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Substitution and Compensation Among Widowed and Divorced Older Adults: The Role of Perceived

Need for Support and Companionship

DISSERTATION

submitted in partial satisfaction of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

in Psychological Science

by

Danielle Oleskiewicz

Dissertation Committee:
Distinguished Professor Emerita Karen S. Rook, Chair
Professor Susan T. Charles
Associate Professor of Teaching Jenny Rinehart

2024

DEDICATION

This dissertation is dedicated to my grandmothers, Lorraine Newman (grandma) and Sally Oleskiewicz (nonna). The relationship between a grandmother and a grandchild is so special, and I have been fortunate to have had my nonna during college and my grandma during part of my time in graduate school as a source of support. The love I have felt from these two incredible people is hard to describe, and their absence is a thought that crosses my mind constantly.

I am dedicating this dissertation to them partly because their experiences in later life deeply inspired me, and they are the reason I chose a path in aging psychology, but also because they taught me the importance of social relationships. My grandma was a stage four ovarian cancer survivor. She was diagnosed in her early 80s, but under the care of oncologists here at UCI, my grandmother went into remission. Her reason for fighting? Even well into her eighties? She wanted to see her grandchildren graduate, see my sister marry, and be there as a great-grandmother to my older sister's children. Her motivation was to be there to support us during important milestones; cheer us on as we crossed the stage to grab our diplomas, help my sister pick the perfect wedding dress, and cuddle her great grandchildren so they knew what her love felt like. Family also motivated my nonna throughout her life. She faced great grief and heartache, and despite that, she persevered for my father, her daughters-in-law, and her grandchildren. I know I am the woman I am today because of the power and strength I observed as I watched these two brave and incredible women love those around them. They taught me the value of support and companionship in later life, a lesson at the heart of this dissertation.

I also want to dedicate this dissertation to my fiancé, Alex. You and I started dating my first year of college, meaning you have been there every step of the way as I navigated my undergraduate and graduate education. I have had the unique pleasure of experiencing these pivotal years with my best friend and confidant by my side. This dissertation could not have been completed without your support. Thank you for loving animals as much as I do, and for, without hesitation, adopting our cat Fez and dog Pickle. Thanks to my furry companions for forcing me to take proper breaks for playtime and cuddles.

I also dedicate this dissertation to my twin, my second half. Jessica, you have been my cheerleader since the very beginning. I cannot even imagine what life would be like without you by my side. Thank you for always believing in me and reminding me of what I am capable of. I also want to thank my brother-in-law, Jose, for forcing me to have fun and enjoy the little things.

I also dedicate this dissertation to my parents. Mom, your devotion to your children is the reason I am at this stage of my life. I truly could not have made it here without you. I know how hard you have worked for us, and it will always be appreciated. Dad, thank you for always reminding me that it is okay to laugh at my mistakes and that my imperfections are something to love and appreciate.

I also dedicate this dissertation to my childhood best friends, Bijaneh and Amanda, and the 2018 Psychological Science cohort. I am lucky to have had such a wonderful group of friends over the years. Thank you all for being there throughout this process.

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I want to thank my wonderful committee for their guidance during the completion of this dissertation and graduate school. I am immeasurably grateful for my experience as a doctoral student, which would not have been the same without your support.

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I also want to extend my thanks to Susan Charles. I have greatly appreciated the community I gained from joining her lab. Her statistical knowledge has been invaluable over the years. She also taught me about the many topics researchers study in aging psychology, broadening my knowledge. Thank you for guiding me then and now during this dissertation process.

I have also learned a lot from Jenny Rinehart. Over the years, I was lucky enough to be a Teaching Assistant for multiple courses she taught. She taught me the value of integrating humor to connect with larger audiences, and I hope to emulate her presentational style as I enter future phases of my career. Thank you for showing me how to teach and for giving me the opportunity to take part in students' education.

VITA

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ABSTRACT OF THE DISSERTATION

Substitution and Compensation Among Widowed and Divorced Older Adults: The Role of Perceived

Need for Support and Companionship

by

Danielle Oleskiewicz

Doctor of Philosophy in Psychological Science

University of California, Irvine, 2024

Distinguished Professor Emerita Karen S. Rook, Chair

In later life, the loss of social ties is particularly consequential for emotional health. Widowhood becomes increasingly common as people age, and divorce rates have been on the rise among older adult populations. Such losses, particularly in the absence of remarriage, reduce older adults' access to support and companionship. Research on spousal loss has yet to consider variations in perceived need for support and companionship. It is also possible that having additional support and companionship beyond a minimum threshold reduces need for support and companionship and contributes little to older adults' emotional health. A new and growing form of social contact, remote interactions, is becoming increasingly important, however, research has yet to examine whether older adults use remote interactions to garner support and companionship following widowhood and divorce. To address these gaps in the literature, the current dissertation used two waves of data sourced from the UC Berkeley Social Networks Study (UCNets). A subsample of community-dwelling older adults aged 60-70 years ($N = 411$) were interviewed about their social networks (i.e., support and companionship providers and marital status), remote interactions (e.g., text, email, or other online methods), and emotional

health (i.e., days felt isolated, days felt lonely, and psychological distress). Analyses revealed that widowed/divorced older adults experience a greater need for support and companionship than do married older adults. Current support and companionship did not change widowed/divorced older adults' need for support and companionship. Contrary to expectations, experiencing a greater need for support and companionship was associated with decreased support and companionship providers over time. Even when considering current support and companionship, the duration of widowhood/divorce was not associated with a need for support and companionship. Remote interactions were significantly associated with emotional health, but only for older adults whose number of support and companionship providers was insufficient (i.e., below a threshold). Marital status (widowed/divorced vs. married) did not influence the association between remote interactions and emotional health. These findings convey the importance of examining need for support and companionship as an antecedent to substitution and compensation following spousal loss. Future research examining remote interactions should take into consideration the joint effects of in-person support and companionship.

INTRODUCTION

Throughout all stages of development, social ties have extensive impacts on health and well-being. In later life, social ties are particularly consequential for well-being (Rook & Charles, 2017). Widowhood becomes increasingly common as people age, and divorce has also become more common in later life. Such losses, particularly in the absence of remarriage, reduce older adults' access to support and companionship. Learning more about the social processes involved when need for support becomes elevated following the loss or disruption of a marital relationship is important.

Social Loss in Later Life

Need for social support and companionship may increase substantially after the loss of key social network members. In later life, the loss of a spouse often occurs through death or relationship dissolution (Rook et al., 2004; Brown & Lin, 2012), and such social losses are the primary focus of this dissertation. The death of a spouse is common in later life. Among older adults ages 65 to 74, 19.5% of women and 6.4% of men are widowed, moreover, the rate of widowhood increases with advanced age. For example, among the oldest old (ages 85 or older), 72% of women and 35% of men are widowed (Roberts et al., 2018). Relationship dissolution through divorce is another common social network change that can cause older adults to lose access to support and companionship. Between 1990 and 2010, the divorce rate doubled among adults aged 50 years or older, with individuals over the age of 50 comprising 20% of those who divorced in 2010 (Brown & Lin, 2012).

Although older adults often experience other kinds of social losses, such as the loss of friends and siblings, the loss or disruption of the marital relationship appears to be particularly detrimental (Weiss, 1988). Spouses are unique in providing many types of social support and

companionship (Weiss, 1974). Therefore, losing a spouse reduces access to health-protective social support and companionship (Uchino et al., 2018; Utz et al., 2002). Reduced access to social support has been linked to the development of disabilities and declines in physical functioning (Avlund et al., 2004; Leon et al., 2003), and lacking companionship is associated with heightened feelings of loneliness (Savikko et al., 2005) in later life. Accordingly, when older adults become widowed or divorced, heightened risks stem from the lost support and companionship that a spouse typically provides. Indeed, both widowhood and divorce in later life are associated with an increased risk of mortality and depression in numerous studies (Cohen et al., 2007; van Grootheest et al., 1999; Kamiya et al., 2013; Manzoli et al., 2007; Stroebe et al., 2007).

The term loss often connotes death or unwanted marital dissolution. The current dissertation focuses less on recent divorce, which may signal more of an absence of a spouse than loss per se. In recognition of this difference, but for the sake of clarity, the term "spousal loss" will be used to subsume both the loss of a spouse due to death and the absence of a spouse due to divorce.

Substitution and Compensation

The adverse effects of social losses on older adults' health and well-being are often assumed in the literature to be compensated for by substitute social ties. Substitution and compensation are the social processes through which lost social ties are replaced, thereby improving well-being. *Substitution* is the process through which a lost social tie is replaced with an alternate tie that performs functions previously performed by the lost tie (Rook & Charles, 2017; Rook & Schuster, 1996; Zettel & Rook, 2004). The alternate tie can be a new or existing social tie and is considered a *substitute tie*. On the other hand, compensation refers to the extent

to which support and companionship provided by the substitute ties boost older adults' well-being (Rook & Charles, 2017; Rook & Schuster, 1996; Zettel & Rook, 2004). It is commonly assumed in the literature that substitute ties have compensatory benefits, however, some substitute ties may provide perfunctory support or companionship that is not enjoyable, thus limiting compensatory benefits (Antonucci, 1985; Rook & Schuster, 1996). For example, adult children may provide instrumental support (e.g., driving to a doctor's appointment or caregiving) out of feelings of obligation to their widowed or divorced parent, which may make the older adult parent feel like a burden and may provoke emotional distress. Similarly, companionship provided by adult children rather than friends may be less enjoyable or lack the egalitarian nature of companionship (Rook & Schuster, 1996).

Evidence of Substitution

Empirical research on substitution has found evidence that after the loss of a spouse, substitute social ties are tapped to perform functions previously performed by the spouse. Widowed older adults turn to their adult children, relatives, and friends for multiple support needs, including confiding and companionship (Connidis & Davies, 1990). One prospective study found that widowers experienced increased emotional support from network members compared to pre-widowhood levels (Guiaux et al., 2007). Contact with friends also increases after divorce or separation (Kalmijn, 2012). Such findings examining substitution after widowhood and divorce indicate that substitution often occurs; friends and family members at times provide the support and companionship the former spouse previously offered. In contrast, empirical research examining the benefits of substitution on well-being (i.e., compensation) is more sparse and less consistent.

Evidence of Compensation

Investigations of compensation have produced mixed results regarding older adults' health and well-being. Research on widowed older adults has found that making a new friend reduces feelings of loneliness (Utz et al., 2014). Widowed older adults exhibit better health if they have a friend who is a confidant compared to those who lack a friend-confidant (Bookwala et al., 2014). In another study of divorced and widowed older adults, emotional and instrumental support from friends and children was associated with reduced loneliness (Dykstra, 1993). Conversely, one study found that substitute ties were unrelated or harmful to widowed older adult women's psychological health (Zettel & Rook, 2004). Similarly, another study found that increased support soon after the death of the partner did not reduce emotional loneliness in the 1.5 years after widowhood (van Baarsen, 2002).

One reason for these varying results may be the underlying, but largely untested, assumption that older adults *need* to compensate for the loss of support and companionship formerly provided by their spouses. Older adults' perceived need for additional social support and companionship following the loss or dissolution of marital relationships has received surprisingly little empirical attention. Hence, this dissertation sought to address this notable gap in the literature.

Perceived Need for Substitution and Compensation

Theoretical perspectives on social support and companionship posit that spouses are unique in the functions they provide (Weiss, 1974). Unlike family members, who are uniquely poised to provide instrumental support (e.g., practical help such as caregiving), and friends, who are poised to provide companionship (e.g., engaging in fun activities), spouses offer a wide array of support functions, including instrumental support, companionship, and emotional support

(Weiss, 1974). Additionally, the quality of support and companionship from spouses is considered superior to support and companionship from other sources in its availability, intimacy, and responsiveness to the partner's needs and goals (Baumeister & Leary, 1995). Theorists posit that people benefit from a social network comprised of social ties that perform specialized support and companionship functions, however, spouses are unique because they serve multiple functions (Weiss, 1974; Stevens et al., 2006). Therefore, when a person experiences the loss of a spouse, they may need to turn to substitute ties to provide some of the support and companionship formerly provided by the spouse. It is possible that even though widowed and divorced older adults likely have a higher need for support and companionship on average, the actual need may still vary based on current levels of support and companionship as well as changes in support networks over time. Moreover, divorced older adults might not receive much support and companionship from their marriage prior to their separation. Nonetheless, older adults who have been divorced for some time might feel a need to reorganize their social lives to obtain desired support and companionship.

The literature on social network substitution and compensation has yet to examine need-driven substitution in the context of spousal loss. Therefore, the current dissertation sought to investigate the role of need for support and companionship as an antecedent to substitution and compensation following a spousal loss.

Can a Minimum Number of Support and Companionship Providers Substitute for the Lost Spouse?

Research on spousal loss has yet to consider how many support and companionship providers are essential to fulfill a need for support and companionship. It is possible that having additional support and companionship providers beyond a minimum threshold contributes little

to well-being. This idea is derived from Baumeister and Leary's (1995) penetrating review of evidence on the need to belong. These authors posit that a minimum number of positive social ties is needed to fulfill the need to belong. If that minimum number of social ties is unmet, people will be motivated to expand their networks or improve existing social ties to meet their needs. Beyond this threshold, additional social ties might not enhance emotional health further. The dissertation examines this particular perspective on a posited minimum number of social ties. Baumeister and Leary (1995) did not define this minimum or consider this idea in the context of substitution and compensation after widowhood/divorce. The idea is intriguing, however, and points to the value of examining nonlinear, in addition to linear, associations between the number of current support and companionship providers and well-being among older adults who lack a spouse. A notable gap in the literature addressed in this dissertation is the lack of attention to a potential threshold effect that might represent the minimum number of substitute social ties needed to bolster well-being among individuals who have lost a spouse.

Duration of Widowhood and Divorce

Changes in need for support and companionship due to time since, or duration of, widowhood and divorce is another facet of loss that has been understudied in the literature on substitution and compensation. Shortly after the onset of widowhood, support and companionship tend to increase, however, after greater time has elapsed, this additional support and companionship tend to dissipate (Lamme et al., 1996). Research examining changes in support after divorce is sparse, warranting further examination. One study investigating divorce in a sample of adults found decreases in social ties following divorce, and approximately half of divorced participants did not regain their lost social ties (Kołodziej-Zaleska & Przybyła-Basista, 2016). Thus, need for support and companionship may vary over the course of

widowhood/divorce, with earlier and later phases of adaptation potentially being characterized by different needs for support and companionship.

The literature has devoted little attention to whether perceived need for social support and companionship drives efforts to form substitute social ties over time. The current dissertation sought to address this gap by examining the patterns of need over time that characterize substitution and compensation for the lack of a spouse in later life.

Need for Support and Companionship as a Motivator for Forming Future Substitute Social Ties

An additional gap in knowledge that this dissertation sought to address is whether a perceived need for support and companionship results in increased support and companionship (substitution) over time. Presumably, perceived need might drive efforts to form new ties or rekindle dormant ties, but the link between perceived need and subsequent support and companionship has seldom been examined. If such substitution occurs, the question remains whether increases in support and companionship improve well-being over time. Therefore, the current dissertation addressed this gap by assessing whether need for support and companionship influences substitution and compensation over time.

Remote Interactions

Much of the literature on substitution and compensation has focused on support and companionship provided through in-person interactions. Because remote interactions have become more common in later life, the current dissertation assessed whether such interactions play a role in substitution and compensation in the context of a key social loss.

Remote interactions (e.g., texting, email, social networking sites) are becoming an increasingly important area of study as many older adults engage in online communications. The

percentage of older adults in the U.S. using social networking sites (e.g., Facebook, Instagram, or Twitter) has nearly doubled in the past decade (Anderson & Perrin, 2017; Faverio, 2022). Almost half (45%) of older adults now use social networking sites, and 75% use the internet (Faverio, 2022). Older adults' motivations for using social networking sites include enjoyment, social contact, and social support exchanges (Leist, 2013). Many terms have been used in the literature to refer to alternative modes of interaction (e.g., remote communications, virtual communications, virtual interactions, social media usage, social networking, online interactions, online communications, etc.). The term remote interaction is used in this dissertation to refer to these multiple forms of non-in-person interactions.

Following social losses, older adults may use remote interactions to garner support and companionship. The literature on social network substitution and compensation, however, emphasizes social interactions that occur in person (Bookwala et al., 2014; Guiaux et al., 2007; Ha, 2008; Zettel & Rook, 2004). Social interactions occurring remotely may function as substitute ties that confer compensatory benefits.

Increased frequency of remote interactions has the potential to be a positive resource for older adults, particularly when in-person interactions are limited. For many widowed or divorced older adults, their spouses may have been their primary source of in-person contact. Evidence is mixed, however, regarding the psychological benefits of remote interaction in later life. Some research has found that remote interactions help older adults overcome loneliness and depression and improve cognitive functioning (Leist, 2013; Quinn, 2018). In contrast, remote interactions can expose older adults to potential criticism and rejection by others or can become a preoccupation, thus contributing to psychological distress and isolation (Antonucci et al., 2017; Meshi et al., 2020). Other researchers have found no effects of social media use on older adults'

well-being. For example, feelings of loneliness were similar among older social media users and non-users (Bell et al., 2013). Given these mixed findings, more research is needed to understand the health-related impacts of remote interactions in later adulthood, particularly among older adults who have experienced social losses. Hence, this dissertation examined whether in-person interactions and remote interactions have independent effects on health and emotional health or, conversely, whether remote interactions contribute to health and well-being only when an individual has a minimum amount of in-person interaction, as might be posited based on Leary and Baumeister's (1995) analysis. I also anticipated that remote interactions would be beneficial for older adults who have low levels of support and companionship following widowhood and divorce.

Current Studies

Three studies investigated several untested assumptions and overlooked issues in the literature on social network substitution and compensation in later adulthood, focusing on widowed and divorced older adults. Study 1 examined whether there is empirical evidence in support of the assumption that widowed/divorced older adults experience a greater need for support and companionship than do married older adults. Study 1 also investigated whether this need varied as a function of current levels of support and companionship and the duration of spousal loss. Study 2 sought to build on Study 1 by examining whether a greater need for support and companionship is associated with increases in support and companionship as well as improvements in emotional health over a one-year period. Study 2 explored whether these associations are stronger among widowed/divorced older adults than married older adults and whether having at least a minimum level of support and companionship providers at baseline was associated with greater support and companionship providers over time. Study 3 examined

whether older adults whose support and companionship providers fall below the minimum number derive emotional health benefits from remote interactions. Study 3 also investigated whether the potential benefits of remote interactions are stronger for widowed/divorced older adults if they lacked a minimum number of support and companionship providers. Together, these studies contribute to knowledge regarding need for support and companionship in later life as a factor for substitution and compensation. Additionally, this dissertation will help clarify the potential benefits of remote interactions by examining the joint effects of in-person support and companionship.

Study 1: Need for Support and Companionship Following Social Loss in Later Life

Spousal loss is widespread in late life, and the related physical and psychological health effects are severe. The loss of a spouse is particularly significant because the spousal relationship is a unique and essential source of multiple support and companionship functions (Weiss, 1974; Litwak, 1985). Spouses have been posited to provide instrumental support, emotional support, and companionship, whereas other family members and friends have been found to perform a more delimited set of support functions (Weiss, 1974). Therefore, when an older adult is widowed or divorced, a previously established source of support and companionship is no longer available, leading to adverse physical and mental health effects (Donnelly & Hinterlong, 2010). Researchers examining how older adults adapt to these social losses have identified two distinct yet connected social processes: substitution and compensation (Rook & Charles, 2017; Rook & Schuster, 1996; Zettel & Rook, 2004). Substituting lost ties with alternative ties (i.e., substitute ties) is assumed to benefit physical and mental health following a loss (compensation). People who have lost a spouse are assumed to experience a need to turn to others (substitute ties) to replace some of the support and companionship formerly provided by the spouse. This assumption of need for support has seldom been examined empirically. Therefore, this study aims to investigate the untested assumption that perceived need for support and companionship drives efforts to form substitute social ties after spousal loss. Research examining compensation following substitution in response to spousal loss is also mixed (Utz et al., 2014; Bookwala et al., 2014, Dykstra, 1993; Zettel & Rook, 2004; van Baarsen, 2002). Therefore, the current study also examines whether need-driven substitution of social ties contributes to gains in well-being.

Loss of a Spouse in Later Life

Losing a spouse is an increasingly common experience as people age. The rates of widowhood in later life are high among adults ages 65 - 74 years: 19.5% of women and 6.4% of men are widowed, and among adults ages 85 years or older: 72% of women and 35% of men are widowed (Roberts et al., 2018). Divorce rates are also high in later life, doubling between 1990 – 2010 for those 50 or older (Brown & Lin, 2012).

Considering the crucial role of the spouse as a source of support and companionship, a large body of research has examined the impact of marital loss and dissolution on older adults' well-being and health. Both widowhood and divorce have been associated with increased risks of mortality and depression (Cohen et al., 2007; van Grootheest et al., 1999; Kamiya et al., 2013; Manzoli et al., 2007; Stroebe et al., 2007). A matched-pairs longitudinal study of widowed older men and married older men examined suicidal ideation and actions among the two groups. Widowed older men who had lost their spouse approximately one year earlier revealed that 15.4% of the widowers reported suicidal thoughts or actions, in stark contrast to married men who reported no suicidal thoughts or actions (Byrne & Raphael, 1999). In the same study, widowed older adult men exhibited more depressed mood, greater anhedonia, poorer concentration, more sleep disturbances, and increased mortality risk (including mortality due to suicide) than did married older men (Byrne & Raphael, 1999). A prospective study examining community-dwelling widows, widowers, and married older adults over the course of 10 years showed that depressive symptoms were lowest among older adults who were married (Yu et al., 2021). Gender differences among the widowed emerged; men experienced sustained increases in depressive symptoms. On the other hand, widowed women tend to experience a U-shaped curve of depressive symptoms. Widowed women's depressive symptoms were highest immediately

following the bereavement, then taper over time, but increase again in later years. Regarding divorced older adults, divorced men have been found to report more depression than married men, and divorced women were more likely to have been diagnosed with a psychological condition than married women (Zulkanain & Korenman, 2019). Moreover, widowhood and divorce have been linked to a greater likelihood of developing dementia and cognitive impairment (Liu et al., 2019; Shin et al., 2018).

Substitution and Compensation

Given the adverse impact of spousal losses on health and well-being, researchers have investigated adaptive processes that older adults may engage in after a significant spousal loss. Two complementary processes by which older adults may seek to reorganize their social lives to meet their needs for support and companionship following a social loss are substitution and compensation (Rook & Schuster, 1996). *Substitution* is the process through which a lost social tie is replaced by a *substitute tie*, whereas *compensation* is the outcome of substitution or the extent to which support and companionship provided by the substitute tie boost well-being (Rook & Charles, 2017; Rook & Schuster, 1996; Zettel & Rook, 2004). Researchers examining adaptation to loss often predict that the support provided by substitute ties results in compensatory benefits. Substitute ties do not inevitably confer psychological benefits, however, perhaps because the support provided can be "perfunctory" in nature, or the companionship may be obligatory or not enjoyable for other reasons (Rook & Schuster, 1996, p. 235).

Existing Evidence of Substitution of Social Support and Companionship After Spousal Loss

Empirical research on substitution is limited, but some investigations of widowed older adults provide evidence of increased support from substitute ties after losing a spouse. For example, one early cross-sectional study found that widowed older adults relied upon their

children to meet multiple support needs (Connidis & Davies, 1992). Widowed older adults who were childless were found to rely on other family members and friends for support. Another cross-sectional study found that widowed/divorced older adults relied on children and friends for support, whereas married older adults relied primarily on their spouses for support (Li et al., 2014).

Longitudinal studies have also yielded some evidence for substitution among widowed older adults. In one longitudinal study, widowed older adults received greater emotional support from their children, relatives, and friends than did married older adults (Ha, 2008). Similarly, a prospective study of older adults demonstrated that widowed older adults experienced increased support (especially emotional support) from network members after bereavement compared to their pre-widowhood reports (Guiaux et al., 2007). The authors of this study were not measuring substitution directly, but the increases in support following the loss may signify that substitution occurred.

Less research has been conducted on divorced older adults' substitution, however, the limited research conducted to date provides some evidence of substitution occurring among divorced older adults. A 12-year longitudinal study found that after separation/divorce, participants reported more frequent contact with friends than before the separation/divorce. Divorced men and women received more support from friends compared with pre-separation/divorce levels (Kalmijin, 2012).

