a strong social network in place may be less crucial for the emergence of PG in contrast to the process of proactively reaching out to key contacts for support and restructuring one's network accordingly to the needs of the new situation (Bookwala, Marshall & Manning 2014; Hollstein 2002). More process-oriented information on the evolution of social networks throughout the transition, however, was not available in our data.

Although we did not specify hypotheses on the impact of our covariates, some interesting results emerged. For example, older participants consistently reported lower ratings of PG at baseline (not shown). This effect could be attributed to differences in cognitive capacities (Znoj 2006; Charles 2010), but also age-related decreases in social networks and increasing health impairments (Stevens, Martina & Westerhof 2006). Relatedly, healthier individuals reported higher ratings of PG because they may have had more chances to engage in social activities or to look for support in light of the loss compared to their more severely impaired peers.

Interestingly, both the highest level of education and financial security were associated with lower levels of PG, which could be explained from two competing angles. From a stress-resiliency perspective, the less privileged may display more potential for PG because they may have more experience in dealing with and overcoming adverse events due to their cumulative exposure to stressors (Stanton, Bower & Low 2006; Chen & Miller 2012). Alternatively, we may observe a ceiling effect for PG among the most privileged because the PG scale explicitly assessed change in perceptions due to spousal loss rather than baseline ratings. It could be the case that this group may simply not change their habits and perceptions after becoming widowed as much as their more disadvantaged peers because they were already embedded into tighter social networks and activities with or without their spouse due to greater financial resources and benefits tied to higher education (e.g., volunteering, leisure, or cultural activities).

4.9 Limitations and Future Outlook

In this study, we only looked at two aspects of social support: loss-related support seeking and perceived social embeddedness. Both aspects were operationalized with items that captured predominantly cognitive-emotional types of support. We might have observed further variations in PG over time, particularly for social embeddedness, when looking at other aspects or functions of social support, such as support quality and satisfaction or changes in support networks and their composition. Unfortunately, these indicators were not available in our data.

Second, our factor analyses revealed three dimensions of PG, rather than five, for our sample of older widowers. Hence, we suggest that future research should pay close attention to the underlying factorial structure for the construct of PG in specific subpopulations, rather than treating it as a universal construct. Particularly for the older samples, it might be the case that some subdimensions are not as relevant as others (e.g., particularly "new possibilities" may be more important for younger age groups compared to older populations).

Lastly, from a conceptual standpoint, PG is triggered by an event and is therefore supposed to have an initial level of zero and increase after the event. Our study, however, first assessed widowers about 3 years after having become widowed. Because we were not able to capture the initial increase in PG shortly after the event, our results point to rather flat trajectories of PG over time. Additionally, in the case of long-term illnesses or caregiving for the deceased prior to the event, possible anticipation effects cannot be entirely ruled out in the development of PG and are understudied.

Taken together, our study demonstrated, on average, a relatively stable and flat trajectory of PG on a moderate level for most participants who lost their spouse after a long-term marriage. Loss-related social support seeking, however, fostered some dimensions of PG—particularly during the earlier stages of adjusting to the new role as widow(er). Even though we used a unique, time-continuous strategy to model the impact of social support on PG based on yearly data, future studies should expand this line of work by examining the longitudinal link between PG and social support on a finer time scale (e.g., monthly or daily measurements with diary studies). It is our hope that future research will replicate our findings for various normative and non-normative life events across the life course using different scales and subdomains in the assessment of PG.

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