What's Love Got To Do With It? Marital Quality and Mental Health in Older Age

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ABSTRACT

There is much prior research on the benefits of marriage for adults, including for mental and physical health (Carr and Springer 2010). Further research has demonstrated that the *quality* of one's marriage provides benefits, and not merely the status itself (see Carr and Springer 2010; Proulx, Helms, and Buehler 2007). A close, salient relationship such as marriage is not experienced in isolation, but is rather an interpersonal system, where the characteristics, feelings, and opinions of each partner can influence the other (Berscheid and Ammazzalorso 2001; Carr et al. 2014; Moorman 2016). However, less research has been performed that takes advantage of dyadic data to determine whether and how a partner's marital quality may affect one's own well-being (Carr et al. 2014; Kenny 1996). Moreover, emotional experiences rarely remain truly private; individuals unconsciously signal and express their feelings to others, and can even transmit these emotional experiences to close social partners (Christakis and Fowler 2013; Hatfield, Cacioppo, and Rapson 1994).

The present dissertation examines the associations among older husbands' and wives' marital quality and well-being, using two sources of dyadic data, a range of measures of marital quality and well-being, and advanced analytic strategies appropriate for longitudinal and cross-sectional data. Older couples can differ from their younger and midlife counterparts, as both men and women trim their broader social networks in later life and increasingly focus on their closest and most rewarding relationships, such as marriage (Carstensen, Isaacowitz, and Charles 1999; Mancini and Bonanno 2006). Gendered roles may shift in later life, as well, as older adults cease activities such as child-rearing and full-time employment (Bookwala 2012). Thus, potential differences according to gender are also explicitly tested. The results of this dissertation will shed greater light on how older couples' perceptions of marital quality influence various aspects of spouses' well-being, cross-sectionally and over time.

Mutual Influence and Older Married Adults' Anxiety Symptoms: Results from The Irish Longitudinal Study on Ageing analyzes cross-sectional dyadic data from 1,114 married older couples surveyed in the initial wave of The Irish Longitudinal Study on Ageing (TILDA; Kenny 2014), 2009-2011. Dyadic structural equation models (SEM) examined the direct and indirect associations between husbands' and wives' reports of marital strain and generalized anxiety symptoms in later life. Findings revealed that perceptions of marital strain were related with husbands' and wives' own generalized anxiety symptoms. Further, husbands' anxiety symptoms were significantly related with wives' anxiety symptoms, and vice versa, illustrating bi-directional feedback. Lastly, husbands' and wives' perceptions of marital strain were significantly indirectly related with their partners' anxiety symptoms, with these associations being mediated by spouses' own anxiety symptoms. These results suggest that emotional contagion may be the pathway for partner effects of marital strain on spouses' well-being. Findings also suggest that efforts to reduce anxiety symptoms may be most effective when taking marital context and quality into account.

Two-Wave Dyadic Analysis of Marital Quality and Loneliness in Later Life: Results From The Irish Longitudinal Study on Ageing analyzes dyadic reports of marital quality and loneliness over a two-year period, using longitudinal dyadic data collected from 932 older married couples who participated in both of the first two waves of The Irish Longitudinal Study on Ageing (TILDA), collected from 2009-2013. Two-wave lagged dependent variable (LDV) models tested the cognitive perspective on loneliness, emotional contagion theory, and actor-partner interdependence by examining whether husbands' and wives' reports of marital quality and loneliness at baseline predicted both spouses' loneliness two years later. Results indicated that one's own perceptions of negative marital quality at baseline were related with greater loneliness after two years, supporting the cognitive perspective on loneliness. Further, *both* spouses' reports of loneliness at baseline were related with loneliness two years later, supporting emotional contagion theory. Partners' reports of marital quality were not related with future loneliness, failing to support actor-partner interdependence.

Do "His" and "Her" Marriage Influence One Another? Older Spouses' Marital Quality Over Four Years uses two-wave longitudinal data from the Disability and Use of Time (DUST) supplement to the Panel Study of Income Dynamics (PSID) to examine associations between husbands' and wives' reports of marital quality over a four-year period. The sample consisted of 209 older married couples who participated in both the 2009 and 2013 waves of DUST. Lagged dependent variable (LDV) models tested whether older husbands' and wives' perceptions of marital quality are themselves subject to emotional contagion, by examining whether baseline reports of marital quality were related with one's own and a partner's marital quality after four years. Results indicated that (a) husbands reported better marital quality than their wives in both 2009 and 2013, (b) for both husbands and wives, baseline marital quality was significantly related with both one's own *and* one's partner's marital quality four years later, and (c) there were no differences in effects according to gender. These findings offer support for the framework of "his" and "her" marriage, as well as emotional contagion theory.