Taken together, these studies suggest that substitution occurs after older adults become widowed or divorced. In contrast, empirical investigations of compensation are sparser and have yielded less consistent evidence.

Evidence of Compensation after Spousal Loss

The existing literature examining compensation includes mainly longitudinal examinations of widowed older adults. Researchers typically compare support levels and well-being pre- and post-widowhood or compare widowed older adults to married older adults. For example, in one longitudinal study, widowed older adults who had a close friend who was a confidant reported greater gains in health 12 years later than did widowed older adults who lacked a close friend as a confidant (Bookwala et al., 2014). Similarly, a longitudinal study of widowed adults ages 50 or older found that increased support from friends was associated with decreased loneliness over the first year and a half of bereavement (Pinquart, 2003). In addition to compensation associated with support provided by friends, some longitudinal research has found that support provided by adult children boosts well-being following widowhood. As noted earlier, in a prospective study by Ha (2008), widowed older adults who received more support from their children six months following the loss of their spouse experienced fewer depressive symptoms one year later. Similarly, findings from the cross-sectional study by Li and colleagues (2014) indicated that greater support from children was related to less negative affect among widowed/divorced older adults.

Conversely, some studies have found that compensation does not inevitably occur after substitution (see review by Rook & Charles, 2017). For example, a longitudinal study of widowed women ages 60 and older found that women formed substitute ties, but these ties were unrelated or, in some analyses, inversely related to women's psychological health (Zettel & Rook, 2004). Another study examining widowed adults ages 55-89 revealed that increases in social support from existing social network members one and a half years after losing a spouse did not reduce emotional loneliness (van Baarsen, 2002).

Research examining compensation among divorced older adults is limited. A cross-sectional study investigating compensation revealed that among formerly married (divorced, widowed, or living without a partner) older adults, greater support from children and friends was related to less loneliness (Dykstra, 1993). Research has, however, examined boosts in well-being after divorce in later life through remarriage, but that research is sparse. One study examining adults ages 54 - 65 found that those who remarried after a divorce were more emotionally and socially lonely than older adults who married for the first time (van Tilburg et al., 2015). This study did not specifically examine compensation, but the findings suggest that the emotional well-being of divorced older adults is not necessarily boosted (at least to a level comparable to older adults married for the first time) through remarriage.

In sum, research examining compensation following spousal loss and the formation of substitute ties is mixed. The factors contributing to these mixed findings have not been explored in the literature. The perceived need for support and companionship provided by substitute ties may vary among widowed and divorced older adults. Presumably, this need is elevated after losing a spouse, but it may nonetheless vary across individuals.

Lack of Attention to the Role of Perceived Need in Substitution and Compensation

The existing literature on substitution and compensation has yet to examine perceived need for support and companionship. More specifically, the compensation literature assumes a need for alternative sources of support and companionship when existing sources do not provide adequate support and companionship. Such need is likely to be especially strong in the context of social losses. Researchers have previously defined need for support and companionship objectively by identifying when social networks are lacking. The perceived need for social

support and companionship after widowhood/divorce has received little attention in the literature.

Need in Response to Social Loss

The perceived need for support and companionship in the context of spousal loss is important to consider because of the distinctive importance of spouses in performing multiple necessary support and companionship functions. Therefore, married older adults may have less need for support and companionship than older adults who have experienced spousal loss. Weiss (1974) proposed that specific role relationships (e.g., friends, family members) provide relatively specialized kinds of support and companionship, with friends tending to provide companionship but not instrumental support and family members tending to provide instrumental support but not companionship (Weiss, 1974; Litwak, 1985; Rook & Schuster, 1996). Spouses, in contrast, are considered an essential source of instrumental support, emotional support, and companionship (Weiss, 1974). Consistent with this view, empirical evidence has demonstrated that spouses perform all three functions (e.g., Stevens & Weserhof, 2006).

Because spouses perform a broad range of support and companionship functions, married/partnered older adults may have less need for additional social ties that perform specialized support or companionship than do married older adults. Consequently, remarriage is posited to be the primary form of substitution for widowed/divorced older adults. The role of need for support and companionship in adaptation to spousal loss has received limited attention in the compensation literature. The current study accordingly investigated need for support and companionship as a key factor in substitution and compensation following spousal loss.

Levels of Need Based on Current Support and Companionship

An additional gap in the literature concerns whether the presence of network members who perform the functions typically performed by spouses reduces perceived need for support and companionship. If existing network members provide support and companionship akin to that typically provided by the spouse, then perceived need for these support functions might be attenuated. It is possible, however, that adult children, friends, and other network members may be unable to provide support and companionship that is comparably effective, intimate, or enjoyable to that once provided by the spouse (Rook & Schuster, 1996). In that case, current support and companionship might fail to attenuate the association between spousal loss and perceived need for support and companionship.

Levels of Need Based on Duration of Widowhood and Divorce

Also largely absent in the literature is research examining whether the time elapsed since widowhood and divorce influences older adults' need for support and companionship. It is plausible that very shortly after becoming widowed/divorced, older adults might express less need for support and companionship because network members rally to come to their aid (Lamme et al., 1996). Some of this initial support and companionship tends to be withdrawn over time, however (Lamme et al., 1996). In addition, some existing social ties may wither over time. Indeed, widowed individuals may lose friends because of feeling like the "fifth wheel" during social outings (Lee & Bakk, 2001). Similarly, divorced older adults may lose shared friends who, because of conflicts of loyalty, choose one ex-spouse with whom to remain friends (Terhell et al., 2004). Over time, therefore, as social network members provide less support and companionship, older adults' need for alternative sources of support and companionship is likely to increase. Following this intermediate phase of adapting to spousal loss, a subsequent phase

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may develop in which the widowed/divorced have adapted their social ties and are likely to report less need for support and companionship. Their need for support and companionship may be lower in this later phase because they may have formed social ties that provide adequate support and companionship or may have lowered their aspirations for further support and companionship (e.g., Rook, 2000; Dykstra, 1995). It is possible, therefore, that the association between the duration of loss and need for support and companionship would exhibit an inverted U-shaped pattern. Potential nonlinear associations have seldom been investigated empirically.

Do Widowed and Divorced Older Adults Experience Similar Adaptational Challenges Following Spousal Loss?

Substitution and compensation have largely been examined in the context of widowhood. However, divorce is also a common form of spousal dissolution. Therefore, for the purposes of this study, it is important to consider the differences and similarities between becoming widowed and divorced in later life. Widowhood includes an acute stage of grief and an extended period of adaptation, both of which impact older adults' well-being (Stroebe & Schut, 2010). According to the Dual Process Model of Coping, bereaved individuals experience two phases of adaptation (Stroebe & Schut, 2010). The first phase is loss orientation, which is described as acute grief and involves appraising and processing the loss. The second adaptation phase entails a restoration orientation, during which bereaved individuals reorient themselves to the world without their lost social ties (Stroebe & Schut, 2010). As time since the loss elapses, people gradually become less loss-oriented and more restoration-oriented.

Substitution and compensation, therefore, are more likely to occur in the restoration orientation phase and become a more significant focus over time as less attention is paid to loss-orientation tasks (Stroebe & Schut, 2010). Restoration-oriented tasks involve developing new

roles and modifying one's social network to meet social needs. Research examining the long-term effects of widowhood has supported the idea that ongoing efforts to adapt to spousal loss are needed, even years after the death of a spouse. For example, a longitudinal study of widowed older adult women found significant long-term effects of bereavement four or more years after the loss (e.g., depression; Bennett, 1997). Similarly, one study found that divorced older adults who do not remarry experience long-term effects, which could create a need for support and companionship akin to that experienced by widowed older adults. A longitudinal study conducted in Australia found long-term negative impacts of divorce on well-being among older adults who did not re-partner (Gray et al., 2011).

The Dual Process Model has not been empirically tested in the context of divorce, however, evidence of the long-term detrimental effects of divorce provides reasons to believe that the long-term consequences and challenges of adapting to widowhood and divorce may be similar. Indeed, research examining divorce and widowhood in the same study has found similar adverse effects for older adults who experienced marital disruption. One such study collected longitudinal data on a sample of Australian older adults (Ding et al., 2021). They found that both widowed and divorced participants who were previously married at baseline had similar levels of emotional health approximately six years later, which included higher psychological distress, anxiety, depression, and smoking when compared to participants who stayed married. Several meta-analyses have also found that both divorced and widowed older adults experience higher rates of all-cause mortality (Manzoli et al., 2007; Moon et al., 2011).

Current Study

The processes of adaptation may entail substitution and compensation for both widowed and divorced older adults, with perceived need for support and companionship playing a

potentially important role in both contexts. Therefore, the current study sought to address the following broad research questions: Do older adults who are widowed/divorced express a greater need for support and companionship than do married older adults, and is perceived need less pronounced when current social ties provide support? To answer these questions, the study examined two sets of hypotheses (Hypothesis 1A and Hypothesis 1B). For Hypothesis 1A, I predicted that widowed/divorced older adults would report a greater need for support and companionship than married older adults (Figure 1.1, Path A). For Hypothesis 1B, I predicted that current support and companionship would moderate the relation between marital status and need for support and companionship, such that the relation between marital status and need for support and companionship would be weaker among those with greater current support and companionship (Figure 1.1, Path B).

The next set of hypotheses focuses specifically on widowed/divorced older adults (Hypothesis 2A and Hypothesis 2B). For Hypothesis 2A, I predicted that the duration of widowed/divorced status would exhibit a nonlinear, inverted U-shaped association with need for support and companionship (Figure 1.2, Path A). Specifically, earlier in the course of widowhood/divorce, older adults are more likely to report less need for support and companionship as social ties provide more support and companionship in the immediate aftermath of the spousal loss. After this initial phase, need for support and companionship is expected to increase as bereavement-driven support and companionship dwindle. Eventually, need for support and companionship should taper off as widowed/divorced individuals have likely adjusted their social ties to provide adequate support and companionship or have lowered their aspirations for further support and companionship (e.g., Rook, 2000; Dykstra, 1995). For Hypothesis 2B, I predicted that current support and companionship will moderate the relation

between duration of widowhood/divorce and need for support and companionship, such that the association between the duration of widowhood/divorce and need for support and companionship will be weaker among those with greater current support and companionship (Figure 1.2, Path B). I expect that both nonlinear and linear associations will be lessened by the presence of more support and companionship providers.

Method

Sample

The data for this study were derived from a publicly available dataset: UC Berkeley Social Networks Study (UCNets: Claude Fischer, Principal Investigator). The UCNets study included two age groups: 690 adults ages 50-70 years and 495 adults ages 21-30 years. The current study consisted of a subsample of older participants who were 60-70 years of age when the first wave of data were collected ($N = 411$). Data were collected over three years: May 2015 – January 2016 (Wave 1); February 2017 – June 2017 (Wave 2); and February 2018 – May 2018 (Wave 3).

The participants were, on average, approximately 65 years old, perceived themselves to be in very good health, and had a bachelor's degree. Nearly 65% were women, 39% were widowed and divorced, and 80% were non-Hispanic white.

Procedure

Participants were recruited from San Francisco Bay Area counties through address lists derived from the U.S. Postal Service by a vendor with expertise in address-based sampling, Marketing Systems Group. Researchers sent recruitment letters to 30 randomly selected household addresses in designated census tracts. The researchers sampled census tracts proportional to the population and used post-stratification weighting to estimate the data. Any

household member aged 21-30 or 50-70 was invited to participate in the UCNets study. Interested parties were instructed to call in or register on a website if they wanted to participate, yielding a 10% response rate. The researchers attributed the low response rate to the qualifications necessary to participate in the study, the multi-year study commitment, and a general decline in survey response rates (Offer & Fischer, 2018). Participants were randomly assigned to a face-to-face interview (75%) or a web survey (25%) with substantively identical instruments. Analyses that compared these two groups yielded nonsignificant results with one exception: participants who completed the web survey reported modestly more remote interactions.

Face-to-face interviews were conducted through two research firms, Nexant (Waves 1 and 2) and The Henne Group (Wave 3). The Center for Economic and Social Research at the University of Southern California provided the survey software for the face-to-face and web-based interviews. Ultimately, 522 participants in the older age group completed face-to-face interviews, and 168 completed an online survey. Participants were eligible to participate in baseline assessments and two follow-up assessments. Participants were compensated $25 for the first survey, $35 for the second survey, and $50 for the third survey. The current study is cross-sectional, thus, the baseline data were used to address the hypotheses.

Measures

These measures used in this study include information about participants' sociodemographic characteristics, social networks, support and companionship providers, and need for support and companionship.

Marital Status

Participants were asked their current marital status (1 = *married*, 2 = *widowed*, 3 = *divorced*, 4 = *separated*, 5 = *never married*). A dichotomous variable was computed for the current study by combining widowed or divorced participants into one group and married participants into another group (0 = *married*, 1 = *widowed/divorced*; $n_{married}$ = 187, $n_{widowed/divorced}$ = 158).

An independent samples *t*-test was conducted to determine whether divorced older adults (*n* = 104) in the sample statistically differed from the widowed older adults (*n* = 36) in the sample on the key study variable: need for support. The results indicated that the divorced older adults (*M* = 1.04, SD = 0.99) did not significantly differ in their need for support than widowed older adults (*M* = 0.89, SD = 0.92) [*t*(138), *p* = 0.43, 95% CI(-0.52, 0.22)]. Widowed older adults (*M* = 8.69, SD = 3.57) did, however, differ significantly from divorced older adults (*M* = 7.21, SD = 3.30) [*t*(154) = 2.23, *p* = 0.03, 95% CI(2.75, 2.82)] in their number of support and companionship providers. On average, widowed older adults had approximately 1.5 more social support and companionship providers than divorced older adults.

Need for Social Support and Companionship

Participants were asked three questions about whether they wished they knew more people who could provide emotional support, instrumental support, and companionship. For emotional support, participants were asked, "Do you sometimes wish you knew more people you could talk to about your personal concerns, or do you feel you already know enough people to talk with right now?" For instrumental support, participants were asked, "What about wishing you knew more people who could help you with things like work around the home or shopping for you if you are sick, or do you know enough people to rely on for help?" For companionship,

participants were asked, "Do you sometimes wish you knew more people you could get together with to have a good time, or do you feel you already know enough people to have a good time?" Participants responded to each question by indicating whether they wished they knew more people or knew enough people already (0 = *know enough already*, 1 = *wish I knew more*). I interpreted wish to be synonymous with need, in part because the question itself is structured to probe whether participants felt they already had enough people to provide that support or companionship. Previously published research similarly has interpreted a wish for more support as a need for support (Christen et al., 2019; Haider et al., 2023). For the current study, a count variable of need for support or companionship was created by summing the number of questions to which a participant indicated that they wished they knew more people, with higher scores indicating a greater expressed need for support and companionship (0 = *expressed no need for additional support or companionship,* 3 = *expressed need for three additional forms of support or companionship*). The Kuder-Richardson Formula 20 (KR-20) was conducted to assess the internal reliability of the constructed need for support and companionship variable. The results indicate moderate reliability ($\rho = 0.62$).

Number of Support and Companionship Providers

Participants were asked to think about which social network members typically provide emotional support, instrumental support, and companionship. For emotional support, participants were asked to list up to six names of people with whom they had confided when they had personal matters or concerns, such as issues with relationships, important things in their lives, and difficult experiences. For instrumental support, participants were asked to list up to six names of people who had provided practical help, done repairs, picked up something at the store, or provided a ride. Additionally, participants were asked to list up to six names of people whom

they either could ask or had asked for help if they were seriously injured or sick. For companionship, participants listed up to nine names of people with whom they typically did social activities, such as going shopping, going to a park, visiting, getting together for drinks or a meal, or going out to concerts, plays, clubs, and sports, or other events. Participants were also asked who provides them with informational support. Because the data set lacks a variable assessing need for informational support, informational support was omitted from the analyses. A composite variable was constructed to reflect the number of support or companionship providers in a participant's social network (the possible range is 0 – 27 support or companionship providers), which tallied all the unique support or companionship providers' names in a participant's network.

Duration of Widowhood/Divorce

Participants who indicated they were currently widowed were asked how many years or months ago their spouse passed away (the observed range was 1-39 years). Participants who indicated they were currently divorced were asked how many years or months ago they had become divorced (the observed range was 1-50 years). A combined duration variable was constructed to represent the years a participant was widowed or divorced.

Covariates

The analyses included the following covariates: age, gender, race/ethnicity, self-rated health, and education. Age was measured by asking the participants the month and year in which they were born. Race and ethnicity were measured by asking participants, "Are you of Hispanic, Latino, or Spanish origin?" (1 = *yes*; 2 = *no*) and "What is your race?" [1 = *White*, 2 = *Black, African American*, 3 = *American Indian, (Alaskan Native)*; 4 = *Asian*; 5 = *Hispanic, Latino*; 6 = *Other*]. A dichotomized variable was constructed to represent minority status (0 = *does not*

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belong to a minority race/ethnic group, 1 = *belongs to a minority race/ethnic group*). Self-rated health was measured by asking participants a single question, "Would you say your health is excellent, very good, good, fair, or poor?" (1 = *Excellent*; 2 = *Very Good*; 3 = *Good*; 4 = *Fair*; 5 = *Poor*). Educational attainment was measured by asking participants, "What is the highest year or degree of schooling you have completed?" [1 = *Less than 9th grade*; 2 = *9th grade to 12th grade, but did not graduate*; 3 = *High school graduate*; 4 = *GED or equivalent*; 5 = *Some college;* 6 = *Associate's degree*; 7 = *Bachelor's degree*; 8 = *Master's degree*; 9 = *Higher professional degree (like MD, JD, or PhD)*].

Analytic Plan

All analyses were conducted on IBM SPSS Statistics (Version 29). Poisson regressions were used because the constructed need for support and companionship variable is a count variable. Distributions of need for support and companionship resemble a Poisson distribution. Descriptive statistics on the study's key variables and covariates, including the means, standard deviations, and frequencies, are presented in Table 1.1. Intercorrelations among the key study variables are presented in Table 1.2. Standardized deviance residuals were calculated to identify potential outliers. Twelve outliers were identified (standardized deviance residuals exceeded the statistical cutoff of 3; Penn State, 2018) and were subsequently removed from the analyses.

Hypothesis Tests

To examine Hypothesis 1A, a Poisson regression analysis examined need for support and companionship as a function of marital status (married vs. widowed/divorced) and the covariates. To examine Hypothesis 1B, a Poisson regression analysis examined need for support and companionship as a function of marital status (married vs. widowed/divorced), the number of

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support and companionship providers (moderator), and the interaction term (number of support and companionship providers X marital status).

If the coefficient for the interaction term was significant, conditional effects analyses were performed to determine whether the simple slopes of marital status (widowed/divorced vs. married) within each level of the number of current support and companionship providers differed significantly. For ease of interpretation, the simple slopes were evaluated at one standard deviation below the mean, the mean, and one standard deviation above the mean (-1 SD = *low levels of support and companionship providers*, M = *average levels of support and companionship providers*, +1 SD = *high levels of support and companionship providers*).

To examine Hypothesis 2A, a Poisson regression analysis examined need for support and companionship as a function of the duration of widowhood and divorce, the quadratic duration of widowhood term, and the covariates. The quadratic version of the duration variable (duration of widowhood/divorce^2) was constructed and entered into the model to test for a curvilinear pattern.

To examine Hypothesis 2B, a Poisson regression examined need for social support and companionship as a function of the duration of widowhood, the number of support and companionship providers, a first-order interaction term (duration of widowhood/divorce X number of support and companionship providers), a second-order interaction term (duration of widowhood/divorce^2 X number of support and companionship providers) to test for a curvilinear pattern, and the covariates.

If the coefficient for any of the interactions was significant, conditional effects analyses were performed to determine whether the simple slopes of duration of widowhood/divorce and the number of support and companionship providers) within each level of need for support and companionship significantly differed. Again, for ease of interpretation, the slopes were evaluated

at one standard deviation below the mean, the mean, and one standard deviation above the mean [duration of widowhood (-1 SD = *early in the course of widowhood/divorce*, *M* = *average years spent widowed/divorced*, +1 SD = *later in the course of widowhood*/divorce); number of support and companionship providers (-1 SD = *low levels of support and companionship providers*, *M* = *average levels of support and companionship providers*, +1 SD = *high levels of support and companionship providers*)].

Results

Initial Analyses

Table 1.1 presents descriptive statistics, and Table 1.2 presents intercorrelations among all study variables. Participants, on average, had approximately eight social support and companionship providers, expressed a need for one support and companionship function, and were widowed/divorced 18 years. Married participants made up nearly half of the sample (53%), and approximately 39% of the sample were widowed/divorced. Notably, a need for support and companionship was significantly correlated with the number of support and companionship providers, however, in a counterintuitive direction. A greater need for support and companionship was related to fewer support and companionship providers ($p < .001$).

Do Widowed/Divorced Older Adults Report a Greater Need for Support and Companionship than Married Older Adults? (H1A)

The Poisson regression examining need for support and companionship as a function of marital status (0 = *married,* 1 = *widowed/divorced*) is presented in the top panel of Table 1.3. Results revealed a significant main effect of marital status on need for support and companionship ($p < .001$). The need for one additional support and companionship function is 80% higher for widowed/divorced older adults compared to married older adults. These results

support the hypothesis that widowed/divorced older adults report a greater need for support and companionship than do married older adults.

Is the Association Between Marital Status and Need for Support and Companionship Weaker Among Those With More Support and Companionship Providers? (H1B)

The Poisson regression examining the association between marital status and need for support and companionship, moderated by support and companionship providers, is presented in the bottom panel of Table 1.3. There was a significant main effect of marital status ($p < .001$). The need for one additional support and companionship function is 77% higher for widowed/divorced older adults compared to married older adults. The interaction between marital status and the number of support and companionship providers was nonsignificant ($p = 0.69$) (Table 1.3, bottom panel). Together, these results do not support the hypothesis but, rather, indicate that the number of support and companionship providers does not influence the relation between marital status and need for support and companionship.

Is the Association Between the Duration of Widowhood/Divorce and Need for Support and Companionship Curvilinear? (H2A)

The Poisson regression examining the curvilinear association between the duration of widowhood/divorce and need for support and companionship is presented in the top panel of Table 1.4. The association between the duration of widowhood/divorce (linear) and need for support and companionship was nonsignificant ($p = 0.74$) The association between the duration of widowhood/divorce squared (curvilinear) and need for support or companionship was also nonsignificant ($p = 0.92$). This finding does not support the hypothesis that a curvilinear association exists between widowhood/divorce and need for support and companionship.

Is the Curvilinear Association Between Need for Support and Companionship and the Duration of Widowhood/Divorce Weaker Among Those with Greater Current Support and Companionship Providers? (H2B)

The Poisson regression examining the curvilinear association between need for support and companionship and the duration of widowhood/divorce moderated by support and companionship providers is presented in the bottom panel of Table 1.4. No significant main effects emerged, and the interactions between the number of support and companionship providers and years widowed/divorced (linear) ($p = 0.34$) and years widowed/divorced squared (curvilinear) were nonsignificant ($p = 0.42$) (Table 4, bottom panel). Again, these findings contradict the hypothesis, suggesting that the duration of widowhood/divorce does not significantly impact older adults' need for support and companionship when considering current support and companionship.

Discussion

This study aimed to investigate a common premise in the substitution and compensation literature: older adults who have lost a spouse experience a pronounced need for support or companionship, leading to substitution and compensation. Evidence exists that suggests substitution occurs following a spousal loss (Connidis & Davies, 1992; Li et al., 2014; Bookwala et al., 2014; Guiaux et al., 2007; Kalmijin, 2012), but it is unknown whether a need for social support precedes such substitution. To address this gap in knowledge, I hypothesized that widowed/divorced older adults, a group that often loses access to support and companionship, would report a greater need for support and companionship than married older adults (H1A). Moreover, I predicted that current support and companionship would moderate this association. I

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anticipated that need for support and companionship would be weaker among those with greater existing support and companionship (H1B).

In addition to testing the role of need for support and companionship, this study aimed to investigate the association between years since becoming widowed/divorced on the support and companionship needs of older adults. More specifically, research has seldom considered an inverted U-shaped association between need for support and companionship and the duration of widowhood or divorce. Older adults were expected to need less support and companionship immediately following the social loss, as social network members come forward to provide support, but then increase in the intermediate phase, as support providers retreat and provide less support. In the final phase, need for support was expected to decrease as older adults adapted and forged new sources of support and companionship. Specifically, I hypothesized that the duration of widowhood/divorce would be associated with need for support and companionship in an inverted U-shaped pattern (H2A). I also expected that current support and companionship would influence the association between the duration of widowhood/divorce and need for support and companionship. Specifically, I anticipated that the association would be weaker among those with greater current support (H2B). The study results and the questions they raise are discussed below.

Marital Status and Need for Support and Companionship

The loss of a spouse through widowhood or divorce is a common experience in later life. Such a loss has important implications for older adults' health and well-being because spouses are thought to provide essential support and companionship functions. Research has investigated substitution and compensation to understand better how older adults cope with spousal loss (Rook & Schuster, 1996). Absent in these studies, however, is an empirical consideration of

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perceived need for support and companionship following spousal loss. Instead, need is assumed to be an antecedent to substitution. The findings of the current study support this assumption that widowed/divorced older adults experience a greater need for support and companionship than do married older adults.

It is plausible that divorced older adults may experience inadequate support and companionship from their former spouse. Indeed, an independent samples *t*-test confirmed that widowed and divorced older adults ($M = 1.00$, SD $= 0.97$) reported a greater need for social support and companionship than did married older adults in this sample ($M = 0.58$, SD $= 0.73$) [$t(300) = -4.27$, $p < .001$, 95% CI (-0.61, -0.23)]. These results support the notion that older adults who lose access to spousal support through widowhood and divorce experience a need for support, perhaps prompting substitution and compensation. On the one hand, older married adults whose marriages are unsatisfying or conflict-ridden might also perceive a need for additional support and companionship. On the other hand, older married adults in low-quality marriages may not seek out other ties because of their existing spousal support despite having a greater need. Future research would benefit from examining marital quality as a potential factor.

The Role of Current Social Support and Companionship in Need for Support and Companionship

Older adults with small support and companionship networks may also need support and companionship, but the role of current support and companionship has seldom been examined in the literature. In order to empirically test the influence of the existing network, I examined whether current social support and companionship diminish widowed/divorced older adults' need for greater support and companionship. Contrary to expectations, however, current support and companionship did not moderate the association between marital status and need for support.

Thus, regardless of how many support and companionship providers widowed/divorced older adults had in their social network, their need for support and companionship still exceeded that of married older adults.

For widowed/divorced older adults, it is possible that support and companionship from social network members are not enough to match the support provided by the spouse. Relationship specialization theorists posit that support and companionship functions provided by spouses are unique (Weiss, 1974). Spouses are thought to provide multiple support and companionship functions (e.g., emotional support, instrumental support, and companionship). Therefore, substituting for the support provided by the spouse may not diminish need for support and companionship. Additionally, the support provided by the substitute tie may not be effective because the recipient may feel the support is obligatory or forced (Antonucci, 1985; Rook & Schuster, 1996). Similarly, the emotional support typically provided by spouses may feel uncomfortable to receive from other sources (e.g., adult children). Current support providers may also experience difficulty recognizing need for support and companionship by older adults who have lost a spouse (through widowhood or divorce) and may be less willing to offer support and companionship (Finfgeld-Connett, 2005). Such obstacles to receiving support may make substituting for the loss of a spouse difficult.

Curvilinear Association Between Duration of Widowhood/Divorce and Need for Support and Companionship

Need for support and companionship may fluctuate as time since widowhood and divorce elapses. Previous theory and research have suggested a non-linear relationship between the duration of widowhood and support received from substitute ties (e.g., Rook, 2000; Dykstra, 1995). Untested in this work was whether need for support follows a similar inverted U-shaped

pattern, in which need for support is low in the immediate aftermath of the loss, when more support and companionship are available. After this initial phase, support and companionship decrease, and need for support and companionship is expected to rise. In later stages, need for support would decrease again after widowed/divorced older adults adapt through substitution and compensation. The results, however, found neither a linear nor a curvilinear association between the duration of widowhood/divorce, and need for support and companionship. These results contrast with the dual process model of coping, in which theorists posit that the restoration-oriented stage, when substitution and compensation are likely to occur, is more prevalent in later stages of widowhood/divorce (Strobe & Schut, 2010). Instead, our findings suggest that widowed/divorced older adults need more support and companionship, regardless of time since widowhood and divorce.

It is possible that widowhood and divorce have lingering effects that sustain a consistent need for support and companionship. For example, among widowed older adult women, depression can remain elevated for several years (Bennett, 1997). Being divorced has also been associated with chronic stress and deteriorating physical health ten years after the divorce (Lorenz et al., 2006). Gender differences post-widowhood may also play a role. Research has shown that widowed older adult men experience stable increases in depressive symptoms, whereas widowed adult women display a more inverted U-shaped curve of depressive symptoms (Yu et al., 2021). Because widowed/divorced older adults experience enduring adverse effects, it is possible that they still have a strong need for support and companionship.

The design of this study may also play a role in the nonsignificant effects of duration of widowhood and divorce. The study did not focus specifically on newly widowed/divorced older

adults, who were tracked over time. Therefore, tests of linear and curvilinear effects of duration may have been limited, perhaps yielding nonsignificant results.

Limitations and Future Directions

The current study has some limitations that warrant consideration. First, the study is cross-sectional, which precludes causal inferences. Longitudinal examinations are needed to draw more convincing causal inferences. Without a longitudinal assessment, it is impossible to know whether perceived need for support and companionship drives increases in received support and companionship (need-driven substitution). Study 2 of this dissertation examines need-driven substitution longitudinally.

Secondly, the data set lacks information about pre-widowhood and pre-divorce need for support and companionship. Unknown is whether the social network members who provided support and companionship at the time of data collection, provided levels of support and companionship comparable to levels received before the loss of the spouse. Knowing pre-widowhood and pre-divorce levels of need and support would afford a better understanding of how need for support and companionship varies over time in the context of spousal loss. It is also possible that the withdrawal of support and companionship early in the course of widowhood/divorce is not adequately captured by the current sample. Indeed, the average time since widowhood and divorce in this sample was approximately 18 years. Previous studies have implemented multi-year, longitudinal designs (e.g., Changing Lives of Older Couples; Nesse et al., 2006) but have lacked an examination of perceived need for support and companionship. Future research would benefit from a prospective approach with pre-widowhood and divorce levels of need and current support and companionship, however, such research is seldom conducted because of financial and time constraints.

The small number of widows in the sample ($n = 36$) constitutes another limitation. Therefore, statistical analyses examining the divorced and widowed separately would have been underpowered. The original investigators of the UCNets study capped the age of participant eligibility at 70 years, which may have reduced the number of widowed individuals in the data set. Widowhood and divorce both have long-term adverse effects on older adults' well-being over time (Bennett, 1997; Gray et al., 2011), which makes it reasonable to consider them together in the current study. Combining these two marital status groups, however, might overlook important nuances (e.g., societal treatment, grief, financial changes, etc.) that may influence older adults' perceived need for social support and companionship following spousal loss. Despite this limitation, the results of this study indicate that the widowed/divorced do seem to need greater support and companionship, regardless of their current support and companionship and the duration of widowhood/divorce. Given the small subsample of widowed older adults and the significant difference between widowed and divorced older adults in their number of current support and companionship providers, the results from the current study should be interpreted with caution, and future research should seek to examine widowed and divorced older adults separately.

Another limitation that warrants consideration is the low response rate for this study. Only 10% of all participants who were sent recruitment materials completed the survey. Of the older sample (ages 50-70 years), only 3% responded, which likely resulted in a no-response bias. This low response rate means there is a high chance that the results presented in this study are not generalizable to the broader population. It is possible that the older adults who ultimately did not respond differ significantly in their needs, sociodemographic information, and social support.

Future research would benefit from examining the research questions presented in this study among a representative sample of older adults.

Despite these limitations, this study has several strengths. First, it examined perceived need for support and companionship, a construct often assumed but seldom assessed in the literature on social network substitution and compensation. Second, this study examined curvilinear, as well as linear, associations between perceived need for support and companionship and the duration of widowhood/divorce. Curvilinear associations are seldom discussed in the literature on substitution and compensation. This study adds an additional empirical examination of nonlinear associations with duration of widowhood and divorce.

Conclusion

Research on older adults' adaptation to spousal loss has yet to consider empirically whether the commonly assumed perceived need for social support and companionship increases after widowhood or divorce, prompting the formation of substitute social ties. The findings of the current study partially support this assumption as widowed/divorced older adults reported a greater need for support and companionship than did married older adults, however, efforts to further explain need for social support and companionship yielded null results. The duration of widowhood and the existence of current support and companionship were not significantly associated with need for social support and companionship. Future research would benefit from examining these findings in a representative sample, where non-linear associations may be more plausible. This study, being among the first of its kind to examine perceived need in the context of spousal loss, provides an empirical lens on an assumed antecedent to substitution and compensation.

Figure 1.1

Model of Need for Support and Companionship as a Function of Marital Status and Current Support and Companionship Providers
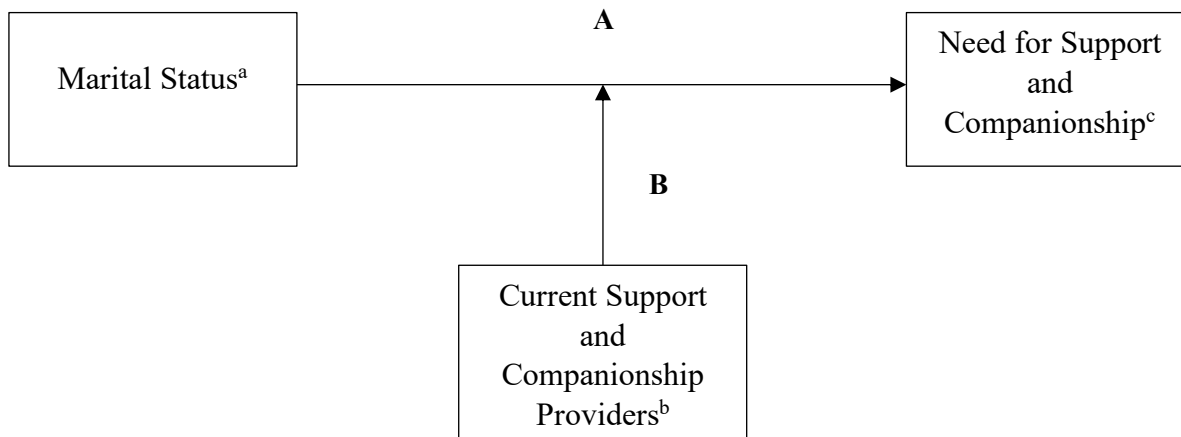
Note. Each association represented with a letter corresponds with a Hypothesis. Association A represents Hypothesis 1A, and Association B represents Hypothesis 1B. All variables were measured at baseline of the UC Berkeley Social Networks Study (UCNets). [a]Marital status (0 = *married*, 1 = *widowed/divorced*). [b]The possible range is 0-27 support or companionship providers named in participants' social networks. [c]Need for support or companionship [range: 0-3 (0 = *expressed no need for additional support or companionship,* 3 = *expressed need for three additional forms of support or companionship*)].

Figure 1.2

Model of Need for Support and Companionship as a Function of Duration of Widowhood/Divorce and Current Support and

Companionship Providers
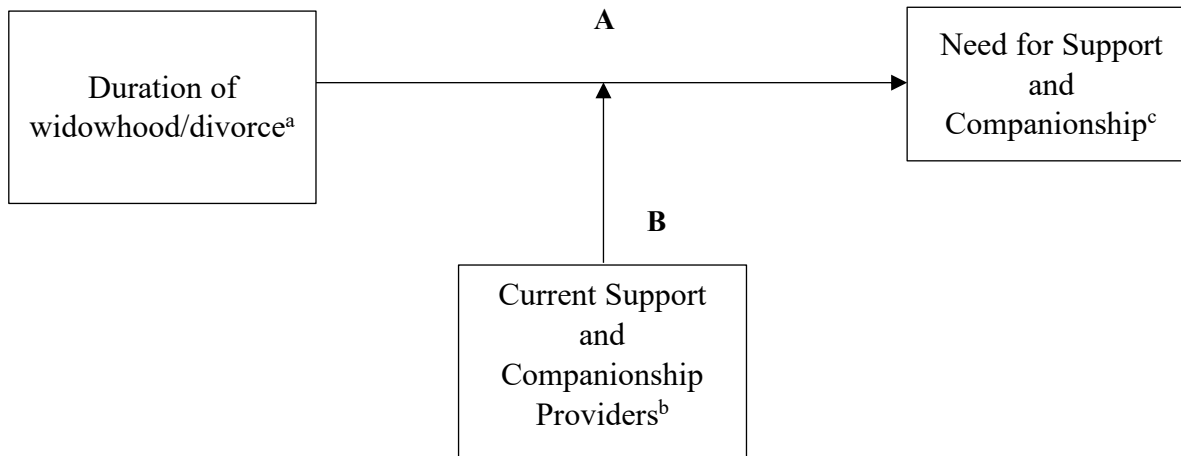
Note: Subpopulation of Widowed/Divorced Older Adults. Each association represented with a letter corresponds with a Hypothesis.

Association A represents Hypothesis 2A. Association B represents Hypothesis 2B. [a]The possible range is 1-50 years since widowhood

or divorce. [b]The possible range is 0-27 support or companionship providers named in participants' social networks. [c]Need for support

or companionship [range: 0-3 (0 = *expressed no need for additional support or companionship, 3 = expressed need for three*

additional forms of support or companionship)].

Table 1.1

Descriptive Statistics of Key Variables

Variable[a] (ns = 159-399)	*M*(SD)
Age[b]	64.98(3.07)
Health[c]	2.37(1.09)
Education[d]	6.88(1.44)
Duration of Widowhood/Divorce[e]	18.09(11.89)
Need for Support[f]	0.82(0.92)
Support Providers[g]	7.66(3.43)
	n(%)
Female[h]	260(65.16%)
Married[i]	178(53.29%)
Widowed/Divorced[i]	156(39.10%)
Race/Ethnicity[j] (1 = minority status)	81(20.30%)

Note. SD = standard deviation. [a]All variables were measured at the baseline of the UC Berkeley Social Networks Study (UCNets).

[b]The possible range for age is 60-70. [c]Health refers to self-rated health, [range: 1-5 (1 = *excellent*, 5 = *poor*)]. [d]Education [1 = *Less than 9th grade*; 2 = *9th grade to 12th grade, but did not graduate*; 3 = *High school graduate*; 4 = *GED or equivalent*; 5 = *Some college;* 6 = *Associate's degree*; 7 = *Bachelor's degree*; 8 = *Master's degree*; 9 = *Higher professional degree (like MD, JD, or PhD)*].

[e]The possible range is 1-50 years since widowhood or divorce. [f]Need for support or companionship [range: 0-3 (0 = *expressed no need for additional support or companionship,* 3 = *expressed need for three additional forms of support or companionship*)]. [g]The possible range is 0-27 support or companionship providers named in participants' social networks. [h]Gender (1 = *male*, 2 = *female*). [i]Marital

status (0 = *married*, 1 = *widowed/divorced*). [j]Race/Ethnicity (0 = *non-Hispanic white*, 1 = *Black/African American, American Indian or Alaska Native, Asian, Hispanic/Latino*). The number of participants varies because the duration of widowhood/divorce is a subsample.

Table 1.2

Intercorrelations for Key Study Variables (ns = 143-362)

Variable[a]	M(SD)	1	2	3
1. Duration of Widowhood/Divorce[b]	18.09(11.89)	—	0.93	0.01
2. Need for Support[c]	0.82(0.92)		—	-0.18***
3. Support and Companionship Providers[d]	7.66(3.43)			—

Note. [a]All variables were measured at the baseline of the UC Berkeley Social Networks Study (UCNets). [b]The possible range is 1-50 years since widowhood or divorce. [c]Need for support or companionship [range: 0-3 (0 = *expressed no need for additional support or companionship,* 3 = *expressed need for three additional forms of support or companionship*)]. [d]The possible range is 0-27 support or companionship providers named in participants' social networks. The number of participants varies because the duration of widowhood/divorce is a subsample.

[+]$p < .09$ *$p < .05$. **$p < .01$. ***$p < .001$.

Table 1.3

Need for Support and Companionship as a Function of Marital Status, Support and Companionship Providers, and their Interaction

$n = 287$ Variable[a]	b(SE)	IRR (Exp(b))	95% CI Lower, Upper	Wald χ^2
Model without Interaction Terms (H1A)				
Intercept	-1.00(1.50)	0.37	0.02, 6.92	0.45
Age[b]	-0.01(0.02)	0.99	0.95, 1.03	0.26
Health[c]	0.18(0.06)	1.19	1.06, 1.34	8.36**
Gender[d]	-0.05(0.15)	0.95	0.71, 1.27	0.10
Education[e]	1.11(0.05)	1.12	1.02, 1.23	5.57*
Race/Ethnicity[f]	0.00(0.16)	1.00	0.73, 1.38	0.00
Marital Status[g]	0.59(0.15)	1.80	1.35, 2.39	16.10***
Model Fit	$\chi^2(6) = 30.77$, $p < .001$, McFadden's Pseudo $R^2 = 0.05$			
Model with Interaction Terms (H1B)				
Intercept	-1.14(1.50)	0.32	0.02, 6.08	0.58
Age[b]	-0.01(0.02)	0.99	0.95, 1.03	0.20
Health[c]	0.16(0.06)	1.17	1.04, 1.32	6.44*
Gender[d]	0.00(0.15)	1.00	0.75, 1.35	0.00
Education[e]	0.12(0.05)	1.12	1.02, 1.23	5.79*
Race/Ethnicity[f]	0.00(0.16)	1.00	0.73, 1.38	0.00
Marital Status[g]	0.57(0.15)	1.77	1.33, 2.36	15.06***
Support & Companionship Providers[h]	-0.05(0.03)	0.95	0.90, 1.02	2.19
Marital Status x Support & Companionship Providers	0.02(0.04)	1.02	0.94, 1.10	0.16
Model Fit	$\chi^2(8) = 34.21$, $p < .001$, McFadden's Pseudo $R^2 = 0.06$			

Note. Continuous predictors were centered before being entered into the model. The top panel presents the results of a multiple regression analysis examining H1A. The bottom panel presents the results of a multiple regression analysis examining H1B. [a]All variables were measured at the baseline of the UC Berkeley Social Networks Study (UCNets). [b]The possible range for age is 60-70.

^cHealth refers to self-rated health, [range: 1-5 (1 = *excellent*, 5 = *poor*)]. ^dGender (1 = *male*, 2 = *female*). ^eEducational attainment [1 =

Less than 9th grade; 2 = *9th grade to 12th grade, but did not graduate*; 3 = *High school graduate*; 4 = *GED or equivalent*; 5 = *Some*

college; 6 = *Associate's degree*; 7 = *Bachelor's degree*; 8 = *Master's degree*; 9 = *Higher professional degree (like MD, JD, or PhD)*].

^fRace/ethnicity(0 = *non-Hispanic white*, 1 = *Black/African American, American Indian or Alaska Native, Asian, Hispanic/Latino*).

^gMarital status (0 = *married*, 1 = *widowed/divorced*). ^hThe possible range is 0-27 support or companionship providers named in

participants' social networks.

⁺$p < .09$ *$p < .05$. **$p < .01$. ***$p < .001$.

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Table 1.4

Need for Support and Companionship as a Function of Years Widowed/Divorced, Support and Companionship Providers, and their

Interaction

$n = 136$[a]	b(SE)	IRR (Exp(b))	95% CI Lower, Upper	Wald χ^2
Model without Interaction Terms (H2A)				
Intercept	-0.62(1.95)	0.54	0.01, 24.69	0.10
Age[b]	-0.02(0.03)	0.98	0.93, 1.04	0.42
Health[c]	0.19(0.07)	1.20	1.05, 1.39	6.57*
Gender[d]	-0.11(0.20)	0.90	0.61, 1.37	0.27
Education[e]	0.22(0.06)	1.24	1.09, 1.41	11.06***
Race/Ethnicity[f]	-0.19(0.21)	0.83	0.55, 1.24	0.86
Duration of Widowhood/Divorce[g]	-0.01(0.03)	1.01	0.96, 1.06	0.11
Duration of Widowhood/Divorce[2h]	0.00(0.00)	1.00	1.00, 1.00	0.01
Model Fit	$\chi^2(7) = 17.52$, $p = 0.01$, McFadden's Pseudo $R^2 = 0.05$			
Model with Interaction Terms (H2B)				
Intercept	-0.76(1.99)	0.47	0.01, 22.86	0.15
Age[b]	-0.02(0.03)	0.98	0.93, 1.04	0.30
Health[c]	0.18(0.07)	1.20	1.04, 1.39	6.30*
Gender[d]	0.00(0.21)	1.00	0.66, 1.52	0.00
Education[e]	0.20(0.06)	1.23	1.08, 1.39	10.29***
Race/Ethnicity[f]	-0.22(0.21)	0.80	0.53, 1.20	1.15
Duration of Widowhood/Divorce[g]	0.01(0.01)	1.01	0.99, 1.03	1.20
Duration of Widowhood/Divorce[2h]	0.00(0.00)	1.00	1.00, 1.00	0.01
Support Providers & Companionship Providers[i]	-0.03(0.04)	0.97	0.90, 1.04	0.91
Duration of Widowhood/Divorce x Support & Companionship Providers	0.00(0.00)	1.00	1.00, 1.01	0.91
Duration of Widowhood/Divorce^2 x Support & Companionship Providers	0.00(0.00)	1.00	1.00, 1.00	0.64
Model Fit	$\chi^2(10) = 20.53$, $p = 0.03$, McFadden's Pseudo $R^2 = 0.05$			

Note. Continuous predictors were centered before being entered into the model. The top panel presents the results of a multiple regression analysis examining H2A. The bottom panel presents the results of a multiple regression analysis examining H2B. [a]All variables were measured at the baseline of the UC Berkeley Social Networks Study (UCNets). [b]The possible range for age is 60-70. [c]Health refers to self-rated health, [range: 1-5 (1 = *excellent*, 5 = *poor*)]. [d]Gender (1 = *male*, 2 = *female*). [e]Educational attainment [1 = *Less than 9th grade*; 2 = *9th grade to 12th grade, but did not graduate*; 3 = *High school graduate*; 4 = *GED or equivalent*; 5 = *Some college;* 6 = *Associate's degree*; 7 = *Bachelor's degree*; 8 = *Master's degree*; 9 = *Higher professional degree (like MD, JD, or PhD)*]. [f]Race/Ethnicity (0 = *non-Hispanic white*, 1 = *Black/African American, American Indian or Alaska Native, Asian, Hispanic/Latino*). [g]The possible range is 1-50 years since widowhood or divorce. [h]Duration of widowhood/divorce was squared to detect possible nonlinear (e.g, curvilinear) effects. [i]The possible range is 0-27 support or companionship providers named in participants' social networks.

[+]$p < .09$ *$p < .05$. **$p < .01$. ***$p < .001$.

Study 2: Older Adults' Need for Support and Companionship Following Spousal Loss Over Time

Widowed and divorced older adults experience a myriad of adverse psychological and physical health effects after losing their main support and companionship providers (Cohen et al., 2007; van Grootheest et al., 1999; Kamiya et al., 2013; Manzoli et al., 2007; Stroebe et al., 2007). But does the loss of a spouse invariably lead to a need for support and companionship, and does such need drive substitution and compensation over time?

Researchers suggest that older adults use two social processes to adapt to a loss: substitution and compensation (East & Rook, 1992; Rook & Schuster, 1996). Evidence suggests that individuals engage in substitution following a key social loss over time (Guiaux et al., 2007; Kalmijin, 2012). For example, a prospective study found that widowed older adults experience higher levels of emotional support from network members after widowhood than before bereavement (Guiaux et al., 2007). These increases in support through either new or existing social ties are considered substitution. Concerning compensation, some studies have found that substituting for the support and companionship provided by the spouse with new or existing social ties results in better health, reduced loneliness, and reduced depressive symptoms (Bookwala et al., 2014; Pinquart, 2003). Other studies, in contrast, have found that substitution does not inevitably boost well-being (Zettel & Rook, 2004; van Baarsen, 2002). Moreover, this mix of research on substitution and compensation over time has seldom evaluated the role of perceived need for support and companionship as a motivator for substitution in the context of spousal loss. The current study sought to address this gap in the literature by examining need-driven substitution and compensation over time.