Together, these papers examine whether and how older spouses' reports of marital quality and well-being are associated with one another, with a particular emphasis on assessing emotional contagion as a potential explanation and mechanism for dyadic partner effects. The results of these articles contribute empirically and theoretically to the literature(s) on marital quality and well-being; spousal interdependence; and emotional contagion. I discuss the implications of these articles for theory and future research concerning marriage and well-being in later life.

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CHAPTER 1: INTRODUCTION AND PURPOSE OF THIS DISSERTATION INTRODUCTION

Marriage, Marital Quality, and Well-Being

Marriage is an important protective factor for adults' well-being, particularly in older age (Carr and Springer 2010; Carstensen, Isaacowitz, and Charles 1999; Mancini and Bonnano 2006). Individuals gain access to social, emotional, and instrumental support through their close relationships, and especially through the closest and most salient of those relationships in adulthood and later life: marriage (Carr and Springer 2010; Sarkisian and Gerstel 2008). Married adults have greater access to economic and social resources like support, improving their mental and physical health in comparison with their unmarried counterparts (e.g., DiMatteo 2004; Goldman 2001; Waite and Gallagher 2000).

The influence of marriage on well-being goes beyond marital status, however. In order for married adults to benefit from spousal support, for instance, spouses must actually *provide* the social, emotional, and instrumental support that can foster better physical, emotional, and mental health (Umberson and Williams 2005). In other words, the protective benefits of marriage are contingent upon marital *quality*, or the extent to which spouses find their relationships to be supportive and/or straining (Walen and Lachman 2000).

For example, long-term low-quality marriages may result in worse well-being compared not only to divorce-and-remarriage, but to divorce-and-remaining-unmarried as well (Hawkins and Booth 2005). Differences in health and well-being between married and unmarried persons may even be due largely to the *negative* effects of the stress involved in marital dissolution, rather than to the "protective" effects of marriage itself

(Williams and Umberson 2004; Zheng and Hart 2002). A recent meta-analysis confirmed both cross-sectional and longitudinal effects of marital quality on personal well-being, as well (Proulx, Helms, and Buehler 2007). High-quality marriages can improve adults' health and well-being, whereas low-quality marriages can be harmful for both spouses. *Dyadic Research: "His" and "Her" Marriage and Both Spouses' Well-Being*

Marriage is not merely a social status or an individual experience, however. Rather, marriage is an interpersonal relationship. This means that both members of the dyad are important for one another: One spouse's experience or opinion of the marriage may matter for his/her partner's experience—and well-being—as well (Kenny 1996; Kenny and Cook 1999).

Recent advances in data collection and analysis have allowed researchers to investigate the marital dyad itself, and estimate "actor" and "partner" effects simultaneously (Kenny, Kashy, and Cook 2006). Actor effects refer to the associations between one's own perceptions of marital quality and one's own well-being; partner effects refer to the associations between one's own perceptions of marital quality and one's spouse's well-being. Dyadic modeling allows researchers to examine whether and how both "his" and "her" appraisals of the marriage may impact *both* spouses' wellbeing.

Investigating both actor and partner effects for older spouses is an important development. Husbands' and wives' appraisals of marital quality tend to be only moderately correlated, indicating that spouses diverge in their opinions, feelings, and perceptions of their own marriages (Bulanda 2011; Carr et al. 2014). A "high-quality" marriage may not be as beneficial for one spouse if his/her partner has a more negative

view of the relationship. That is, the benefits of a high-quality marriage may depend not only on one's own appraisal of the marriage, but on a partner's appraisal of the relationship as well. Thus, dyadic modeling of actor and partner effects is needed to properly analyze marriage as an interpersonal system (Kenny and Cook 1999).

Actor and partner effects of marital quality are of especial interest for later life couples, as they differ from younger and midlife counterparts. In older age, men and women both trim their social networks and focus on their closest and most rewarding relationships, including marriage (Carstensen, Isaacowitz, and Charles 1999; Mancini and Bonanno 2006). Dyadic research to date has established the validity of this approach, with spousal partner effects of marital quality among older couples found for outcomes including life satisfaction, frustration, loneliness, self-rated health, and disability (Carr et al. 2014; Carr, Cornman, and Freedman 2016; Choi, Yorgason, and Johnson 2016; Moorman 2016). Thus, it is clear that the experiences and perceptions of both partners can be influential for husbands' and wives' well-being, including in later life. Yet a number of open questions remain, including two of central interest in this project: 1) Whether there are differences in actor and/or partner effects according to gender, and 2) What mechanisms or pathways may explain significant partner effects.