The Potential Role of Perceived Need for Social Support and Companionship in Adaptation to a Spousal Loss

The perceived need for support and companionship has not been assessed empirically in most studies of adaptation to a significant social loss, such as the loss of a spouse. Instead, such losses are assumed to motivate people to seek alternative sources of support and companionship over time (Zettel & Rook, 2004; Bookwala et al., 2014; Ha, 2008; Guiaux et al., 2007). Additionally, a longitudinal examination of perceived need for support and companionship and substitution and compensation allows for an examination of whether need-driven substitution indeed results in compensation from one time point to another. Married older adults in strained marriages may also have an elevated need for support and companionship and can find spousal support unsatisfying, even if they have not experienced the loss of a spouse (Birditt et al., 2016). For example, if marital quality is low, older adults may receive lower-quality spousal support, impacting physical health and inducing inflammation (Wilson et al., 2021). Therefore, need for support and companionship likely varies for older adults who are married or have experienced spousal loss.

Hence, the current study aimed to test whether the perceived need for support and companionship indeed results in increased support and companionship (i.e., need-driven substitution) and whether such increases are greater for widowed and divorced older adults than married older adults. This study also aimed to test whether need-driven substitution confers benefits to emotional health and whether such benefits are greater for widowed and divorced older adults than for married older adults. Additionally, this study sought to examine whether existing social relationships play a role in need for substitution and compensation. More specifically, is it possible that widowed/divorced older adults have enough support and

companionship providers to diminish need for support and companionship? If so, does having enough support and companionship providers influence whether need drives substitution and compensation?

What is the Minimum Number of Social Ties Needed to Preserve Emotional Health?

In their seminal review paper, Baumeister and Leary (1995) argue that all humans require a minimum number of social ties that provide support and companionship to preserve well-being (i.e., the need to belong). Individuals who lack this minimum number of support and companionship providers are posited to experience adverse effects (e.g., difficulty coping, stress, psychological disorders, health issues), creating motivation to expand their social network (Baumeister & Leary, 1995). Once the minimum number of support and companionship providers is reached, the motivation to expand one's network should dissipate (satiation, Baumeister & Leary, 1995). This view contrasts with a "more is better" view that having more support and companionship providers confers greater benefits in a straightforward, linear fashion. Baumeister and Leary (1995) do not specify the number of support and companionship providers that would constitute the necessary minimum, and they do not consider how a minimum threshold might operate in the context of a social loss. If an older adult's existing ties or ties formed following a social loss contain a minimum number of close, supportive interaction partners, would the older adult be less motivated to develop (or continue developing) substitute ties? The current study sought to examine how existing support and companionship providers in older adults' social networks influence need for support and companionship among the widowed/divorced compared to the married.

Evidence of Satiation

Baumeister and Leary (1995) defined satiation as "diminished motivation that ensues when need to belong is satisfied" (p. 515). When one is satiated, the authors argue that procuring new social ties would result in "diminishing returns" (Baumeister & Leary, 1995, p. 515). In the context of spousal loss, it is possible that widowed/divorced older adults may be satiated by their current support and companionship providers, thereby reducing need for support and companionship.

One study sought to assess whether satiation impacted older women's motivations to develop new friendships. In a longitudinal intervention study of older Dutch women, researchers examined whether women who participated in an intervention, the Friendship Enrichment Program, expanded friendships either through making new social relationships or deepening existing social ties (Stevens et al., 2006). The researchers sought to assess whether participants who did not develop friendships were already satiated with their existing relationship. Having a partner or close friend or experiencing a low level of loneliness was viewed as reflecting satiation in this study (Stevens et al., 2006).

The findings indicated that compared to the control group, the women who participated in the Friendship Enrichment Program developed friendships by forming new or improving existing friendships (Stevens et al., 2006). Those who had a partner or close friend or were less lonely (potentially reflecting satiation) were not more likely to expand friendships than were those who lacked a partner or a close friend and had higher levels of loneliness. This finding is at odds with Baumeister and Leary's prediction that having a minimum number of existing social ties would fulfill (satiate) the need to belong (Stevens et al., 2006).

The findings from this study do not support Baumeister Leary's (1995) perspective on satiation. Specifically, lacking a partner or close friend or those who expressed high levels of loneliness did not increase the likelihood of developing new friendships. Moreover, among those who did not expand their social ties, there was no evidence of satiation. Additionally, participants who had lost a partner through widowhood or divorce were no more likely than married participants to report making new friends or improving existing social relationships. Baumeister and Leary (1995), however, did not link need to belong with the presence of current support providers after widowhood and divorce. It is plausible that current social ties do not sufficiently fulfill need to belong after losing a critical social relationship.

Is a Minimum Number of Social Ties Sufficient to Meet the Social Needs of People Who Have Experienced a Key Social Loss?

Whether having a minimum number of social ties, as described by Baumeister and Leary (1995), would attenuate need-driven substitution among widowed and divorced versus married older adults remains unknown. For example, even widowed or divorced older adults who have a minimum number of social ties might nonetheless experience a need to substitute and compensate for their lost spouse. On the other hand, an older adult with supportive social ties above a minimum threshold may not feel the need to substitute for the support previously provided by the spouse.

Researchers examined this issue with a sample of older Dutch adults and found that having relationships besides the partner was related to decreased feelings of loneliness (Stevens & Westerhof, 2006). Participants were asked to focus on the eight people in their social network with whom they have most stable and important relationships with. The researchers measured emotional support, instrumental support, companionship, and levels of loneliness. For both men

and women, having more family members and friends was related to fewer feelings of loneliness. Additionally, having friends in the network and an emotionally supportive partner was significantly related to decreased levels of loneliness (Stevens & Westerhof, 2006). Greater availability of emotional support from friends and family was also associated with less loneliness for only women (Stevens & Westerhof, 2006).

The findings from this study suggest that existing social relationships influence an individual's well-being, even in a partnered relationship. Importantly, having supportive friends and family members affects loneliness in a way comparable to having a partner. This finding could indicate that even among the married, a minimum number of social ties is not necessarily met. Therefore, current support and companionship may moderate whether widowed and divorced older adults, relative to married older adults, express a greater need for support and companionship and whether that need leads to substitution and compensation.

To summarize, the findings regarding satiation and the influence of existing social ties leave a gap in the literature. Examining whether a minimum number of social ties exists in the context of social loss would help reconcile whether that minimum drives a need for substitution and compensation.

Current Study

This study investigated the following broad research question: Do widowed/divorced older adults who express a greater need for support and companionship compensate over time? If widowed/divorced older adults compensate, would this be evident through improvements in emotional health? Specifically, the study examined two sets of related hypotheses for a total of five hypotheses. The first set of hypotheses tested whether a need for support and companionship is associated with substitution. I hypothesized that older adults who expressed a greater need for

support and companionship at Wave 1 would report an increase in the number of social support

and companionship providers at Wave 2, adjusting for Wave 1 (H1A; Path A in Figure 2.1). I

also anticipated that marital status would moderate the relation between need for support and

companionship at Wave 1 and the number of social support and companionship providers at

Wave 2, adjusting for Wave 1, such that the association between need for support and

companionship and the number of support and companionship providers would be greater among

those who are widowed/divorced than the married (H1B; Path B in Figure 2.1). Among

widowed/divorced older adults, the threshold of companionship providers at Wave 1 would

modify the association between need for support and companionship at Wave 1 and social

support and companionship providers at Wave 2 relative to Wave 1(moderated moderation,

H1C; Path C in Figure 2.1). Relative to married older adults and older adults whose social ties

fell above the threshold of support and companionship at Wave 1, the moderation posited in link

B was expected to be stronger for widowed and divorced older adults whose support and

companionship providers fell below the threshold.

The current study also examined compensation from substitution (improvements in

emotional health). Therefore, I hypothesized that increased social support and companionship

providers at Wave 2, adjusting for Wave 1, would facilitate improved emotional health (fewer

days felt isolated, fewer days felt lonely, and less psychological distress) at Wave 2, adjusting for

Wave 1 (H2A; Path A in Figure 2.2). I also expected that marital status would moderate the

relation between social support and companionship providers at Wave 2, adjusting for Wave 1,

and emotional health at Wave 2, adjusting for Wave 1, such that the association between

increased social support and companionship providers and emotional health will be greater

among the widowed/divorced than the married (H2B; Path B in Figure 2.2).

Method

Sample

The data for this study were derived from a publicly available dataset: UC Berkeley Social Networks Study (UCNets: Claude Fischer, Principal Investigator). The UCNets study included two age groups: 690 adults aged 50-70 years and 495 adults aged 21-30. The study consisted of a subsample of the older age group that was 60-70 when the first wave of data was collected (Wave 1 $N = 411$; Wave 2 $N = 371$).

Procedure

In addition to the baseline measurement described in Study 1, participants were also asked to complete a survey with parallel measures approximately a year after Wave 1. Total monetary compensation increased with each subsequent wave of data collection to combat attrition. Interviews and online surveys were conducted through an experienced field research firm to collect data on participants' social networks and well-being. For more information regarding the recruitment of the participants and procedures, see Study 1.

Measures

The UCNets study included measures assessing need for support and companionship, support and companionship providers in participants' social networks, emotional health, and sociodemographic information at both Wave 1 and Wave 2.

Need for Social Support and Companionship

Participants were asked if they wished they knew more people who could provide emotional support, instrumental support, and companionship. For more information regarding the operationalization of need for social support and companionship, please see Study 1. The

Kuder-Richardson Formula 20 (KR-20) indicated that the computed variable had moderate internal reliability ($\rho = 0.62$).

Marital Status

Participants were asked about their current marital status at baseline (1 = *married*, 2 = *widowed*, 3 = *divorced*, 4 = *separated*, 5 = *never married*). A dichotomous variable was computed for the current study by combining participants who were widowed or divorced into one group and participants who were married into another group (0 = *married*, 1 = *widowed/divorced*; $n_{widowed/divorced} = 158$, $n_{married} = 187$). For further details on the combination of widowhood and divorce into a single variable, see Study 1.

Network Elicitation & Number of Support & Companionship Providers.

Participants were asked to think about who typically provides them with emotional support, instrumental support, and companionship. For emotional support, participants were asked to list up to six names of people with whom they had confided when they had personal matters or concerns, such as issues with relationships, important things in their lives, and difficult experiences. For instrumental support, participants were asked to list up to six names of people who had given practical help, done repairs, picked up something at the store, or provided a ride. Additionally, participants were asked to list up to six names of people whom they either could ask or have asked for help if they were seriously injured or sick. For companionship, participants listed up to 9 names of people with whom they did social activities, such as going shopping, going to a park, visiting, getting together for drinks or a meal, or going out to concerts, plays, clubs, sports, or other events. A variable was constructed by summing all the unique names listed as support and companionship providers. For more information, see Study 1. These items were asked at both Wave 1 and Wave 2.

Two separate dichotomous versions of support and companionship providers for Wave 1 and Wave 2 were constructed to identify participants who were in the bottom quartile of support and companionship (below the hypothesized threshold) and those above the bottom quartile of support and companionship providers (above the threshold). This approach was first done by Fischer & Phillips (1982) to identify the socially isolated in which two cutoffs were chosen based on the distribution of participants' social networks: 10% as the severely isolated and 40% as the moderately isolated. For the current sample, I chose the bottom quartile of the distribution as below the threshold of support and companionship providers. Older adults with four or fewer support and companionship providers were below the threshold, and older adults with five or more support and companionship providers were above the threshold (0 = *below-threshold number of support and companionship providers;* 1 = *above-threshold number of support and companionship providers*).

Days Spent Isolated

Participants were asked how many days in the past seven days they felt isolated from other people (0 = *no days felt isolated*; 7 = *felt isolated for seven days*). This item was asked at both Wave 1 and Wave 2.

Days spent Lonely

Participants were asked how many days they felt lonely in the past seven days (0 = *no days felt lonely*; 7 = *felt lonely for seven days*). This item was asked at both Wave 1 and Wave 2.

Psychological Distress

Using the six-item short form of the Kessler Psychological Distress Scale (Kessler et al., 2002), participants were asked about the frequency with which they experienced feelings of depression, nervousness, hopelessness, restlessness, worthlessness, and that everything was an

effort. Items were measured on a 6-point Likert scale (1 = *all of the time*, five = *none of the time*). Responses to each of the items were summed to create an overall measure of psychological distress for Wave 1 (Chronbach's α = 0.75) and Wave 2 (Chronbach's α = 0.73).

Covariates. The following covariates were included in the multiple regression models: age, gender, race/ethnicity, self-rated health, and educational attainment. For more information on how the covariates were operationalized in the study, see Study 1. All covariates were measured at baseline (Wave 1).

Analytic Plan

All analyses will be conducted using SPSS and the PROCESS macro (Hayes, 2017). Ordinary least squares multiple regressions analyses were conducted to address the main hypotheses. All regression models adjusted for the covariates and Wave 1 (W1) scores when examining key variables at Wave 2 (W2). Descriptive statistics were conducted (Table 2.1), including each variable's means, standard deviations, and frequencies. Z-scores were calculated to identify outliers in the analyses. Ultimately, 24 participants exceeded the statistical cutoff of a z-score greater than three and were subsequently removed from the analyses (standardized residuals exceeded the statistical cutoff of 3; Penn State, 2018). Intercorrelations among the key study variables were examined and are presented in Table 2.

Hypotheses

Hypothesis 1A was assessed through a multiple regression analysis that examined number of support and companionship providers at W2 as a function of need for support and companionship, adjusting for W1 support and companionship providers and the covariates.

Hypothesis 1B was assessed through a multiple regression analysis that examined support and companionship providers at W2 as a function of need for support and companionship at W1,

marital status (married vs. widowed/divorced), the interaction between need for support and companionship at W1 and marital status, adjusting for W1 support and companionship providers and the covariates. Analyses of the conditional effects were performed if the interaction was significant to determine at what level of marital status (married vs. widowed/divorced) the simple slopes of need for support and companionship were significant.

For Hypothesis 1C, a threshold was defined on an a priori empirical basis in the absence of established criteria in the literature (0 = *below-threshold number of support and companionship providers;* 1 = *above-threshold number of support and companionship providers*). Then, a regression analysis was conducted that examined the number of social support and companionship providers at W2 as a function of need for social support and companionship at W1, the threshold of support and companionship providers at W1, marital status, a first-order interaction term (need for support and companionship X marital status), and a second-order interaction term (need for support and companionship X marital status X threshold of support and companionship providers), and the covariates.

Analyses of the conditional effects were performed if the interaction terms were significant to determine at what level of marital status (widowed/divorced vs. married) and the threshold of support and companionship providers (below-threshold number of support and companionship providers vs. above-threshold number of support and companionship providers) the simple slopes of need for support and companionship were significant.

For Hypothesis 2A, three multiple regression analyses were conducted with each of the emotional health variables measured at W2 as outcomes (days felt isolated, days felt lonely, and psychological distress) as a function of support and companionship providers at W2, adjusting for Wave 1 support and companionship providers, W1 emotional health, and the covariates.

For Hypothesis 2B, three multiple regression analyses were conducted with each of the emotional health variables measured at W2 (days felt isolated, days felt lonely, and psychological distress) as a function of support and companionship providers from W2, marital status (widowed/divorced vs. married), a first-order interaction term (W2 support and companionship providers X marital status), adjusting for Wave 1 support and companionship providers, W1 emotional health, and the covariates.

Analyses of the conditional effects were performed if the first-order interactions were significant to determine at what level of marital status (married vs. widowed/divorced) the simple slopes of support and companionship at Wave 2, adjusting for Wave 1, exhibited a significant association.

Results

Initial Analyses

Table 2.1 represents descriptive analyses, including the means, standard deviations, and frequencies for all study variables. Intercorrelations between the key study variables are presented in Table 2.2. The a priori approach of constructing a support and companionship threshold successfully created a group below the threshold of support and companionship (four or fewer social support providers; $M = 3.50$, SD $= 1.27$) and a group above the threshold of support and companionship (five or more social support providers; $M = 9.22$, SD $= 2.51$). These two groups significantly differed in the number of support and companionship providers at Wave 1 [$t(341.83) = 29.40$, $p < .001$, 95% CI (-6.11, -5.34)].

Do Older Adults Who Expressed a Greater Need for Support and Companionship at Wave 1 Report an Increase in the Number of Social Support and Companionship Providers at Wave 2? (H1A)

A multiple regression analysis was conducted in SPSS to examine whether need for support and companionship predicts changes in support and companionship providers over time. The relation between need for support and companionship at W1 and the number of support and companionship providers at W2 was significant ($p = 0.04$) but not in the expected direction (Table 2.3). A greater need for support and companionship at W1 was associated with decreases in support and companionship providers at W2, adjusting for W1 support and companionship providers.

Relative to Married Older Adults, Is the Association Between Need for Support and Companionship and the Number of Support and Companionship Providers at Wave 2 Greater among the Widowed/Divorced Older Adults? (Moderation) (H1B)

A multiple regression analysis was conducted with the PROCESS macro (Hayes, 2017) to assess whether marital status moderates the association between need for support and companionship and the number of support providers at W2, controlling for W1. Contrary to expectations, the interaction between need for support and companionship and marital status was nonsignificant, as shown in Table 2.4 ($p = 0.84$).

Relative to Other Older Adults, Is the Association Between Need for Support and Companionship and the Number of Support and Companionship Providers at Wave 2 Greater among the Widowed/Divorced Older Adults Who Fell Below the Minimum Threshold? (Moderated Moderation) (H1C)

A multiple regression analysis was conducted using the PROCESS macro (Hayes, 2017). To assess whether the association between the number of support and companionship providers at W2, adjusting for W1 support and companionship providers, and need for support and companionship is influenced by marital status (moderator) and a threshold effect of W1 support and companionship providers (second-order moderator), a moderated moderation analysis was conducted (Table 2.5). Contrary to what was hypothesized, a second-order interaction term assessing a three-way interaction of need for support and companionship, marital status, and threshold of W1 support and companionship providers was nonsignificant ($p = 0.91$). In this analysis, marital status had a significant main effect on W2 support and companionship providers, adjusting for W1 support and companionship providers ($p = 0.04$). This finding indicates that gains in support and companionship providers are, to a greater extent, associated with being married rather than widowed/divorced. A need for support and companionship providers at W1 demonstrated a significant main effect on W2 support and companionship providers, although, in an unexpected direction, indicating that having a greater need for support and companionship was related to decreases in the number of support and companionship providers over time ($p = 0.01$).

Does an Increase in Support and Companionship Providers at Wave 2 Facilitate Improved Emotional Health at Wave 2, adjusting for Wave 1? (H2A)

Three parallel multiple regression analyses were conducted to examine whether W2 support and companionship providers, adjusting for W1, predicted improved emotional health (days felt isolated, days felt lonely, and psychological distress). The first model examined days felt isolated as the outcome and W2 support and companionship providers as the predictor. The main effect of W2 support and companionship providers was significant ($p = 0.04$) (Table 2.6,

left panel). Consistent with the hypothesis, this finding suggests that increases in support and companionship providers from Wave 1 to Wave 2 are associated with fewer days of feeling isolated at Wave 2. Contrary to expectations, however, the association between days felt lonely predicted by W2 support and companionship providers was nonsignificant ($p = 0.10$) (Table 2.6, middle panel). The same association with psychological distress was also nonsignificant ($p = 0.64$) (Table 2.6, right panel). Together, these findings provide only partial evidence that increases in social support and companionship providers are related to improved emotional health.

Is the Association Between Increased Social Support and Companionship Providers and Emotional Health at Wave 2, Greater among the Widowed/Divorced Than the Married? (Moderation) (H2B)

Three parallel multiple regression analyses were conducted using the PROCESS macro (Hayes, 2017), assessing whether marital status moderates the association between W2 support and companionship providers, adjusting for W1 support and companionship providers, regressing emotional health (days felt isolated, days felt lonely, and psychological distress). The interaction between W2 support and companionship providers and marital status was only marginally related to days felt isolated ($p = 0.07$) (Table 2.7, left panel). Analyses of the conditional effects revealed that only the widowed and divorced older adults experienced a significant decrease in the number of days they felt isolated when support and companionship providers increased from Wave 1 to Wave 2 [$b = -0.13$, $t(263) = -2.16$, $p = 0.03$, 95% CI (-0.25, -0.01)]. In contrast, married older adults did not report a significant change in their days felt isolated when the number of their support and companionship providers increased from Wave 1 to Wave 2 [$b = -0.01$, $t(263) = -0.17$, $p = 0.87$, 95% CI (-0.11, 0.09)].

The second parallel model assessed whether marital status moderated the association between W2 support and companionship providers, adjusting for W1 support and companionship providers, and W2 days felt lonely. The interaction between W2 support and companionship providers and the marital status of W2 support and companionship providers was nonsignificant ($p = 0.89$) (Table 2.7, middle panel).

The final multiple regression model examined whether marital status moderated the association between W2 support and companionship providers, adjusting for W1 support and companionship providers, and W2 psychological distress. Once again, the interaction between marital status and support and companionship providers at W2 was nonsignificant ($p = 0.17$) (Table 2.7, right panel). Altogether, these results provide little support for the hypothesis that marital status influences the relation between changes in support and companionship providers from Wave 1 to Wave 2 and emotional health.

Discussion

Investigations of the adaptations to social losses, known as substitution and compensation, have missed potential areas of further exploration, perhaps leading to mixed findings. In particular, research has yet to examine whether a perceived need for greater support and companionship drives substitution (expansion of social ties) and whether such need-driven substitution results in improvements in emotional health (compensation). Instead, need for support and companionship has been assumed to precede substitution. Additionally, in Baumeister and Leary's (1995) seminal paper on the fundamental need to belong, the authors suggest that a minimum number of social ties satiates the need to belong. This idea of satiation, however, has not yet been examined in the context of substitution and compensation. Additionally, the minimum number of social ties (threshold effect) has not been defined.

Therefore, the current study aimed to examine whether need for support and companionship drives substitution and compensation over time, reflected in changes in support and companionship providers and in emotional health. Additionally, because spouses are considered unique in the support and companionship they provide (Weiss, 1974), and adverse psychological effects of widowhood and divorce have been documented in later life (Cohen et al., 2007; van Grootheest et al., 1999; Kamiya et al., 2013; Manzoli et al., 2007; Stroebe et al., 2007), the current study also aimed to examine whether need-driven substitution over time was more evident for widowed/divorced older adults.

Lastly, the current study sought to examine whether changes in the number of social support providers were related to improvements in emotional health (compensation) and whether such improvements were stronger for the widowed/divorced, and, further, for older adults' social ties that fall below the minimum number of social ties. Despite the aim to add clarity to the literature, the results of this study are largely mixed. The findings and the questions sparked by these results are discussed below.

Substitution

Research examining substitution and compensation has often assumed that a universal need for support and companionship exists, which prompts substitution to fulfill that need when support and companionship are low. Contrary to expectations, however, the findings from the current study indicate that a greater perceived need for support and companionship is related to decreases in the number of support and companionship providers over time. This finding is at odds with previous assumptions often implied in the substitution and compensation literature and may be due to a variety of factors. First, it is possible that despite a need for social support and companionship, older adults still engage in proactive winnowing of their social ties, a later life

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process that is posited by researchers who endorse socioemotional selectivity theory (SST) (Lang & Carstensen, 1994). Instead of expanding social ties via substitution, older adults may still tighten their social networks to include only emotionally close social ties. On the other hand, older adults who also have a high need for social support and companionship may experience mental health challenges that act as obstacles to making new ties and maintaining existing social ties. As noted, a lack of social support and companionship has been linked to adverse effects, including psychological disorders (Cohen et al., 2007; van Grootheest et al., 1999; Kamiya et al., 2013; Manzoli et al., 2007; Stroebe et al., 2007). Psychological disorders or depressive symptoms may hinder older adults' ability to maintain supportive ties and companions. Indeed, research has found that among depressed older adults, having a smaller social network is associated with greater feelings of loneliness (Domènech-Abella et al., 2017).

Previous research suggests that spouses are uniquely poised to provide support and companionship (Weiss, 1975). Additionally, according to SST, older adults proactively winnow their social ties to focus on close, supportive relationships (Lang & Carstensen, 1994; Emer & Proulx, 2020). Because older adults' social networks are thought to shrink, typically, spouses remain the main source of support and companionship. Therefore, I expected that older adults who lack their spouse experience a greater need for support and companionship because their central source of support and companionship is absent, driving substitution. Contrary to this prediction, marital status did not moderate the relation between need for support and companionship and substitution over time. Instead, being married was related to increases in social support providers over time. Based on these findings, it appears that a greater perceived need for support and companionship is related to decreases in social support providers over time, regardless of marital status.