Gender: Not Just Spouses, but Husbands and Wives

Although marriage is an interpersonal system, it is not necessarily an egalitarian one. The terminology of "actor" and "partner" effects can obfuscate the gendered roles, norms, and expectations that persist in contemporary heterosexual marriages. Older married adults are not simply spouses; they are husbands and wives, and prior research

has garnered mixed results concerning whether actor and partner effects of marital quality on well-being differ according to gender.

For instance, there is some evidence that the protective benefits of marriage are greater for husbands than for wives (Carr and Springer 2010; Gardner and Oswald 2004; Johnson et al. 2000), though this is not conclusive (Carr and Springer 2010; Manzoli et al. 2007; Simon 2002). Additionally, Proulx and colleagues (2007) found that marital quality may be more strongly linked to well-being for wives than for husbands.

This seeming contradiction—that marriage offers greater protective benefits to husbands, even as marital quality matters more for wives—may be due to spouses' differing appraisals of their own marriages. Even though marriage is a shared dyadic relationship, "his" and "her" marriage can reflect very different experiences (Bernard 1972; Boerner et al. 2014; Umberson and Williams 2005). In short, husbands tend to rate their marriages more favorably than their wives do, and thus may reap greater benefits from their superior marital quality—even if the link between marital quality and wellbeing is stronger for wives (Boerner et al. 2014; Jackson et al. 2014; Umberson and Williams 2005).

However, it is worth noting that much prior research concerning marital quality and well-being has focused on young and middle-aged married persons rather than on older adults (e.g., Beach et al. 2003; Proulx et al. 2007; Whisman, Uebelacker, and Weinstock 2004; see Carr et al. 2014). As Carr and colleagues (2014) note, married older adults may differ from their younger counterparts in important ways: They may view their marriages as particularly salient due to the weakening of external social ties, and their marriages may be more gender equitable, as social roles pertaining to employment

and childrearing have passed – yet cohort differences in gender norms do persist (Amato et al. 2003; Bookwala 2012; Carstensen et al. 1999; Hagedoorn et al. 2006; Kulik 2002; Lang 2001).

Dyadic research has also produced mixed evidence concerning gender differences in actor and partner effects. Thomeer and colleagues (2013), for instance, found that wives' depressive symptoms influenced husbands' future depressive symptoms, with no corresponding influence of husbands' depressive symptoms on wives' future symptoms. Carr and colleagues (2014) found that the effect of husbands' marital quality on their own life satisfaction was strengthened when wives reported greater marital quality, but found no such interaction for wives' life satisfaction. Additionally, Carr and colleagues (2016) found actor effects of marital strain on wives' frustration, sadness, and worry, but on husbands' frustration only. Moreover, they found partner effects of husbands' marital strain on wives' frustration, and of wives' marital support on husbands' frustration. Importantly, however, Carr and colleagues (2014; 2016) used seemingly unrelated regression models rather than structural equation models (SEM), meaning that they were unable to directly test whether these apparent gender differences were truly significant or not. In sum, there is limited but inconsistent evidence concerning gender differences in dyadic partner effects among older married couples.

Some recent dyadic research has explicitly tested for gender differences, largely finding any apparent differences to be non-significant. Ayalon and colleagues (2013) estimated mutual influence models concerning marital quality and loneliness, with no significant gender differences. Further, Moorman (forthcoming) analyzed numerous dimensions of marital quality and older spouses' loneliness, finding significant actor and

partner effects but no differences in effects according to gender. Likewise, Choi and colleagues (2016) examined links between marital quality and health outcomes, with equivalent actor and partner effects for husbands and wives. In sum, evidence of gender differences concerning marital quality and well-being for both spouses is mixed, and research ought to thoroughly examine the significance and implications of any apparent gender differentials. The present dissertation project uses SEM in order to determine whether any effects are significantly different for older husbands and wives.

Theoretical Framework

The advancement of dyadic data collection and analytic techniques has contributed greatly to knowledge concerning the interdependence of spouses' marital quality and well-being across the life course. However, while dyadic research has established the importance of "his" and "her" marital quality for both spouses' well-being empirically, the development of theoretical explanations for these dyadic effects has been somewhat slower to progress.

For instance, dyadic research has depended extensively upon use of the actorpartner interdependence model (APIM; Kenny and Cook 1999) which estimates direct actor and partner effects. Yet the very success of the APIM framework has resulted in its becoming the "default" approach, to the detriment of other modeling strategies (Ledermann and Kenny 2012). Moreover, the development of theory concerning dyadic interdependence and the potential pathways for partner effects has lagged behind empirical advancement.

The APIM framework is related with a systems theory approach (e.g., von Bertalanffy 1969; see Kenny and Cook 1999). In short, spouses comprise the two

members of a shared system. Thus, married adults may be influenced by the behaviors, characteristics, or feelings of their partners (Kenny and Cook 1999). The APIM framework is often treated as a theoretical framework itself (e.g., Carr et al. 2014; 2016; Kenny and Cook 1999), but it is primarily a *methodological* framework. Research on dyadic marital quality and well-being must build theory concerning the mechanisms whereby partner effects are transmitted, beyond establishing their existence and importance for adults' lives.

Recent studies have begun this work of theory-building, using different approaches. For instance, Moorman (forthcoming) utilizes the emotion-in-relationships model (ERM; Berscheid 1983; Berscheid and Ammazzalorso 2001) to explain associations between spousal marital quality and loneliness. The ERM posits that close relationships such as marriage involve strong expectations for partner behaviors. When these expectations are violated, partners can experience negative emotional responses (Berscheid and Ammazzalorso 2001). Additionally, these responses can occur automatically when there are problems in the relationship that spouses are not consciously aware of (Berscheid and Ammazzalorso 2001). Thus, spousal dis/satisfaction can affect one's partner even if not consciously or intentionally communicated. Potential mechanisms for these "automatic" partner effects include spousal interactions, communication and conversation patterns, and even attachment orientation (Berscheid and Ammazzalorso 2001; Givertz et al. 2013; Knobloch 2008; Moorman, forthcoming). Another explanation is given by Choi and colleagues (2016) in their investigation of dyadic marital quality and physical health. They propose that the "reflected self" serves as a mechanism for partner effects. When one partner views the marriage—and his/her

spouse—as high-quality, that positive appraisal can be communicated to a partner (directly or indirectly), bolstering the partner's self-efficacy, well-being, and even health (Choi et al. 2016). Thus, for example, a husband whose wife reports high marital quality may feel appreciated by his wife, and experience improved health and well-being because of it.

What these recent attempts at theory-building reveal is that dyadic partner effects are "direct" in a methodological sense, but not necessarily in a literal or theoretical sense. That is, even "direct" partner effects are mediated by more proximal causal mechanisms, such as spousal behaviors, interactions, or communication. The present dissertation project seeks to contribute to theory-building in the area of dyadic research on marriage and well-being by investigating another potential pathway for partner effects: emotional contagion (Hatfield, Cacioppo, and Rapson 1994).

Emotional contagion, also called the "induction hypothesis", describes the unconscious spread of emotional experiences between close social partners (Ayalon, Shiovitz-Ezra, and Palgi 2013; Hatfield et al. 1994). Emotions can affect how individuals comport themselves and treat others, unconsciously signaling and spreading the emotions they are experiencing throughout social networks (Cacioppo, Fowler, and Christakis 2009; Hatfield et al. 1994). Anxiety and loneliness, for instance, are both related with negative and hostile behaviors (Berscheid and Reis 1998; Cacioppo et al. 2009; Cacioppo et al. 2006). Whether spouses recognize it or not, internal experiences such as anxiety and loneliness are made manifest in their verbal and non-verbal communication with partners, and such manifestations can induce anxiety and loneliness in a spouse (Cacioppo et al. 2009; Hatfield et al. 1994). Spouses can perceive their partners'

emotions and feelings, and may then even experience those same emotions and feelings themselves.

Therefore, emotional contagion theory proposes a potential mechanism for partner effects of marital quality on older married adults' well-being: Perceptions of marital quality influence husbands' and wives' own well-being (such as anxiety and loneliness), which in turn influence their partners' experiences of well-being (e.g., anxiety and loneliness). That is, spouses' own emotional experiences may serve as a pathway for partner effects, contributing to both theory-building and practical understanding of spousal interdependence in later life.