To further clarify the association between need for support and companionship and changes in support and companionship providers over time, I examined whether having a minimum number of social ties, a thought originally presented in theories of need to belong, attenuated the relation between perceived need and increases in social support providers (Baumeister & Leary, 1995). Analyses that examined the implications of having fewer versus more than a posited minimum number of social ties, however, yielded nonsignificant results. Not only did marital status not influence the relation between increased need for support and companionship and increases in social ties over time, neither did having a minimum number of social ties. The nonsignificant threshold effect, however, is aligned with previous research conducted by Stevens et al. (2006), which found that the presence of existing ties, partners, or friends did not influence the likelihood of expanding social ties. Similarly, the current study provided no evidence for satiation, as shown by a lack of a threshold effect of support and companionship providers.

Compensation

The results from this study partially support theories of compensation after substitution in later life. Increases in support and companionship providers over time were related to significantly fewer days felt isolated. Days felt lonely, and psychological distress, however, was unrelated to substitution. Several potential reasons exist as to why support and companionship providers were only significantly related to days felt isolated. Importantly, social isolation and loneliness are considered two distinct constructs and do not necessarily co-occur (de Jong-Gierveld et al., 2006). Social isolation refers to the objective absence of social ties or social contact, whereas loneliness refers to subjective feelings about one's social networks. The presence of support and companionship providers, therefore, reduces social isolation but not

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necessarily levels of loneliness. Thus, it is possible that older adults may experience reductions in the number of days they feel isolated when the number of support and companionship providers in their networks increases. Objectively, participants may have felt as though they were experiencing less isolation, but not necessarily less loneliness. Days that felt isolated was also the only emotional health outcome related to support and companionship providers that were moderated by marital status. Widowed and divorced older adults experienced a marginal decrease in days they felt isolated when support and companionship providers increased, but this was not true for married older adults. This nonsignificant finding for married older adults partially supports the idea of satiation, in that the spouse may be able to meet their needs for support and companionship. It is important to bear in mind that this interpretation of satiation rests on the comparison of the marginal finding for the widowed/divorced and the nonsignificant finding for the married. Further tests of satiation need to be conducted in larger samples with more comprehensive measures of support and companionship.

Limitations and Future Directions

The current study has several limitations that warrant consideration. First, the study lacked pre-widowhood and pre-divorce data. Thus, the levels of perceived need and the number of support and providers in participants' networks were unknown before participants experienced spousal loss. Such information would have provided insight into whether perceived needs change after social losses and whether social networks subsequently experience structural or functional changes. For example, the Changing Lives of Older Couples (CLOC) study has a prospective design that includes pre-widowhood and post-widowhood levels, however, such studies are rare because of logistical and financial challenges (Nesse et al., 2006). Novel to the current study is a consideration of perceived need for support and companionship, which the CLOC study does not

include an assessment of. Future research would benefit from prospective designs that examine levels of need for support and companionship before and after spousal loss.

Another limitation of this study is how need for support and companionship was measured. The need variable was assessed by summing dichotomous responses to three questions that asked participants if they wished they knew more network members to provide emotional support, instrumental support, and companionship. This operationalization of need for support and companionship may be missing the granularity that a lengthier scale with Likert response options would provide. Despite having sufficient reliability, it is possible that need for support and companionship is more nuanced and exists on a continuum that cannot be captured adequately by a brief count variable (Adelson & McCoach, 2010). The current study, however, it one of the first to examine a perceived need for greater social support in conjunction with substitution and compensation. Future research would benefit from developing a validated and reliable scale that captures a perceived need for social support and companionship.

The current study's sample is relatively young (60 – 70 years old), which also constitutes a limitation. If the study included participants in their 80s or 90s (the oldest old), there would have likely been greater variation in the duration of widowhood/divorce. Older adults over the age of 80 may also have different support and companionship needs. For example, as functional limitations increase in later years, social support decreases (Hajek et al., 2022). Therefore, the oldest old may need more support and, perhaps, support that is more intense (i.e., caregiving).

The sample is likely to have a smaller number of widows because of the younger age range as well. It is possible that the experience of widowhood and divorce is differentially associated with substitution and compensation, however, research has not yet examined this difference. The current study was unable to examine widowhood and divorce separately due to

small cell sizes. Future research should aim to examine the unique need for support and companionship across marital groups. Future research should also investigate past marital status in addition to current marital status since currently married older adults may have experienced spousal loss. Lastly, future research can benefit from examining changes in employment status as the number of support and companionship providers is likely to change based on interactions with co-workers.

Despite these limitations, the current study has multiple strengths. First, the study is longitudinal, which helps to strengthen inferences about need for social support and companionship and the effects of need on substitution and compensation over time. Research has not yet determined whether a critical threshold of support and companionship exists, even though the idea of such a threshold has been present in the literature for some time (Baumeister & Leary, 1995). Analytic strategies have most often assumed linear relations between social support and companionship and emotional health. Therefore, by investigating plausible thresholds of support and companionship providers (such as being above or below the bottom quartile), future research will be able to examine the role of current social ties in emotional health more precisely. Additionally, future research would benefit from examining different theoretical and statistical cut points for the threshold with larger samples. This is also one of few studies to examine need for social support and companionship empirically in the context of marital loss in later life.

Conclusion

The overall aim of the current study was to examine whether need-driven substitution occurs over time and whether such substitution confers benefits for emotional heath in the form of compensation. More specifically, research has yet to examine whether spousal loss in later life prompts efforts to form substitute ties, which may or may not result in compensation. Research

also has yet to examine the role of need for support and companionship and whether current support and companionship play a role in widowed/divorced older adults' motivations to expand their social networks. The findings from the current study provide only partial evidence of satiation and also provide contradictory evidence for substitution and compensation. Future research will benefit from expanding on these findings by narrowing a focus on widowed older adults, improving the assessment of key constructs, and extending the longitudinal timeframe.

Figure 2.1

Need for Support and Companionship in the Context of Marital Status and Existing Support and Companionship (Substitution)
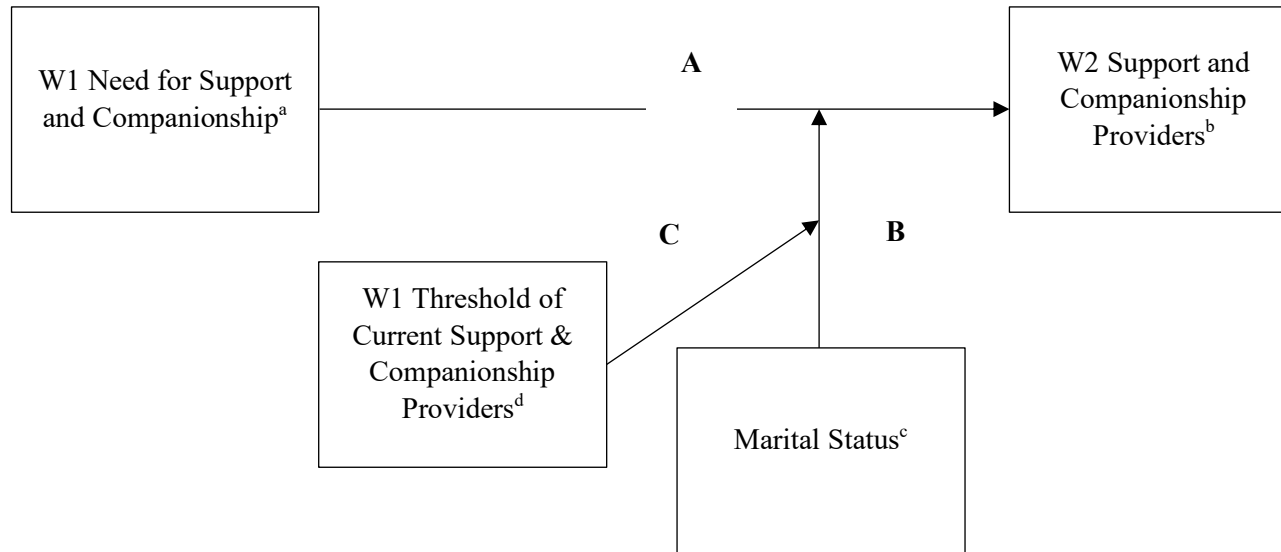
Note. The figure demonstrates the associations hypothesized for Hypothesis 1A (Path A), Hypothesis 1B (Path B), and Hypothesis 1C (Path C). [a]Need for support or companionship measured at Wave 1 [range: 0-3 (0 = *expressed no need for additional support or companionship,* 3 = *expressed need for three additional forms of support or companionship*)]. [b]The possible range is 0-27 support or companionship providers named in participants' social networks, assessed at Wave 2. [c]Marital status (0 = *married,* 1 = *widowed/divorced*). [d]Threshold of support and companionship providers measured at Wave 1 (0 = *below-threshold number of support and companionship providers;* 1 = *above-threshold number of support and companionship providers*).

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Figure 2.2

Effects of Increased Support and Companionship on Emotional Health in the Context of Marital Status (Compensation)
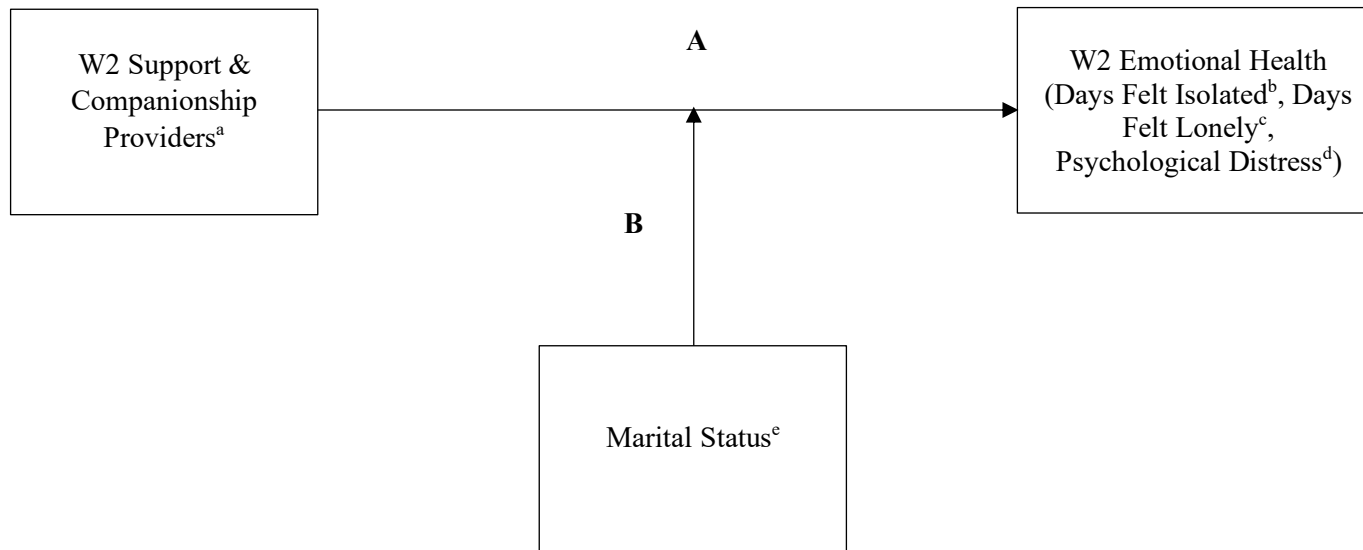
Note. The figure demonstrates the associations hypothesized for Hypothesis 2A (Path A) and Hypothesis 2B (Path B). [a]The possible range is 0-27 support or companionship providers named in participants' social networks, assessed at Wave 2. [b]Days felt isolated assessed at Wave 2 (0 = *no days felt isolated*; 7 = *felt isolated for seven days*). [c]Days felt lonely assessed at Wave 2 (0 = *no days felt lonely*; 7 = *felt lonely for seven days*). [d]A sum of six items representing the frequency of psychological distress assessed at Wave 2 [range: 6-22 (1 = *none of the time*, 5 = *all of the time*)]. [e]Marital status (0 = *married*, 1 = *widowed/divorced*) assessed at Wave 1.

Table 2.1

Descriptive Statistics of Key Variables

Variable (*ns* = 329-387)	*M*(SD)
Age[a]	65.05(3.07)
Health[b]	2.29(1.04)
Education[c]	6.90(1.44)
Need for Support[d]	0.83(0.93)
W1 Support & Companionship Providers[e]	7.72(3.38)
W2 Support & Companionship Providers[e]	4.22(2.61)
W1 Duration of Widowhood[f]	11.56(10.04)
W1 Duration of Divorce[g]	20.17(11.74)
W1 Days Felt Isolated[h]	0.77(1.50)
W2 Days Felt Isolated[h]	0.74(1.41)
W1 Days Felt Lonely[i]	0.76(1.55)
W2 Days Felt Lonely[i]	0.68(1.25)
W1 Psychological Distress[j]	9.48(2.98)
W2 Psychological Distress[j]	9.49(2.82)
	n(%)
Female[k]	251(64.86%)
Below W1 Support & Companionship Providers Threshold[l]	82(21.19%)
Above W1 Support & Companionship Providers Threshold[l]	305(78.81%)
Married[m]	183(55.62%)
Widowed/Divorced[m]	146(44.38%)
Race/Ethnicity[n] (1 = minority status)	78(20.16%)

Note. SD = standard deviation. W1 = collected at Wave 1 (baseline) of the UC Berkeley Social Networks Study (UCNets). W2 = collected at Wave 2, approximately one year later. The number of participants varies due to attrition of participants from Wave 1 to Wave 2 and because the Duration of Widowhood and Duration of Divorce was only assessed for a subsample. Variables listed without a designated Wave were collected at baseline. [a]The possible range for age is 60-70. [b]Health refers to self-rated health, [range: 1-5 (1 =

excellent, 5 = *poor*)]. [c]Educational attainment [1 = *Less than 9th grade*; 2 = *9th grade to 12th grade, but did not graduate*; 3 = *High school graduate*; 4 = *GED or equivalent*; 5 = *Some college;* 6 = *Associate's degree*; 7 = *Bachelor's degree*; 8 = *Master's degree*; 9 = *Higher professional degree (like MD, JD, or PhD)*]. [d]Need for support or companionship [range: 0-3 (0 = *expressed no need for additional support or companionship,* 3 = *expressed need for three additional forms of support or companionship*)]. [e]The possible range is 0-27 support or companionship providers named in participants' social networks. [f]The possible range is 1-50 years since widowhood. [g]The possible range is 1-50 years since divorce [h]Days felt isolated (0 = *no days felt isolated*; 7 = *felt isolated for seven days*). [i]Days felt lonely (0 = *no days felt lonely*; 7 = *felt lonely for seven days*). [j]A sum of six items representing the frequency of psychological distress [range: 6-22 (1 = *none of the time*, 5 = *all of the time*)]. [k]Gender (1 = *male*, 2 = *female*). [l]Threshold of support and companionship providers measured at Wave 1 (0 = *below-threshold number of support and companionship providers;* 1 = *above-threshold number of support and companionship providers*). [m]Marital status (0 = *married*, 1 = *widowed/divorced*). [n]Race/ethnicity (0 = *non-Hispanic white*, 1 = *Black/African American, American Indian or Alaska Native, Asian, Hispanic/Latino*).

Table 2.2

Intercorrelations for Key Study Variables (ns = 143-362)

Variable	1	2	3	4	5	6	7	8	9	10
1. Need for Support[a]	—	0.19***	-0.15**	-0.18***	0.28***	0.32***	0.27***	0.26***	0.23***	0.22***
2. Marital Status[b]		—	-0.07	-0.14**	0.10+	0.21***	0.25***	0.25***	0.06	0.06
3. W1 Support Providers[c]			—	0.59***	-0.10*	-0.08	-0.10+	-0.06	-0.18***	-0.10+
4. W2 Support Providers[c]				—	-0.05	-0.14*	-0.06	-0.09+	-0.10*	-0.08
5. W1 Days Felt Isolated[d]					—	0.48***	0.69***	0.48***	0.55***	0.33***
6. W2 Days Felt Isolated[d]						—	0.44***	0.66***	0.38***	0.29***
7. W1 Days Felt Lonely[e]							—	0.62***	0.53***	0.30***
8. W2 Days Felt Lonely[e]								—	0.42***	0.38***
9. W1 Psychological Distress[f]									—	0.64***
10. W2 Psychological Distress[f]										—

Note. W1 = collected at Wave 1 (baseline) of the UC Berkeley Social Networks Study (UCNets). W2 = collected at Wave 2, approximately one year later. Variables listed without a designated Wave were collected at baseline. The number of participants varies due to attrition of participants from Wave 1 to Wave 2. [a]Need for support or companionship [range: 0-3 (0 = *expressed no need for additional support or companionship,* 3 = *expressed need for three additional forms of support or companionship*)]. [b]Marital status (0 = *married*, 1 = *widowed/divorced*). [c]The possible range is 0-27 support or companionship providers named in participants' social networks. [d]Days felt isolated (0 = *no days felt isolated*; 7 = *felt isolated for seven days*). [e]Days felt lonely (0 = *no days felt lonely*; 7 = felt lonely for seven days*). [f]A sum of six items representing the frequency of psychological distress [range: 6-22 (1 = *none of the time,* 5 = *all of the time*)].

+*p* < .09 **p* < .05. ***p* < .01. ****p* < .001.

Table 2.3

Need for Support and Companionship Predicting Changes in Support and Companionship Providers Over Time (H1A)

Variable	W2 Support & Companionship Providers[f] $N = 335$		
	b(SE)	t(327)	95% Boot CI Lower, Upper
Intercept	-0.46(2.53)	-0.18	-5.13, 4.33
Age[a]	0.02(0.04)	0.40	-0.06, 0.08
Health[b]	-0.07(0.11)	-0.63	-0.27, 0.14
Gender[c]	0.20(0.24)	0.82	-0.30, 0.70
Education[d]	-0.10(0.08)	-1.27	-0.05, 0.26
Race/Ethnicity[e]	-0.71(0.28)*	-2.49	-1.25, -0.18
W1 Support & Companionship Providers[f]	0.42(0.04)***	11.88	0.35, 0.49
Need for Support & Companionship[g]	-0.26(0.13)*	-2.11	-0.51, -0.01
Model Fit	Adj. $R^2 = 0.34$, $F(7, 327) = 25.26$, $p < .001$		

Note. W1 = collected at Wave 1 (baseline) of the UC Berkeley Social Networks Study (UCNets). W2 = collected at Wave 2, approximately one year later. Variables listed without a designated Wave were collected at baseline. [a]The possible range for age is 60-70. [b]Health refers to self-rated health, [range: 1-5 (1 = *excellent*, 5 = *poor*)]. [c]Gender (1 = *male*, 2 = *female*). [d]Educational attainment [1 = *Less than 9th grade*; 2 = *9th grade to 12th grade, but did not graduate*; 3 = *High school graduate*; 4 = *GED or equivalent*; 5 = *Some college;* 6 = *Associate's degree*; 7 = *Bachelor's degree*; 8 = *Master's degree*; 9 = *Higher professional degree (like MD, JD, or PhD)*]. [e]Race/ethnicity (0 = *non-Hispanic white*, 1 = *Black/African American, American Indian or Alaska Native, Asian, Hispanic/Latino*). [f]The possible range is 0-27 support or companionship providers named in participants' social networks. [g]Need for

support and companionship [range: 0-3 (0 = *expressed no need for additional support or companionship, 3 = expressed need for three*

additional forms of support or companionship)].

$^+p < .09$ *$p < .05$. **$p < .01$. ***$p < .001$.

Table 2.4

Changes in Support and Companionship Providers Over Time as a Function of Need for Support and Companionship, Marital Status, and their Interaction (H1B)

Variable	W2 Support & Companionship Providers[f] $N = 283$		
	b(SE)	t(273)	95% Boot CI Lower, Upper
Intercept	0.91(2.80)	0.33	-4.36, 6.01
Age[a]	-0.01(0.04)	-0.34	-0.09, 0.06
Health[b]	-0.07(0.13)	-0.53	-0.30, 0.16
Gender[c]	0.38(0.27)	1.41	-0.14, 0.88
Education[d]	-0.11(0.09)	-1.25	-0.06, 0.29
Race/Ethnicity[e]	-0.71(0.32)*	-2.22	-1.34, -0.11
Wave 1 Support & Companionship Providers[f]	0.40(0.04)***	10.32	0.33, 0.48
Need for Support & Companionship[g]	-0.25(0.15)	-1.68	-0.53, 0.06
Marital Status[h]	-0.39(0.27)	-1.46	-0.92, 0.15
Need for Support & Companionship x Marital Status	0.06(0.29)	0.20	-0.51, 0.64
Model Fit	Adj. $R^2 = 0.33$, $F(9, 273) = 16.12$, $p < .001$		

Note. W1 = collected at Wave 1 (baseline) of the UC Berkeley Social Networks Study (UCNets). W2 = collected at Wave 2 of data collection, approximately one year later. Variables listed without a designated Wave were collected at baseline. [a]The possible range for age is 60-70. [b]Health refers to self-rated health, [range: 1-5 (1 = *excellent*, 5 = *poor*)]. [c]Gender (1 = *male*, 2 = *female*). [d]Educational attainment [1 = *Less than 9th grade*; 2 = *9th grade to 12th grade, but did not graduate*; 3 = *High school graduate*; 4 = *GED or equivalent*; 5 = *Some college;* 6 = *Associate's degree*; 7 = *Bachelor's degree*; 8 = *Master's degree*; 9 = *Higher professional degree (like MD, JD, or PhD)*].[e]Race/ethnicity (0 = *non-Hispanic white*, 1 = *Black/African American, American Indian or Alaska Native,*

Asian, Hispanic/Latino). [f]The possible range is 0-27 support or companionship providers named in participants' social networks.

[g]Need for support and companionship [range: 0-3 (0 = *expressed no need for additional support or companionship,* 3 = *expressed*

need for three additional forms of support or companionship)]. [h]Marital status (0 = *married*, 1 = *widowed/divorced*).

[+]*p* < .09 *p < .05. **p < .01. ***p < .001.

Table 2.5

Change in Support and Companionship Providers Over Time as a Function of Need for Support and Companionship, Marital Status,

Threshold of Wave 1 Support & Companionship Providers, and their Interactions (H1C)

Variable	W2 Support & Companionship Providers[i] N = 283		
	b(SE)	t(270)	95% Boot CI Lower, Upper
Intercept	2.69(3.02)	0.89	-3.02, 8.25
Age[a]	-0.00(0.04)	-0.10	-0.09, 0.08
Health[b]	-0.07(0.14)	-0.52	-0.33, 0.18
Gender[c]	0.56(0.29)+	1.92	-0.01, 1.11
Education[d]	0.17(0.09)+	1.84	-1.21, 0.17
Race/Ethnicity[e]	-0.52(0.34)	-1.52	-0.72, -0.01
Need for Support & Companionship[f]	-0.39(0.16)*	-2.49	-0.70, 0.00
Marital Status[g]	-0.59(0.29)*	-2.03	-1.17, -0.01
Threshold of Wave 1 Support & Companionship Providers[h]	2.61(0.35)***	7.36	2.05, 3.14
Need for Support & Companionship x Marital Status	0.09(0.31)	0.30	-0.61, 0.74
Need for Support & Companionship x Threshold of W1 Support & Companionship Providers	-0.46(0.38)	-1.26	-1.13, 0.14
Marital Status x Threshold of W1 Support & Companionship Providers	-0.55(0.72)	-0.77	-1.63, 0.51
Need for Support & Companionship x Marital Status x Threshold of W1 Support & Companionship	-0.09(0.77)	-0.11	-1.20, 1.13
Model Fit	Adj. R^2 = 0.19, $F(12, 270)$ = 7.80, $p < .001$		

Note. W1 = collected at Wave 1 (baseline) of the UC Berkeley Social Networks Study (UCNets). W2 = collected at Wave 2 of data

collection, approximately one year later. Variables listed without a designated Wave were collected at baseline. [a]The possible range

for age is 60-70. [b]Health refers to self-rated health, [range: 1-5 (1 = *excellent*, 5 = *poor*)]. [c]Gender (1 = *male*, 2 = *female*). [d]Educational

attainment [1 = *Less than 9th grade*; 2 = *9th grade to 12th grade, but did not graduate*; 3 = *High school graduate*; 4 = *GED or*

equivalent; 5 = *Some college;* 6 = *Associate's degree*; 7 = *Bachelor's degree*; 8 = *Master's degree*; 9 = *Higher professional degree (like MD, JD, or PhD)*]. [e]Race/ethnicity (0 = *non-Hispanic white*, 1 = *Black/African American, American Indian or Alaska Native, Asian, Hispanic/Latino*). [f]Need for support or companionship [range: 0-3 (0 = *expressed no need for additional support or companionship,* 3 = *expressed need for three additional forms of support or companionship*)]. [g]Marital status (0 = *married*, 1 = *widowed/divorced*). [h]Dichotomized social support providers variable (0 = *below-threshold number of support and companionship providers;* 1 = *above-threshold number of support and companionship providers*). [i]The possible range is 0-27 support or companionship providers named in participants' social networks.

[+]$p < .09$ *$p < .05$. **$p < .01$. ***$p < .001$.

Table 2.6

Change in Support and Companionship Providers Predicting Improvements in Emotional Health (H2A)

Variable	W2 Days Felt Isolated[h] n = 325			W2 Days Felt Lonely[i] n = 325			W2 Psychological Distress[j] n = 326		
	b(SE)	t(316)	95% Boot CI Lower, Upper	b(SE)	t(316)	95% Boot CI Lower, Upper	b(SE)	t(317)	95% Boot CI Lower, Upper
Intercept	1.42(1.47)	0.97	-1.08, 3.97	-0.20(1.20)	-0.17	-2.48, 1.93	-2.65(2.69)	-0.99	-8.54, 3.44
Age[a]	-0.02(0.02)	-0.91	-0.06, 0.02	0.01(0.02)	0.59	-0.02, 0.05	0.07(0.04)$^+$	1.86	-0.02, 0.16
Health[b]	0.08(0.07)	1.10	-0.06, 0.21	0.02(0.06)	0.40	-0.09, 0.14	-0.09(0.13)	-0.69	-0.34, 0.17
Gender[c]	0.04(0.14)	0.25	-0.24, 0.29	0.02(0.12)	0.14	-0.21, 0.23	0.55(0.25)*	2.16	0.07, 1.02
Education[d]	0.02(0.05)	0.46	-0.06, 0.10	-0.01(0.04)	-0.31	-0.08, 0.05	0.11(0.09)	1.26	-0.06, 0.27
Race/Ethnicity[e]	0.23(0.17)	1.32	-0.12, 0.62	-0.07(0.14)	-0.50	-0.31, 0.16	0.25(0.31)	0.81	-0.40, 0.92
W1 Support & Companionship Providers[f]	0.03(0.03)	0.96	-0.02, 0.07	0.01(0.02)	0.54	-0.03, 0.05	-0.01(0.05)	-0.11	-0.11, 0.09
W1 Emotional Health[g]	0.41(0.05)***	8.90	0.28, 0.57	0.52(0.04)***	13.74	0.41, 0.65	0.66(0.05)***	14.31	0.56, 0.76
W2 Support & Companionship Providers[f]	-0.08(0.04)*	-2.03	-0.16, -0.01	-0.06(0.03)	-1.68	-0.12, 0.00	-0.03(0.07)	-0.46	-0.19, 0.13
Model Fit	Adj. R^2 = 0.24, $F_{(8,316)}$ = 13.41, $p < .001$			Adj. R^2 = 0.39, $F_{(8,316)}$ = 25.16, $p < .001$			Adj. R^2 = 0.44, $F_{(8, 317)}$ = 31.66, $p < .001$		

Note. W1 = collected at Wave 1 (baseline) of the UC Berkeley Social Networks Study (UCNets). W2 = collected at Wave 2 of data collection, approximately one year later. Variables listed without a designated Wave were collected at baseline. [a]The possible range for age is 60-70. [b]Health refers to self-rated health, [range: 1-5 (1 = *excellent*, 5 = *poor*)]. [c]Gender (1 = *male*, 2 = *female*). [d]Educational attainment [1 = *Less than 9th grade*; 2 = *9th grade to 12th grade, but did not graduate*; 3 = *High school graduate*; 4 = *GED or equivalent*; 5 = *Some college;* 6 = *Associate's degree*; 7 = *Bachelor's degree*; 8 = *Master's degree*; 9 = *Higher professional degree (like MD, JD, or PhD)*]. [e]Race/ethnicity (0 = *non-Hispanic white*, 1 = *Black/African American, American Indian or Alaska Native,*

Asian, Hispanic/Latino). [f]The possible range is 0-27 support or companionship providers named in participants' social networks.

[g]Emotional health outcome variable (days felt isolated, days felt lonely, and psychological distress) measured at Wave 1. [h]Days felt isolated (0 = *no days felt isolated*; 7 = *felt isolated for seven days*). [i]Days felt lonely (0 = *no days felt lonely*; 7 = *felt lonely for seven days*). [j]A sum of six items representing the frequency of psychological distress [range: 6-22 (1 = *none of the time*, 5 = *all of the time*)].

[+]$p < .09$ *$p < .05$. **$p < .01$. ***$p < .001$.

Table 2.7

Changes in Days Felt Isolated as a Function of Changes in Support and Companionship Providers, Marital Status, and their

Interactions (H2B)

Variable	W2 Days Felt Isolated[i] $n = 274$			W2 Days Felt Lonely[j] $n = 274$			W2 Psychological Distress[k] $n = 274$		
	b(SE)	t(263)	95% Boot CI Lower, Upper	b(SE)	t(263)	95% Boot CI Lower, Upper	b(SE)	t(263)	95% Boot CI Lower, Upper
Intercept	0.48(1.65)	0.29	-2.48, 3.40	-0.68(1.39)	-0.49	-3.37, 1.90	-6.87(2.96)*	-2.33	-13.13, -0.44
Age[a]	-0.01(0.02)	-0.37	-0.05, 0.04	0.01(0.02)	0.52	-0.03, 0.05	0.13(0.04)**	3.08	0.04, 0.22
Health[b]	0.04(0.08)	0.49	-0.13, 0.20	0.06(0.06)	0.90	-0.08, 0.20	-0.20(0.14)*	-1.45	-0.48, 0.08
Gender[c]	-0.09(0.16)	-0.60	-0.42, 0.21	0.34(0.13)	0.29	-0.21, 0.29	0.56(0.28)	2.00	0.02, 1.10
Education[d]	0.04(0.05)[+]	0.75	-0.05, 0.12	-0.00(0.04)	-0.06	-0.07, 0.07	0.14(0.09)	1.60	-0.04, 0.33
Race/Ethnicity[e]	0.29(0.19)	1.50	-0.11, 0.71	-0.11(0.16)	-0.70	-0.38, 0.16	-0.59(0.33)[+]	1.76	-0.12, 1.31
W1 Support & Companionship Providers[f]	0.03(0.03)	0.99	-0.02, 0.08	0.02(0.03)	0.71	-0.03, 0.06	0.01(0.05)	0.17	-0.09, 0.12
W1 Emotional Health[g]	0.37(0.05)***	7.36	0.24, 0.53	0.52(0.04)***	11.72	0.38, 0.66	0.67(0.05)***	13.83	0.56, 0.79
W2 Support & Companionship Providers[f]	-0.06(0.05)	-1.36	-0.14, 0.02	-0.05(0.04)	-1.28	-0.12, 0.02	-0.09(0.08)	-1.07	-0.25, 0.08
Marital Status[h]	0.44(0.15)**	2.85	0.11, 0.76	0.21(0.13)	1.59	-0.07, 0.51	0.02(0.27)	0.07	-0.52, 0.54
W2 Support and Companionship Providers x Marital Status	-0.12(0.07)[+]	-1.84	-0.28, 0.02	-0.01(0.06)	-0.14	-0.14, 0.11	-0.16(0.12)	-1.39	-0.40, 0.07
Model Fit	Adj. $R^2 = 0.23$, $F(10,263) = 9.04$, $p < .001$			Adj. $R^2 = 0.39$, $F(10,263) = 18.69$, $p < .001$			Adj. $R^2 = 0.46$, $F(10,263) = 24.34$, $p < .001$		

Note. W1 = collected at Wave 1 (baseline) of the UC Berkeley Social Networks Study (UCNets). W2 = collected at Wave 2 of data

collection, approximately one year later. Variables listed without a designated Wave were collected at baseline. [a]The possible range

for age is 60-70. [b]Health refers to self-rated health, [range: 1-5 (1 = *excellent*, 5 = *poor*)]. [c]Gender (1 = *male*, 2 = *female*). [d]Educational attainment [1 = *Less than 9th grade*; 2 = *9th grade to 12th grade, but did not graduate*; 3 = *High school graduate*; 4 = *GED or equivalent*; 5 = *Some college;* 6 = *Associate's degree*; 7 = *Bachelor's degree*; 8 = *Master's degree*; 9 = *Higher professional degree (like MD, JD, or PhD)*]. [e]Race/ethnicity (0 = *non-Hispanic white*, 1 = *Black/African American, American Indian or Alaska Native, Asian, Hispanic/Latino*). [f]The possible range is 0-27 support or companionship providers named in participants' social networks. [g]Emotional health outcome variable (days felt isolated, days felt lonely, and psychological distress) measured at Wave 1. [h]Marital status (0 = *married*, 1 = *widowed/divorced*). [i]Days felt isolated (0 = *no days felt isolated*; 7 = *felt isolated for seven days*). [j]Days felt lonely (0 = *no days felt lonely*; 7 = *felt lonely for seven days*). [k]A sum of six items representing the frequency of psychological distress [range: 6-22 (1 = *none of the time*, 5 = *all of the time*)].

[+]$p < .09$ *$p < .05$. **$p < .01$. ***$p < .001$.

Study 3: Remote Interactions as a Context for Substitution and Compensation Following Spousal Loss

The experience of spousal loss is pervasive in later life, evidenced by high rates of widowhood and divorce, which increase markedly with age (Roberts et al., 2018). Social losses impact older adults' health and well-being by reducing access to support and companionship (Uchino et al., 2018; Utz et al., 2014). Having low levels of social support in later life is linked to an increased risk of disability development (Avlund et al., 2004), a more significant rate of decline in physical functioning (Leon et al., 2003), and greater loneliness (Cacioppo et al., 2006).

Losing access to social support from any close relationship can be harmful, but losing a spouse is unique because of the many support functions the spouse provides (Weiss, 1974). Hence, the loss of a spouse is more detrimental to health and well-being than other kinds of social losses (e.g., friends or other family members; Weiss, 1988). Therefore, after an initial period of bereavement, older adults who lose a spouse may engage in social processes called substitution and compensation. These processes help them cope with such losses by obtaining support and companionship from a substitute tie (substitution). Any subsequent boosts to well-being attributed to the substitute tie are formally known as compensation (East & Rook, 1992; Rook & Schuster, 1996).

The Role of Remote Interactions in Substitution and Compensation

Researchers investigating the prevalence and effectiveness of substitution and compensation in later life have focused almost exclusively on in-person interactions. Currently untested is how these social processes play out in remote contexts (e.g., electronic and online communications). Remote interactions are a meaningful context to consider, given recent increases of such interactions in later life (Faverio, 2022; Anderson & Perrin, 2017). Research

has yet to examine whether having more remote interactions (e.g., texting, emailing, social media/social networking) might help to compensate for a lack of in-person social support and companionship, especially for widowed/divorced older adults. Whether through social networking sites such as Facebook or Twitter or text messages from friends, older adults are using forms of remote interactions to connect with others. Recent reports have found that up to 45% of older adults use social networking sites, and approximately 75% use the Internet (Faverio, 2022). Likewise, in the past decade, Facebook, Instagram, and Twitter have collectively seen a twofold increase in the number of older adults users on their platforms (Anderson & Perrin, 2017; Faverio, 2022).

Given how many older adults interact remotely, it seems plausible that such interaction could benefit their emotional health due to the accessibility of social networking sites, email, and text messaging. Surprisingly, however, research examining the potential benefits of remote interactions for older adults' well-being has been mixed and inconclusive.

For example, one of the first reviews of research conducted on social media use by older adults showed that remote interactions help older adults overcome loneliness, relieve stress, and improve self-efficacy (Leist, 2013). One intervention study found a significant reduction in emotional loneliness among older adults coached by visiting volunteers on how to use the Internet; no similar reduction in loneliness was evident in a control group that was not coached (Fokkema & Knipscheer, 2007). The review by Leist (2013) also summarized motivations for using social networking sites, finding that older adults use social networking sites for enjoyment, social contact, and to provide and receive social support. The conclusions from this review focus primarily on the positive effects of remote interactions and emotional health, with the caveat that older adults still prefer in-person interactions during times of stress (Leist, 2013). For instance,

one study found that in-person interaction was preferred when support was needed during adverse life events (Leist, 2013; Lewandowski et al., 2011).

Different results emerged in a recent systematic review of older adults' use of social networking (e.g., Facebook, Twitter, Instagram, LinkedIn, Snapchat, Tumblr, Quora, and WhatsApp; Newman et al., 2021). Unlike the findings described in Leist (2013), this review found that the association between social networking and loneliness was mixed across studies. On the one hand, no consistent association between social networking, mental health problems, and quality of life emerged. One study in the review found social networking to be related to higher levels of perceived social support from adult children, but another study found no such evidence (Yu et al. 2021). On the other hand, researchers found that social satisfaction, which refers to the levels of satisfaction associated with social roles and social activities, was greater among older adults who used social networking sites (Bell et al., 2013; Hutto et al., 2015). Similar to the brief review by Leist (2013), qualitative and quantitative studies found that older adults' primary motivation for social networking site usage was to maintain close ties (Newman et al., 2021). Interestingly, very few older adults used social networking sites to develop new relationships (Newman et al., 2021).

The review by Newman et al. (2021) also revealed motivations for not using social networking sites. Across studies, older adults reported social networking to be unimportant for their social, communication, and information needs. Social networking was seen as non-meaningful because the conversations were perceived as superficial rather than an opportunity for emotional support. In some studies, contact with close relationships via social networking was considered less desirable than in-person contact because older adults viewed social networking as a way to connect with peripheral ties (Lüders & Brandtzæg, 2017). Rylands and

Van Belle (2017) concluded that older adults use social networking sites to maintain close ties rather than to expand their social networks. The review by Newman et al. (2021) tells a different story from the review conducted by Leist (2013), indicating that it is unclear whether remote interactions yield support and whether that support conveys benefits to emotional health.

Altogether, the literature examining the effects of remote interactions in later life is mixed. Reviews that synthesized existing studies have reached inconsistent conclusions regarding remote interactions and well-being. Considering the joint effects of current support and companionship providers might help to resolve these inconsistencies. Moreover, potential threshold effects of support and companionship may determine when remote interactions are beneficial or inconsequential. For example, older adults whose social support and companionship are insufficient (i.e., fall below a threshold of support and companionship) might find remote interactions more beneficial than those whose social support is at a minimum level. Another potential factor that was not discussed in these reviews is the possible differences in these effects between widowed/divorced and married older adults.

Joint Effects of In-person Support and Companionship Providers and Remote Interactions: Possible Threshold Effects

One potential factor that could help explain the varying effects of remote interactions is the influence of existing social support and companionship providers. In their seminal paper, Baumeister and Leary (1995) described the need to belong, stating that human beings have a fundamental motivation to maintain a minimum level of social contact with close and rewarding ties. According to the authors, after reaching a point of satiation (i.e., having a minimum number of positive social ties), the benefits of additional social ties diminish, and the motivation to build new relationships subsides (Baumeister & Leary, 1995). For example, an older adult who does

not have a minimum level of positive interactions would be below the threshold of positive interactions needed to preserve well-being. Falling below this threshold would have adverse effects on well-being. In contrast, older adults who have at least a minimum number of support and companionship providers would be above the threshold. Therefore, they would not be expected to derive further emotional health benefits from additional social ties beyond the critical, minimum threshold. Unclear is whether this threshold effect of support and companionship extends to remote interactions.

Remote interactions with social ties may be less beneficial if a minimum level of current support and companionship providers already exists. Importantly, Baumeister and Leary (1995) did not define the minimum level of current support and companionship providers required to fulfill the need to belong, meaning that researchers need to develop their own criteria for defining this minimum level. Also unknown is whether remote interactions can substitute for in-person interactions, thereby potentially benefiting well-being. Baumeister and Leary (1995) discussed long-distance communications over the telephone, arguing that such contact cannot substitute for in-person support and companionship (Gerstel & Gross, 2008; Baumeister & Leary, 1995). The authors imply that social relationships that lack in-person interactions are likely to be unsatisfactory. This view echoes the finding that remote interactions do not seem to be preferred by older adults (Newman et al., 2021) and may not be a sufficient way to meet the need to belong. Hence, it is important to investigate whether a minimum level of support and companionship providers exist and whether remote interactions provide benefits to older adults who fall below that threshold.

A Key Gap in the Literature: The Role of Remote Interactions

An implicit assumption in the literature is that support and companionship provided by substitute ties occur primarily in person; little attention has been paid to whether social support and companionship can be derived effectively through remote interactions with others (e.g., texting, emailing, social media/social networking sites). Remote interactions may be particularly important following social losses, such as divorce and widowhood.

After spousal loss, it is plausible that older adults interact remotely, as well as in person, to fulfill their support and companionship needs. The possible compensatory benefits of such remote interactions, however, have not been empirically investigated. The literature has yet to determine whether remote interactions with social ties benefit the emotional health of widowed/divorced older adults. Moreover, whether the potential benefits of remote interactions hinge on a low level of support and companionship, particularly among widowed/divorced older adults, remains largely unknown.

Current Study

The current study sought to address these questions and reconcile mixed evidence in the literature by examining the role of support and companionship providers in older adults' use of remote interactions. I sought to address whether older adults whose support and companionship providers meet an existing minimum experience improvements in their emotional health. Are there fewer emotional health benefits of remote interactions if older adults have the minimum level of support and companionship providers (a threshold effect)? Additionally, I sought to examine whether the experience of a spousal loss strengthens the hypothesized threshold effect. Are remote interactions more beneficial for those who have experienced social loss?

Therefore, I hypothesized that a minimum number of in-person support and companionship providers would moderate the association between the frequency of remote interactions and emotional health (Figure 3.1, Hypothesis 1). I predicted that there would be a minimum threshold below of in-person support and companionship providers below which more frequent remote interactions would be likely to benefit emotional health. I also predicted that more frequent remote interactions would be more beneficial for emotional health among widowed/divorced older adults whose social ties fall below the minimum threshold of support and companionship providers, compared to widowed/divorced older adults who have met the minimum and married older adults on either side of the threshold (moderated moderation) (Figure 3.2, Hypothesis 2). I did not hypothesize simple moderation by marital status because the effect of marital status is expected to play a role only for older adults whose number of support and companionship providers falls below the minimum threshold.

Method

Sample

The data for this study were derived from a publicly available three-wave dataset: UC Berkley Social Networks Study (UCNets: Claude Fischer, Principal Investigator). The UCNets study included two age groups: 690 adults aged 50-70 years and 495 adults aged 21-30 years. The questions used in this study were assessed using a subsample of the older age group 60-70 years of age when the first wave of data was collected ($N = 411$). On average, participants were 65 years of age, held a Bachelors' degree, and perceived themselves to be in good health. Participants were approximately 65% female, 38% married, and 80% were non-Hispanic white.

Procedure

      The current cross-sectional study examines the baseline data from the UCNets study. For more information regarding the recruitment of the participants and procedures, see Study 1.

Measures

      The UCNets study included measures assessing participants' social networks, including their support and companionship providers and frequency of remote interactions. Measures also included constructs related to emotional health and sociodemographic information.

Marital Status

      Participants were asked their current marital status (1 = *married*, 2 = *widowed*, 3 = *divorced*, 4 = *separated*, 5 = *never married*). A dichotomous variable was computed for the current study by assigning married participants to one group and combining widowed into another group (0 = *married*, 1 = *widowed/divorced*; $n_{\text{widowed/divorced}}$ = 158, n_{married} = 187). For clarification regarding the construction of a composite spousal loss variable, see Study 1.

Threshold of In-person Support and Companionship Providers

      Participants were asked to think about who typically provides them with emotional support, instrumental support, and companionship. For emotional support, participants were asked to list up to six people (first names provided) in whom they had confided when they had personal matters or concerns, such as issues with relationships, important things in their lives, and difficult experiences. For informational support, participants were asked to list up to six people whose advice they seek out when making decisions, such as taking a job, family issues, or health problems. For instrumental support, participants were asked to list up to 6 names of people who had given practical help, done repairs, picked up something at the store, or provided a ride. Additionally, participants were asked to list up to six names of people whom they either

could ask or have asked for help if they were seriously injured or sick. For companionship, participants listed up to nine names of people with whom they do social activities, such as going shopping, going to a park, visiting, getting together for drinks or a meal, or going out to concerts, plays, clubs, sports, or other events. A variable was constructed by summing all the unique names listed as support and companionship providers.

In order to create a variable defining the minimum number of in-person social ties, I used an a priori approach modeled after an approach done by Fischer (1982) (see Study 2). I defined a threshold by distinguishing between participants who fall in the bottom quartile of the sample in terms of their number of in-person support and companionship providers (five and below) and participants who fall above this quartile in terms of the number of in-person support and companionship providers (six and above) (0 = *below-threshold number of in-person support/companionship providers*, 1 = *above-threshold number of in-person support/companionship providers*).

Frequency of Remote Interactions

The frequency of remote interactions was assessed for a subsample of participants' social networks. The subsample was selected through a computer-generated algorithm. The subsample could include up to five unique names and excluded household members who are kin, a spouse, or a significant other. The procedure takes the first name offered in each of the six support and companionship questions and automatically goes to the next name if the name is not unique and the next question if no unique names are listed (Figure 3). Then, participants were prompted to think about these five unique people in follow-up questions that gauged the frequency of their remote interactions. Participants were asked how often they communicate with each subsample network member by text, email, or other ways online on a 7-point Likert scale (1 = *at least once*

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a day; 3 = *at least once a month*; 6 = *never*). The responses to each remote mode of interaction were reverse-coded and summed to represent an overall frequency of remote interactions in which higher scores indicate more remote interactions.

Days Felt Isolated

Participants were asked how many days in the past seven days they felt isolated from other people (0 = *no days felt isolated*; 7 = *felt isolated for seven days*).

Days Felt Lonely

Participants were asked how many days in the past seven days they felt lonely (0 = *no days felt lonely*; 7 = *felt lonely for seven days*). Previous research has examined the construct validity of single-use items to screen for loneliness and has determined it to be sufficient (Reinwarth et al., 2023; Mund et al., 2023). Another published study using the UCNets study data has also examined days felt isolated and days felt lonely as single-item outcomes (Child & Lawton, 2019).

Psychological Distress

Using the six-item short form of the Kessler Psychological Distress Scale (Kessler et al., 2002), participants were asked about the frequency with which they experienced feelings of depression, nervousness, hopelessness, restlessness, worthlessness, and that everything was an effort. Items were measured on a 6-point Likert scale (1 = *all of the time*, 5 = *none of the time*). The responses to each item were reverse-coded and summed, with higher scores representing more psychological distress (Chronbach's $\alpha = 0.75$).

Covariates

The multiple regression models included the following covariates: age, gender, race/ethnicity, self-rated health, and educational attainment. For more information on how the covariates were operationalized in the study, see Study 1.

Analytic Plan

All analyses were conducted using SPSS and the PROCESS macro (Hayes, 2017). Analyses included ordinary least squares multiple regressions with interaction terms to address the main hypotheses. Descriptive statistics were computed, including each variable's mean, standard deviation, and frequency (Table 3.1). Descriptive statistics, independent samples t-tests, and chi-squares were analyzed to assess whether older adults whose social ties fell below the threshold significantly differ in their sociodemographic information and responses to key study variables from older adults whose social ties fell above the threshold (Table 3.2). Intercorrelations among the key study variables were examined (Table 3.3). Analyses of the assumptions identified five outliers (z-scores for each outcome exceeded the statistical cutoff of 3; Cousineau & Chartier, 2010); the outliers were subsequently removed from the analyses.

For Hypothesis 1, multiple three regression analyses examined the association between each of the outcome variables (days felt isolated, days felt lonely, and psychological distress) and the frequency of remote interactions, the threshold of support and companionship providers, the interaction term (frequency of remote interactions X threshold of support and companionship providers), and the covariates.

For Hypothesis 2, three multiple regression analyses examined the association between each of the outcome variables (days felt isolated, days felt lonely, and psychological distress) and the frequency of remote interactions, the threshold of support and companionship providers,

marital status, the first-order interaction terms (frequency of remote interactions X marital status; frequency of remote interactions X threshold of support and companionship providers), the second-order interaction term (frequency of remote interactions X marital status X threshold of support and companionship providers), and the covariates.

Analyses to probe conditional effects were conducted for any significant interactions to determine at what level of the moderator the simple slopes are significant. For Hypothesis 1, the conditional effects would test at what level of the threshold of support/companionship providers the frequency of remote interactions is significantly associated with emotional health. For Hypothesis 2, the conditional effects would test at what levels of both marital status and the threshold of support/companionship providers the frequency of remote interactions is significantly associated with emotional health.

Results

Initial Analyses

Descriptive information for all study variables is represented in Table 3.1. Sociodemographic characteristics and mean comparisons of participants below vs. above the threshold of in-person support and companionship providers are presented in Table 3.2, and intercorrelations between all the study variables are included in Table 3.3. The sociodemographic characteristics between the two groups are fairly similar. Of those whose number of support and companionship providers fell below the threshold of five or fewer support providers, approximately 59% were female, 48% were widowed/divorced, and 26% belonged to a minority group. They were also, on average, 65 years old, perceived their health as excellent, and had a bachelor's degree. Of those whose number of support providers fell above the threshold, approximately 68% were female, 56% were widowed/divorced, and 18% belonged to a minority

group. On average, they were 65 years old, perceived their health as very good, and had a Bachelor's degree. Older adults whose social ties fell below the threshold, on average, reported better perceived health ($p = 0.00$) and were marginally less educated ($p = 0.05$) than older adults whose support and companionship providers were above the threshold. They also had marginally less women ($p = 0.08$), and marginally more non-Hispanic white participants ($p = 0.08$) than those above the threshold of support and companionship providers. A significant, positive correlation between remote interactions and the threshold of support and companionship providers suggests that a higher frequency of remote interactions is related to being above the threshold of support and companionship providers ($p < 0.001$).

Does Being Below the Threshold of In-Person Support and Companionship Providers Strengthen the Association Between Remote Interactions and Emotional Health? (H1)

Three parallel multiple regression analyses assessed emotional health (days felt isolated, days felt lonely, and psychological distress) as a function of remote interactions and the threshold of support/companionship providers (0 = *in the bottom quartile*, 1 = *above the bottom quartile*). The main effect of remote interactions in relation to days felt isolated was marginally significant ($p = 0.06$). The main effect of the threshold of support and companionship providers was nonsignificant ($p = 0.24$). A marginally significant interaction effect emerged between remote interactions and the threshold of support and companionship providers ($p = 0.06$) (Table 3.4, left panel). Simple slopes analyses revealed that more frequent remote interactions were significantly associated with decreases in days felt isolated among those whose support providers fell below the minimum threshold of in-person support and companionship providers [$b = -0.08$, $t(364) = -2.26$, $p = 0.02$, 95% CI(-0.16, -0.01)], but not among older adults whose support providers fell above the threshold [$b = -0.01$, $t(364) = -0.48$, $p = 0.63$, 95% CI(-0.04, 0.02)] (Figure 3.4).

The main effect of remote interactions ($p = 0.63$) and the threshold of support and companionship providers in relation to days felt lonely was nonsignificant ($p = 0.84$). The interaction between the frequency of remote interactions and the threshold of support and companionship providers was also nonsignificant ($p = 0.42$; Table 3.4, middle panel).

The main effect of remote interactions in relation to psychological distress was nonsignificant ($p = 0.11$). The main effect of the threshold of support and companionship providers was significant ($p = 0.02$), suggesting that being above the threshold of support and companionship providers was related to increases in psychological distress, however, this main effect was qualified by a significant interaction between older adults' remote interactions and the threshold of support and companionship providers ($p = 0.03$; Table 3.4, right panel). Simple slopes were evaluated at two levels of this threshold of to probe the interaction. More frequent remote interactions was significantly associated with decreases in psychological distress among those who fell below the threshold of support and companionship providers [$b = -0.16$, $t(366) = -2.39$, $p = .02$, 95% CI(-0.29, -0.30)], but not among older adults who fell above the threshold [$b = 0.26$, $t(366) = -0.00$, $p = 0.97$, 95% CI(-0.05, 0.05] (Figure 3.5).

Does Being Below the Threshold of Support and Companionship Providers and Being Widowed/Divorced Strengthen the Association Between Remote Interactions and Emotional Health (Moderated Moderation)? (H2)

Three parallel multiple regression analyses with three-way interaction terms assessed emotional health (days felt isolated, days felt lonely, and psychological distress) as a function of the threshold of support and companionship providers (below-threshold number of support and companionship providers vs. above-threshold number of support and companionship providers).

No significant main effects of remote interactions ($p = 0.53$), threshold of support and companionship providers ($p = 0.66$), and marital status in relation to days felt isolated emerged ($p = 0.39$) in these analyses. Contrary to expectations, the interaction between remote interactions, support and companionship providers threshold, and marital status was nonsignificant ($p = 0.87$; Table 3.5 left panel). Parallel nonsignificant interactions emerged in the analyses of days felt lonely ($p = 0.48$; Table 3.5, middle panel) and psychological distress ($p = 0.92$; Table 5, right panel). There was a significant main effect of marital status in relation to days felt lonely, such that widowed/divorced older adults reported more days felt lonely ($p = 0.03$; Table 3.5, middle panel).

Sensitivity Analyses

To test the sensitivity of the regression models that include the threshold of support and companionship providers as a moderator, parallel regression models were conducted with a continuous measure of support and companionship providers. The results for Hypothesis 1, including the main effects of the predictors and the interaction terms, were nonsignificant. For Hypothesis 2, the results for days felt isolated and psychological distress were nonsignificant, however, the three-way interaction in the analysis of psychological distress was significant ($p = 0.00$). Conditional effects revealed that older adults experienced fewer days felt lonely with more frequent remote interactions, but only for widowed/divorced older adults in the group with fewer social ties (-1 SD) [$t(300) = -2.59$, $p = 0.01$, 95% CI(-0.14, -0.02)].

Discussion

The present study sought to reconcile mixed literature on the benefits of remote interactions (Leist, 2013; Newman et al., 2021) by examining whether substitution and compensation occur remotely but only when in-person support and companionship are lacking.

More specifically, I hypothesized that remote interactions are beneficial to emotional health, but only if older adults' social ties fell below a threshold of in-person support and companionship (Hypothesis 1). I also expected that the association between the frequency of remote interactions and emotional health would be stronger among those who did not meet the minimum number of in-person interactions and were widowed/divorced (Hypothesis 2). The findings from the current study supported my first hypothesis but, unexpectedly, provided no evidence for my second hypothesis. These findings and the potential theoretical and practical implications are discussed below.

Minimum Levels of In-Person Interactions

Baumeister and Leary (1995) posited that the need to belong motivates people to maintain a minimum level of close social ties and that, at a certain but undefined level, the need to belong becomes satisfied. Unlike in-person or face-to-face interactions, the authors also argued that support provided over the phone does not meet this need. The current findings somewhat support Baumeister and Leary's (1995) argument that remote interactions do not fulfill the need for positive in-person interactions. More specifically, if older adults met the minimum threshold of support and companionship providers, remote interactions were not beneficial to emotional health. This supports the idea that there is a minimum threshold of social support where the need to belong is satisfied. Older adults who were below the minimum threshold of support and companionship providers, however, did experience improvements in their emotional health by engaging in remote interactions, evidenced by reductions in psychological distress and days felt isolated. This finding suggests that lacking support and companionship has consequences, to such an extent that remote interactions become beneficial when they would otherwise be inconsequential.

The results provide some support for the positive impacts of remote interactions as described in the review authored by Leist (2013). Importantly, the results only found benefits of remote interactions for older adults who fell below the threshold of support and companionship providers. Therefore, the results support the conclusion made by previous researchers that remote interactions are related to boosts to well-being (Leist, 2013). However, these boosts depend on whether a minimum level of support and companionship is met.

It is possible, however, that the design of the current study may have influenced these results. Questions about the frequency with which participants interacted with social ties were asked only for a subsample of participants' networks. It is possible that the operationalization underestimated the frequency of remote interactions. Additionally, the current study lacked a variable that assesses participants' technological literacy. It is possible that older adults with higher levels of technological literacy may experience more positive remote interactions free from frustration or confusion that may arise when navigating remote means of interactions.

Marital Status

Spousal loss in later life is widespread. Therefore, it was expected that older adults who are widowed/divorced may rely on remote interactions more than married older adults when lacking in-person support and companionship providers. Contrary to my predictions, older adults lacking a marital partner (i.e., widowed and divorced) as well as sufficient support and companionship (i.e., below the threshold) did not especially benefit from engaging in remote interactions. There are a few reasons why the results of the current study did not support the hypothesis. As previously discussed, older adults prefer in-person contact during adverse life events (Leist, 2013; Lewandowski et al., 2011). During the adverse event of losing a spouse

(e.g., through widowhood or divorce), remote interactions may be unhelpful or too taxing to engage in, thereby reducing their compensatory effects.

It should be noted that the majority of the spousal loss group were divorced (rather than widowed). Despite the findings in the literature indicating that both widowhood and divorce similarly detract from emotional health, the null findings may be because these analyses did not account for the unique needs of these two different groups.

Additionally, the a analysis of days felt lonely revealed a significant three-way interaction between a continuous measure of support, marital status, and remote interactions. More frequent remote interactions was associated with fewer days felt isolated, but only for widowed/divorced older adults in the lowest support and companionship group. This significant finding is at odds with the null results that emerged from other tests of potential threshold effects. This significant finding is, nonetheless, consistent with a threshold model because only widowed/divorced older adults in the lowest support and companionship group exhibited better emotional health. In general, the mixed findings of the tests of the threshold effect call into question whether the threshold level is correctly defined as the bottom quartile of support and companionship. The current approach, although adapted from Fischer (1982), may not have captured the most meaningful threshold of the current sample, which may have increased the odds of null findings.

Remote Interactions as a Modality for Substitution and Compensation

My findings both support and misalign with existing research on substitution and compensation. Notably, in the context of widowhood and divorce, remote interactions do not seem to compensate for lacking a spouse, unlike previous research linking substitution and compensation as a way to cope with spousal loss (Rook & Charles, 2017; Rook & Schuster, 1996; Zettel & Rook, 2004). These results question whether substitution and compensation can

occur through remote interactions. Older adults with in-person support and companionship above a minimum threshold did not benefit from engaging in remote interactions. In contrast, older adults with in-person support and companionship below a minimum threshold derived benefits from engaging in remote interactions. While this may provide evidence for compensation among older adults lacking in-person support and companionship, it is unclear whether they substituted for in-person support and companionship with remote interactions.

In order to gain more descriptive insight, I divided the number of in-person support and companionship providers and frequency of remote interactions into tertiles. I conducted a crosstabs analysis to see if those in the lowest tertile of in-person support and companionship providers are turning to more remote interactions. The results did not provide evidence of substitution, as older adults in the lowest tertile of in-person support and companionship providers were the least likely to turn to remote interactions; only 9.8% of older adults in the lowest tertile of in-person support and companionship providers were in the highest tertile of remote interactions. People with the least support and companionship are not turning to remote ties more than people with more in-person support and companionship, but despite that, they still reap benefits from remote interactions. Researchers examining substitution and compensation have consistently stated that substitution occurs before compensation (East & Rook, 1992; Rook & Schuster, 1996). The findings presented here call into question whether these two social processes must always co-occur. Substitution may be less likely to occur in the context of remote interactions since research has shown that older adults use social networking sites to maintain contact with already existing close ties rather than expand their social ties (Lüders & Brandtzæg, 2017; Newman et al., 2021). The subsequent benefits to emotional health may stem from older adults interacting with a small subsample of their network members who are meaningful to them.

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Substitution might not occur remotely, but whether the resulting benefits of remote interactions are compensatory remains to be determined. Disentangling these two distinct but related social processes, namely substitution and compensation, is an avenue for future research.

Limitations and Future Directions

Despite its merit, this study has some limitations. The dataset only measured the frequency of remote interactions for a limited number of network members, perhaps to reduce participant burden. Given that the subsample for whom remote interactions were assessed includes only five network members, the potential effects of other remote interactions cannot be estimated. Despite this limitation, the current study is one of the first to examine the role of remote interactions in substitution and compensation.

This study is also cross-sectional, precluding causal inferences regarding how remote interactions affect well-being among older adults who have experienced spousal loss. Future research would benefit from a longitudinal examination. Nonetheless, this will be one of the first studies to examine the potential role of in-person interactions in modifying the effects of remote interactions on emotional health in later life.

Another potential limitation is the lack of statistical power needed to examine widowhood and divorce separately. The widowed and divorced may have unique social needs, therefore, future research may consider examining them separately. This study also lacked the statistical power to disentangle living status from marital status, which may be related to more days felt isolated and more frequent remote interactions.

Notwithstanding the limitations, this study had multiple strengths afforded by the study's design and statistical approaches. First, this research included information regarding participants' remote interactions and in-person support and companionship providers. As older adults become

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more involved with remote forms of communication, research must consider their remote interactions, as they may contribute meaningfully to well-being. This study also paved the way for identifying an empirical threshold of in-person interactions that renders the benefits of remote interactions less beneficial. Future research examining the impacts of remote interactions in later life should consider the joint effects of in-person interactions.

Conclusion

The current study provides insights into how older adults who lack social support and companionship engage in substitution and compensation. Importantly, when a minimum threshold of in-person support and companionship is not met, using remote interactions may be particularly important to older adults' emotional health, regardless of marital status. The results of this study yielded empirical support for a minimum threshold of in-person support and companionship in which the need to belong is met (Baumeister & Leary, 1995). The findings from this study also indicate that remote interactions may benefit older adults, but primarily for those who fall below this threshold. Future research should continue to examine the joint effects of in-person and remote interactions and the potential benefits of such interactions in later life.

Figure 3.1

Model of Emotional Health as a Function of Frequency of Remote Interactions and Threshold of Support & Companionship Providers
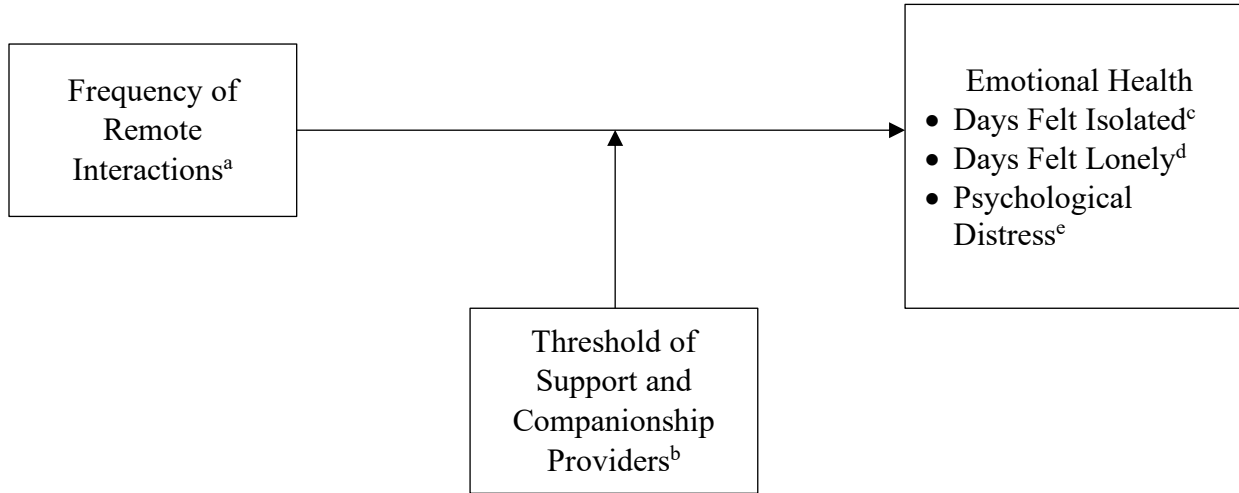
Note. [a]Remote interactions is a sum of five items asking how often five network members interacted over text, email, or other ways online (1 = *never; 3 = at least once a month;* 6 = *at least once a day).* [b]Threshold of support and companionship providers (0 = *below-threshold number of support and companionship providers;* 1 = *above-threshold number of support and companionship providers*). [c]Days felt isolated (0 = *no days felt isolated*; 7 = *felt isolated for seven days*). [d]Days felt isolated (0 = *no days felt isolated*; 7 = *felt isolated for seven days*). [e]A sum of six items representing the frequency of psychological distress [range: 6-22 (1 = *none of the time*, 5 = *all of the time*)].
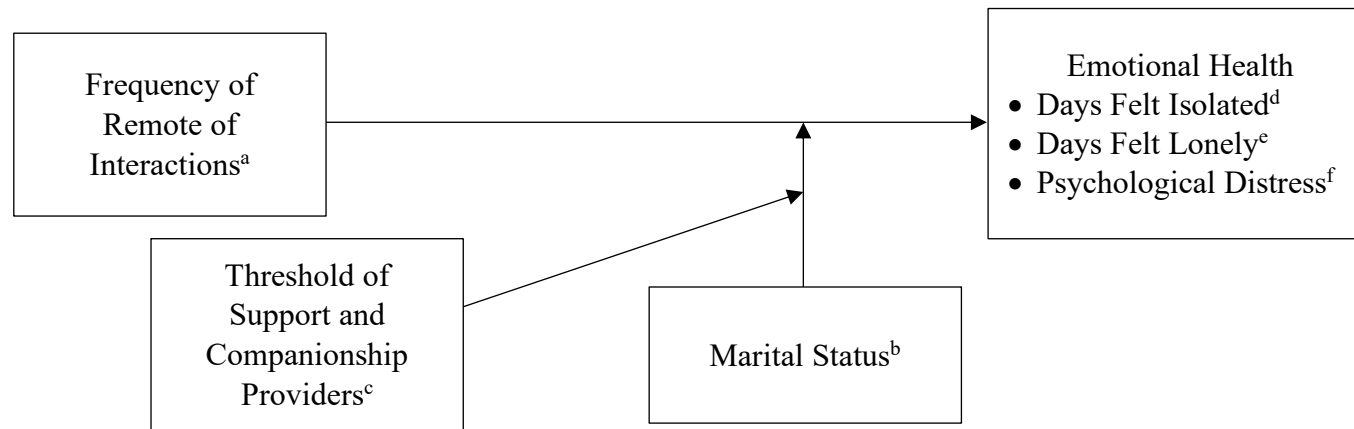
Figure 3.2

Model of Emotional Health as a Function of Frequency of Remote Interactions, Marital Status, and Threshold of Support and Companionship Providers

Note. [a]Remote interactions is a sum of five items asking how often five network members interacted over text, email, or other ways online (1 = *never; 3 = at least once a month; 6 = at least once a day).* [b]Marital status (0 = *married, 1 = widowed/divorced*). [c]Threshold of support and companionship providers (0 = *below-threshold number of support and companionship providers; 1 = above-threshold number of support and companionship providers*). [d]Days felt isolated (0 = *no days felt isolated*; 7 = *felt isolated for seven days*). [e]Days felt isolated (0 = *no days felt isolated*; 7 = *felt isolated for seven days*). [f]A sum of six items representing the frequency of psychological distress [range: 6-22 (1 = *none of the time*, 5 = *all of the time*)].

Figure 3.3

Flowchart of the Computer Algorithm to Select a Remote Interactions Subsample

Full Sample

Emotional Support:
Name 1
Name 2
Name 3
Name 4
Name 5
Name 6

Instrumental Support (2 Questions):	
Name 1	Name 1
Name 2	Name 2
Name 3	Name 3
Name 4	Name 4
Name 5	Name 5
Name 6	Name 6

Companionship:	
Name 1	Name 8
Name 2	Name 9
Name 3	
Name 4	
Name 5	
Name 6	

Informational Support:
Name 1
Name 2
Name 3
Name 4
Name 5
Name 6

Remote Interactions Subsample
First Unique Name
Second Unique Name
Third Unique Name
Fourth Unique Name
Fifth Unique Name

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Note. First unique name listed in each category of support/companionship was included in the remote interactions subsample. Two unique names were selected for instrumental support because two questions asked about instrumental support. If no unique name was listed in a given category, the computer-generated algorithm would select a unique name from another category.

Table 3.1

Descriptive Statistics of Key Variables

Variable[a] (*ns* = 342 - 406)	*M*(SD)
Age[b]	65.01(3.06)
Health[c]	2.34(1.06)
Education[d]	6.88(1.45)
Days Felt Isolated[e]	0.86(1.64)
Days Felt Lonely[f]	0.87(1.70)
Psychological Distress[g]	9.64(3.11)
	n(%)
Female[h]	265(65.27%)
Married[i]	156(38.42%)
Widowed/Divorced[i]	186(45.81%)
Race/Ethnicity[j] (1 = minority status)	83(20.44%)

Note. SD = standard deviation. [a]All variables were measured at the baseline of the UC Berkeley Social Networks Study (UCNets).

[b]The possible range for age is 60-70. [c]Health refers to self-rated health, [range: 1-5 (1 = *excellent*, 5 = *poor*)]. [d]Educational attainment

[1 = *Less than 9th grade*; 2 = *9th grade to 12th grade, but did not graduate*; 3 = *High school graduate*; 4 = *GED or equivalent*; 5 =

Some college; 6 = *Associate's degree;* 7 = *Bachelor's degree*; 8 = *Master's degree*; 9 = *Higher professional degree (like MD, JD, or*

PhD)]. [e]Days felt isolated (0 = *no days felt isolated*; 7 = *felt isolated for seven days*). [f]Days felt lonely (0 = *no days felt lonely*; 7 = *felt*

lonely for seven days). [g]A sum of six items representing the frequency of psychological distress [range: 6-22 (1 = *none of the time*, 5 =

all of the time)]. [h]Gender (1 = *male*, 2 = *female*). [i]Marital status (0 = *married,* 1 = *widowed/divorced*). [j]Race/ethnicity (0 = *non-*

Hispanic white, 1 = *Black/African American, American Indian or Alaska Native, Asian, Hispanic/Latino*). The *n*s vary because the

spousal loss variable excludes separated and never married older adults.

Table 3.2

Characteristics of Participants with Support and Companionship Providers Below vs. Above a Minimum of Support and Companionship Providers

Variable[a] ($N = 406$)	Below Threshold of Support & Companionship Providers ($n = 111$)	Above Threshold of Support & Companionship Providers ($n = 295$)	Independent Samples *t*-test or Pearson Chi-Square
	M(SD)	*M*(SD)	*t*(df)
Age[b]	65.05 (3.02)	65.00 (3.08)	0.17(404)
Health[c]	2.62 (1.18)	2.23 (1.00)	3.13(173.13)**
Education[d]	6.65(1.50)	6.97(1.42)	-1.96(380)[+]
	n(%)	*n*(%)	$\chi 2(1)$
Female[e]	65 (58.56%)	200 (67.80%)	3.04[+]
Married[f]	44 (51.76%)	112 (43.58%)	1.73
Widowed/Divorced[f]	41 (48.24%)	145 (56.42)	1.73
Race/Ethnicity[g] (1 = minority status)	29 (26.13%)	54 (18.31%)	3.03[+]

Note. SD = standard deviation. [a]All variables were measured at the baseline of the UC Berkeley Social Networks Study (UCNets).

[b]The possible range for age is 60-70. [c]Health refers to self-rated health. The possible range is 1-5 (1 = *excellent*, 5 = *poor*).

[d]Educational attainment [1 = *Less than 9th grade*; 2 = *9th grade to 12th grade, but did not graduate*; 3 = *High school graduate*; 4 = *GED or equivalent; 5 = Some college; 6 = Associate's degree; 7 = Bachelor's degree; 8 = Master's degree; 9 = Higher professional degree (like MD, JD, or PhD)*]. [e]Gender (1 = *male*, 2 = *female*). [f]Marital status (0 = *married,* 1 = *widowed/divorced*). [g]Race/Ethnicity (0 = *non-Hispanic white*, 1 = *Black/African American, American Indian or Alaska Native, Asian, Hispanic/Latino*). The *n*s vary because the spousal loss variable excludes separated and never married older adults.

$^{+}p < .09$ *$p < .05$. **$p < .01$. ***$p < .001$.

Table 3.3

Intercorrelations for Key Study Variables (ns = 342 – 405)

Variable[a]	M (SD)	1	2	3	4	5	6
1. Psychological Distress[b]	9.64 (3.11)	—	0.51***	0.53***	-0.06	-0.06	0.06
2. Days Felt Isolated[c]	0.86 (1.64)		—	0.68***	-0.08	-0.08	0.13*
3. Days Felt Lonely[d]	0.87 (1.70)			—	-0.05	-0.09+	0.25***
4. Remote Interactions[e]	12.84 (6.54)				—	0.46***	0.05
5. Threshold of Support and Companionship Providers[f]	0.73 (0.45)					—	-0.07
6. Martial Status[g]	0.46 (0.50)						—

Note. [a]All variables were measured at the baseline of the UC Berkeley Social Networks Study (UCNets). [b]A sum of six items representing the frequency of psychological distress [range: 6-22 (1 = *none of the time*, 5 = *all of the time*)]. [c]Days felt isolated (0 = *no days felt isolated*; 7 = *felt isolated for seven days*). [d]Days felt lonely (0 = *no days felt lonely*; 7 = *felt lonely for 7 days*). [e]Remote interactions is a sum of five items asking how often five network members interacted over text, email, or other ways online (1 = *never*; 3 = *at least once a month*; 6 = *at least once a day*). [f]Threshold of support and companionship providers (0 = *below-threshold number of support and companionship providers*; 1 = *above-threshold number of support and companionship providers*). [g]Marital status (0 = *married,* 1 = *widowed/divorced*). The *n*s vary because the spousal loss variable excludes separated and never married older adults.

+$p < .09$ *$p < .05$. **$p < .01$. ***$p < .001$.

Table 3.4

Emotional Health as a Function of the Frequency of Remote Interactions, Threshold of Support and Companionship Providers, and their Interaction (H1)

Predictor	Days Felt Isolated[a] (N = 373)			Days Felt Lonely[b] (N =373)			Psychological Distress[c] (N = 375)		
	b(SE)	t(364)	95% Boot CI Lower, Upper	b(SE)	t(363)	95% Boot CI Lower, Upper	b(SE)	t(366)	95% Boot CI Lower, Upper
Constant	1.82(1.81)	1.00	-1.34, 5.19	2.85(1.87)	1.52	-0.81, 6.66	14.56(3.26)***	4.47	8.13, 20.99
Age[d]	-0.03(0.03)	-1.29	-0.08, 0.01	-0.04(0.03)	-1.60	-0.10, 0.01	-0.12(0.04)*	-2.52	-0.22, -0.03
Health[e]	0.47(0.08)***	5.95	0.28, 0.67	0.35(0.08)***	4.29	-0.17, 0.53	1.04(0.14)***	7.27	0.72, 1.35
Gender[f]	0.22(0.17)	1.29	-0.12, 0.56	0.12(0.18)	0.67	-0.24, 0.48	0.32(0.31)	1.06	-0.30, 0.97
Education[g]	-0.04(0.06)	-0.65	-0.15, 0.07	-0.03(0.06)	-0.49	-0.15, 0.08	-0.05(0.10)	-0.54	-0.28, 0.16
Race/Ethnicity[h]	-0.16(0.21)	-0.80	-0.56, 0.23	-0.11(0.21)	-0.52	-0.51, 0.31	0.13(0.37)	0.35	-0.61, 0.91
Remote Interactions[i]	-0.03(0.01)[+]	-1.85	-0.06, 0.00	-0.01(0.02)	-0.48	-0.04, 0.03	-0.04(0.03)	-1.61	-0.10, 0.01
Threshold of Support and Companionship Providers[j]	0.30(0.26)	1.17	-0.16, 0.77	-0.05(0.27)	-0.19	-0.48, 0.64	1.14(0.47)*	2.43	0.31, 1.98
Remote Interactions x Threshold of Support & Companionship Providers	0.08(0.04)[+]	1.92	-0.01, 0.17	-0.03(0.04)	-0.80	-0.07, 0.16	0.16(0.07)*	2.21	0.01, 0.32
Model Fit	$R^2_{Adj.}$ = 0.01, F(8,364) = 6.10, p < .001			$R^2_{Adj.}$ = 0.06, F(8,364) = 3.08, p = 0.00			$R^2_{Adj.}$ = 0.15, F(8,366) = 8.96, p < .001		

Note. Each panel presents the regression coefficients, test statistics, and bootstrapped 95% confidence intervals (based on 5,000 resamples) for a multiple regression analysis for days felt isolated (left panel), days felt lonely (middle panel), and psychological distress (right panel). [a]Days felt isolated (0 = *no days felt isolated*; 7 = *felt isolated for seven days*). [b]Days felt isolated (0 = *no days felt isolated*; 7 = *felt isolated for seven days*). [c]A sum of six items representing the frequency of psychological distress [range: 6-22 (1 = *none of the time*, 5 = *all of the time*)]. [d]The possible range for age is 60-70. [e]Health refers to self-rated health, [range: 1-5 (1 =

excellent, 5 = *poor*)]. [f]Gender (1 = *male*, 2 = *female*). [g]Educational attainment [1 = *Less than 9th grade*; 2 = *9th grade to 12th grade,*

but did not graduate; 3 = *High school graduate*; 4 = *GED or equivalent*; 5 = *Some college;* 6 = *Associate's degree*; 7 = *Bachelor's*

degree; 8 = *Master's degree*; 9 = *Higher professional degree (like MD, JD, or PhD)*]. [h]Race/ethnicity (0 = *non-Hispanic white*, 1 =

Black/African American, American Indian or Alaska Native, Asian, Hispanic/Latino). [i]Remote interactions is a sum of five items

asking how often five network members interacted over text, email, or other ways online (1 = *never*; 3 = *at least once a month*; 6 = *at*

least once a day). [j]Threshold of support and companionship providers (0 = *below-threshold number of support and companionship*

providers; 1 = *above-threshold number of support and companionship providers*).

[+]$p < .09$ *$p < .05$. **$p < .01$. ***$p < .001$.

Table 3.5

Emotional Health as a Function of the Frequency of Remote Interactions, Threshold of Support and Companionship Providers,

*Marital Status, and their Interactions (H2)*

Predictor	Days Felt Isolated[a] (N = 313)			Days Felt Lonely[b] (N = 313)			Psychological Distress[c] (N = 314)		
	b(SE)	t(300)	95% Boot CI Lower, Upper	b(SE)	t(300)	95% Boot CI Lower, Upper	b(SE)	t(301)	95% Boot CI Lower, Upper
Constant	1.59(2.02)	0.79	-1.98, 5.49	1.63(1.93)	0.84	-2.08, 5.60	13.22(3.54)***	3.74	6.19, 20.40
Age[d]	-0.03(0.03)	-1.05	-0.09, 0.03	-0.04(0.03)	-1.41	-0.10, 0.02	-0.09(0.05)[+]	-1.82	-0.19, 0.01
Health[e]	0.45(0.09)***	5.07	0.24, 0.66	0.28(0.04)***	3.35	0.10, 0.48	1.04(0.15)***	6.71	0.68, 1.41
Gender[f]	0.22(0.19)	1.17	-0.15, 0.59	0.06(0.18)	0.34	-0.30, 0.41	0.62(0.33)[+]	1.85	-0.06, 1.27
Education[g]	-0.01(0.06)	-0.13	-0.13, 0.11	0.02(0.06)	0.35	-0.10, 0.13	-0.10(0.11)	-0.99	-0.34, 0.12
Race/Ethnicity[h]	-0.29(0.23)	-1.01	-0.64, 0.19	-0.11(0.22)	-0.50	-0.54, 0.32	0.18(0.40)	0.45	-0.72, 1.04
Remote Interactions[i]	-0.06(0.09)	-0.63	-0.26, 0.08	0.02(0.08)	0.19	-0.04, 0.09	-0.04(0.16)	-0.23	-0.37, 0.37
Threshold of Support and Companionship Providers[j]	-0.32(0.72)	-0.44	-2.21, 1.02	0.51(0.69)	0.74	-0.07, 1.16	-0.97(1.23)	-0.76	-3.70, 1.79
Marital Status[k]	0.72(0.82)	0.87	-1.39, 2.55	1.77(0.79)*	2.25	0.15, 3.37	-0.47(1.45)	-0.33	-3.94, 2.97
Remote Interactions x Threshold of Support & Companionship Providers	0.06(0.09)	0.65	-0.09, 0.26	-0.02(0.09)	-0.19	-0.10, 0.05	0.06(0.16)	0.40	-0.35, 0.40
Remote Interactions x Marital Status	-0.02(0.10)	-0.20	-0.20, 0.20	-0.09(0.10)	-0.87	-0.24, 0.07	-0.10(0.18)	-0.54	-0.56, 0.30
Threshold of Support & Companionship Providers x Marital Status	0.23(0.98)	0.24	-1.96, 2.57	-0.81(0.94)	-0.87	-2.81, 1.21	1.92(1.73)	1.11	-2.17, 5.92
Remote Interactions x Threshold of Support & Companionship Providers x Marital Status	-0.02(0.11)	-0.16	-0.25, 0.18	0.07(0.10)	0.71	-0.10, 0.25	0.02(0.19)	0.10	-0.40, 0.50
Model Fit	$R^2_{Adj.} = 0.09$, $F(12,300) = 3.52$, $p = 0.00$			$R^2_{Adj.} = 0.01$, $F(12,300) = 3.85$, $p < .001$			$R^2_{Adj.} = 0.15$, $F(12,301) = 5.43$***, $p < .001$		

Note. Each panel presents the regression coefficients, test statistics, and bootstrapped 95% confidence intervals (based on 5,000 resamples) for a multiple regression analysis for days felt isolated (left panel), days felt lonely (middle panel), and psychological distress (right panel). [a]Days felt isolated (0 = *no days felt isolated*; 7 = *felt isolated for seven days*). [b]Days felt lonely (0 = *no days felt lonely*; 7 = *felt lonely for seven days*). [c]A sum of six items representing the frequency of psychological distress [range: 6-22 (1 = *none of the time*, 5 = *all of the time*)]. [d]The possible range for age is 60-70. [e]Health refers to self-rated health, [range: 1-5 (1 = *excellent*, 5 = *poor*)]. [f]Gender (1 = *male*, 2 = *female*). [g]Educational attainment [1 = *Less than 9th grade*; 2 = *9th grade to 12th grade, but did not graduate*; 3 = *High school graduate*; 4 = *GED or equivalent*; 5 = *Some college;* 6 = *Associate's degree*; 7 = *Bachelor's degree*; 8 = *Master's degree*; 9 = *Higher professional degree (like MD, JD, or PhD)*]. [h]Race/Ethnicity (0 = *non-Hispanic white*, 1 = *Black/African American, American Indian or Alaska Native, Asian, Hispanic/Latino*). [i]Remote interactions is a sum of five items asking how often five network members interacted remotely over text, email, or other ways online (1 = *never*; 3 = *at least once a month*; 6 = *at least once a day*). [j]Threshold of support and companionship providers (0 = *below-threshold number of support and companionship providers;* 1 = *above-threshold number of support and companionship providers*). [k]Marital status (0 = *married,* 1 = *widowed/divorced*).

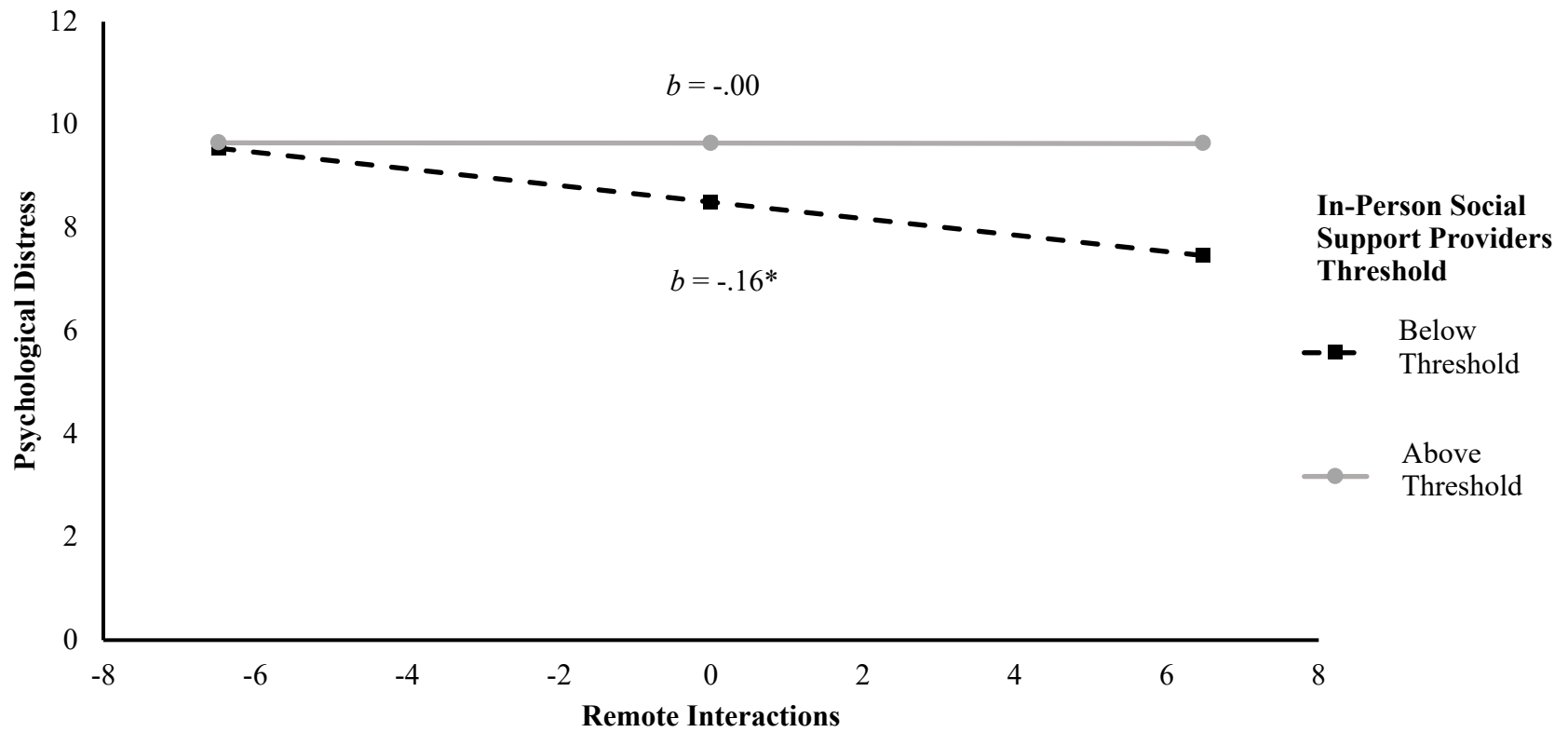[+]$p < .09$ *$p < .05$. **$p < .01$. ***$p < .001$.

Figure 3.4

Days Felt Isolated of Older Adults Below Threshold of Support and Companionship Providers vs. Above Threshold of Support and Companionship Providers
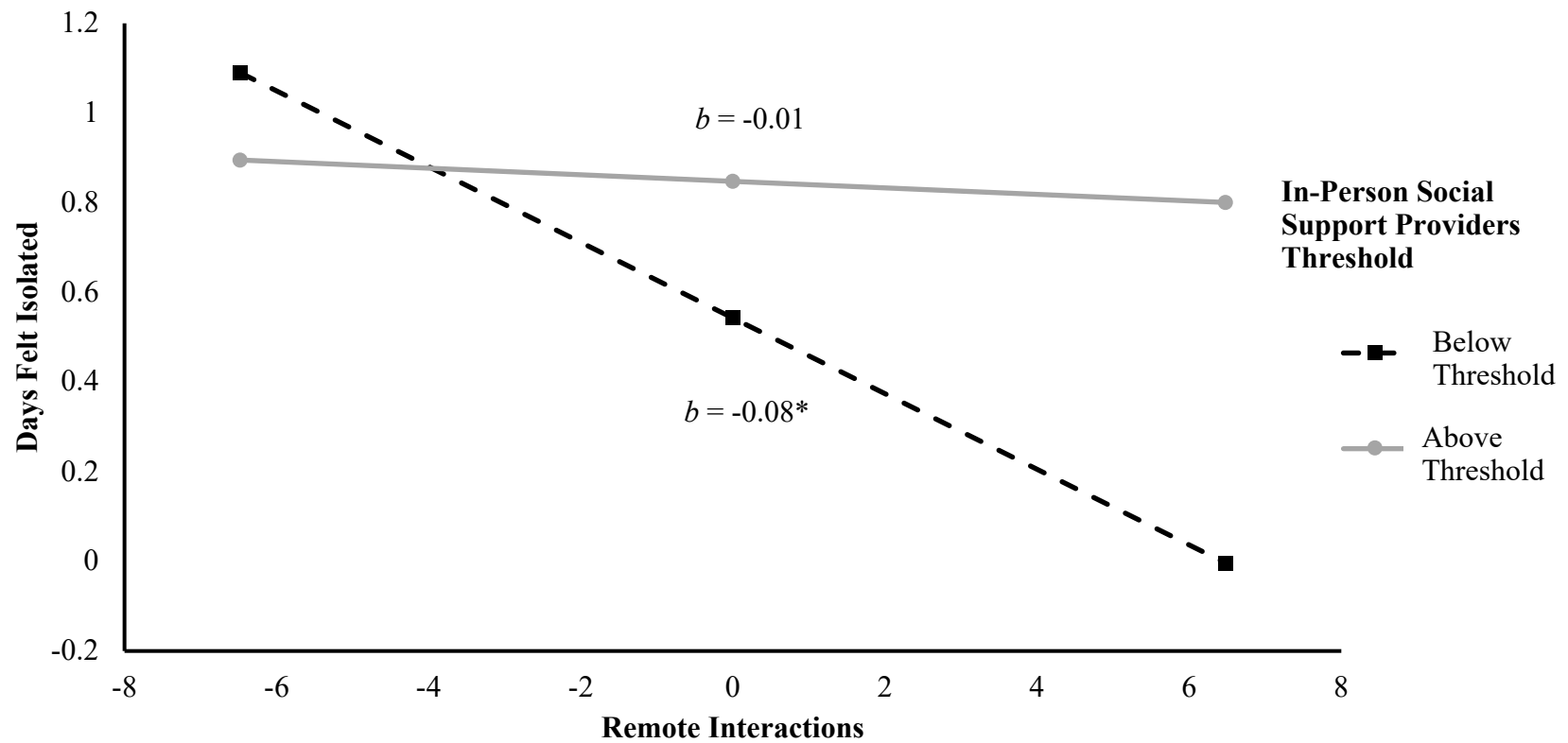
Note. $^{+}p < .09$ *$p < .05$. **$p < .01$. ***$p < .001$

Figure 3.5

Psychological Distress of Older Adults Below Threshold of Support and Companionship Providers vs. Above Threshold of Support and Companionship Providers

DISCUSSION

The goal of the current dissertation was twofold: to examine need for support and companionship as a potential motivator for substitution and compensation following the loss of a spouse and to test the utility of remote interactions in adaptations to spousal loss. Theoretical perspectives on social support and companionship and the need to belong support the idea that perceived need has special relevance to widowed and divorced older adults (Baumeister & Leary, 1995). Remote interactions as an avenue for substitution and compensation have also been understudied.

This dissertation sought to examine whether need for support and companionship predicted substitution and compensation over time in the context of spousal loss. The current dissertation also aimed to postulate a minimum number of social ties needed to meet the threshold of the need to belong, and to examine non-linear associations of duration of widowhood/divorce with need for support and companionship. Finally, I examined remote interactions, a modern way widowed and divorced older adults may seek to adapt to their lost support and companionship. Together, these studies aimed to reconcile mixed findings, evaluated common assumptions in the literature, and helped to pinpoint when remote interactions are beneficial for emotional health. The main findings and the questions that remain are discussed below.

Need for Support and Companionship as a Factor in Substitution and Compensation

Study 1 examined need for support and companionship cross-sectionally to determine if widowed/divorced older adults experienced an elevated need for support and companionship. Overall, results revealed that widowed/divorced older adults experienced a greater need for support and companionship than married older adults, regardless of the number of support and companionship providers in participants' social networks. These findings support prior assertions

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in the literature regarding the unique and specialized role of spouses in providing support and companionship (Weiss, 1974). Hence, other social ties may be unable to effectively provide the lost support and companionship needed to fulfill widowed/divorced older adults' needs.

Future research would benefit from examining whether older adults who experience any social loss (e.g., loss of a friend, child, or family member) also express a pronounced need for support and companionship. Doing so will give researchers insights into when a need for support and companionship is heightened, perhaps providing a window of time where interventions promoting support and companionship are most effective. Research would also benefit from developing a validated scale that assesses need for support and companionship in different contexts. For example, it is possible that cross-cultural differences in need for support and companionship may emerge among cultures that endorse familism or collectivism. The studies included in this dissertation examine data from a sample of relatively highly educated older adults recruited from the Bay Area in Northern California, which limits external validity.

Although gender was not the focus of this dissertation, possible gender differences in need for support and companionship warrant further consideration. Gender was often a significant covariate in the analyses conducted for this dissertation, and previous research has discovered notable gender differences in received and provided support (Antonucci & Akiyama, 1987; Kahn et al., 2011).

Duration of Widowhood and Divorce

Previous research suggests a non-linear pattern of perceived support and companionship after the loss of a spouse, suggesting an inverted U-shape pattern of support and companionship over time. The duration of widowhood/divorce in this study exhibited neither a linear nor a non-linear association with need for support and companionship. Similarly, contrary to expectation, a

current number of support and companionship providers did not attenuate the association between the duration of widowhood/divorce and need for support and companionship.

It is possible that the need variable constructed for this study, despite sufficient reliability, may not have been nuanced enough to capture non-linear patterns based on the duration of widowhood/divorce despite sufficient statistical reliability. For instance, measures examining affiliation motivation were successfully developed through a factor analysis (Hill, 1987). A subscale of the Interpersonal Orientation Scale (IOS) examined motivations to seek emotional support on a 5-point Likert scale. The items that measured emotional support demonstrated high factor loadings, good internal consistency, as well as good convergent and discriminant validity. This measure does not exactly capture a need for emotional support, nor do the authors compare this continuous measure with a count variable. Future development of a need for social support and companionship, however, would benefit from developing a scale through a factor analysis, then determining the validity and reliability of that scale. By doing so, future examinations may better capture non-linear patterns of need for support and companionship.

Additionally, the current research lacks a sufficient number of widows ($n = 36$) to examine widowhood and divorce in later life separately. Previous literature suggests that both widowhood and divorce are associated with similar psychological outcomes. However, it is possible that the duration of widowhood is differentially association with emotional health than is duration of divorce. In a similar vein, prospective studies examining need for support and companionship pre- and post-divorce and widowhood would provide greater insights into the variations of need for support and companionship over time. To date, studies examining

widowhood and divorce prospectively have yet to test whether perceived need for support and companionship changes over time.

Need for Support and Companionship as a Driving Motivation for Forming Substitute Ties and Compensation

Results presented in Study 2 indicate that a greater need for support and companionship does not drive substitution. Unexpectedly, being widowed/divorced and having social ties below the threshold of support and companionship providers did not play a significant role. Instead, a greater need for support and companionship was related to decreases in support and companionship over time.

Partial evidence supports compensation occurring for older adults who increased social support and companionship over time. For instance, increases in support and companionship from Wave 1 to Wave 2 were related to fewer days participants reported feeling isolated, but no association emerged for days felt lonely and psychological distress. Marital status marginally moderated this association, such that only widowed/divorced older adults experienced decreases in the number of days spent isolated when substitution occurred through increases in support and companionship. Married older adults who experienced an increase in support and companionship reported fewer days felt isolated. Models examining days spent lonely and days spent isolated were nonsignificant.

Overall, these results largely depart from previous research on substitution and compensation. Importantly, however, this dissertation is one of the first empirical examinations of need for support and companionship as an antecedent to substitution and compensation. Methodological challenges, such as the operationalization of need, the small sample of widows, and the lack of pre-widowhood and pre-divorce data, limit the inferences that can be made.

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Despite these limitations, there was some evidence of compensation over time among widowed and divorced older adults, however, this was not true of all the emotional health measures. Future research would benefit from examining need-driven substitution and compensation among nationally representative samples of older adults to further clarify these results.

Remote Interactions as a Path to Substitution and Compensation

The findings of Study 3 revealed that remote interactions can be beneficial for emotional health in certain contexts. Particularly, more frequent remote interactions were associated with improvements in psychological distress, but only among older adults who fell below the threshold of support and companionship providers, regardless of marital status.

This finding provides some clarity for the existing mixed literature on the benefits of remote interactions in later life and provides an additional focus of intervention when facilitating remote interactions for older adults who have particularly low levels of support and companionship. Interventions aimed at increasing remote interactions may only be helpful for older adults below that threshold. Future research would benefit from examining whether remote interventions are particularly helpful among older adults with insufficient levels of in-person support.

<div align="center">

Conclusion

</div>

Overall, the results of the current dissertation highlight increases in need for support and companionship following spousal loss but this need does not necessarily lead to substitution and compensation. Remote interactions did emerge as beneficial for psychological distress, but only when considered jointly with in-person support and companionship. This dissertation provides guidance on potential targets to improve older adults' emotional health following social losses. Extending this research by creating scales to measure need for support and considering the joint

effects of in-person interactions when examining remote interactions will enhance understanding of how older adults cope following social losses.

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