Purpose and Description of These Studies

The present dissertation project seeks to contribute to the empirical and theoretical literature concerning marital quality, well-being, and spousal interdependence among older adults. The broad purpose of this study is to determine whether and how husbands' and wives' perceptions of marital quality and well-being are related in later life. Further, this study seeks to determine what mechanisms may link marital quality and both partners' well-being, as well as whether these associations are similar or different for husbands and wives. The three papers that comprise this study use multiple sources of data on older married adults, and use a variety of samples, measures, and analytic strategies to address research questions.

The three articles in this dissertation will contribute to the literature in a number of important ways. Specifically, they will: 1) compare dyadic modeling strategies to assess actor and partner effects concerning the influence of marital quality on well-being, with a particular focus on theoretical implications; 2) analyze older married couples

rather than young or midlife couples; 3) explicitly test differences in actor and partner effects according to gender; 4) address various aspects of marital quality and well-being; and 5) use different data sources and analytic techniques to answer the central research questions.

Article 1. Mutual Influence and Older Married Adults' Anxiety Symptoms

The first article in this dissertation examines the associations among older husbands' and wives' reports of marital strain and anxiety symptoms. Generalized anxiety symptoms are relatively frequent among older adults, and are associated with experiencing poor physical and mental health, including symptoms of depression, cognitive decline, diminished physical functioning, and mortality (Bierman et al. 2005; Mehta et al. 2003; Denollet et al. 2009). Generalized anxiety is also associated with features of poor marital quality, such as a lack of emotional support, greater marital distress, and worse marital functioning (Hickey et al. 2005; Mehta et al. 2003; Whisman 2007). Aspects of adults' marriages, though, may also reduce symptoms of generalized anxiety (Brown, Lemyre, and Bifulco 1992; Hickey et al. 2005; Whisman, Uebelacker, and Weinstock 2004). However, little research has used dyadic data to examine ways in which both partners' experiences of marital strain and anxiety may be linked.

This study uses data from 1,114 married older couples who participated in the initial wave of The Irish Longitudinal Study of Ageing (TILDA), administered in 2009-2011 (Kenny 2014). Initially, the design for this study involved comparing actor-partner interdependence models (APIM) with mutual influence (MI) modeling, to determine which approach better described associations between older husbands' and wives' reports of marital strain and generalized anxiety symptoms. The primary purpose was to assess

whether direct and/or indirect partner effects of perceived marital quality on spouses' generalized anxiety symptoms existed. Later, this would evolve into a comparison between mutual influence and individual influence modeling. Thus, the primary purpose shifted to determining whether indirect partner effects (via emotional contagion) described associations among older husbands' and wives' reports of marital strain and anxiety symptoms better than traditional actor-only analyses that also accounted for non-independence in spouses' responses. I also examine whether trends were similar for husbands and wives. This paper therefore contributes to the literature(s) on marital strain and anxiety symptoms; spousal interdependence in later life; and emotional contagion within married dyads.

Article 2. Two-Wave Dyadic Analysis of Marital Quality and Loneliness in Later Life

The second article in this dissertation examines associations between marital quality and loneliness over two years. Loneliness refers to the subjective experience of *feeling* alone; it is closely related to, but distinct from, social isolation (Dykstra, van Tilburg, and de Jong Gierveld 2005; Hughes et al. 2004). Thus, even persons with social relationships and networks that prevent isolation can suffer from loneliness, and married older adults are no exception (Perissinotto, Cenzer, and Covinsky 2012). Loneliness also increases in later life, making an examination of potential influences on older married adults' experiences of loneliness an important topic for research.

Loneliness can be a deeply unpleasant experience, and is also related with symptoms of depression, worse cognitive functioning, and even functional decline and death (Cacioppo et al. 2006; Hawkley and Cacioppo 2007; 2010; Luanaigh and Lawlor

2008; Perissinotto et al. 2012). Unlike with generalized anxiety, loneliness *has* been a focus of dyadic research among older adults (e.g., Ayalon et al. 2013; Moorman 2016). However, prior dyadic studies concerning older husbands' and wives' reports of marital quality and loneliness have been limited by cross-sectional data and mixed results. For instance, Ayalon and colleagues (2013) used mutual influence modeling to analyze Health and Retirement Study (HRS) data and found evidence of emotional contagion, whereas Moorman (forthcoming) used actor-partner interdependence models (APIM) to analyze National Social Life, Health, and Aging Project (NSHAP) data and found evidence of direct partner effects of marital quality on loneliness. The purpose of this article was to utilize two-wave longitudinal data to examine both emotional contagion and direct partner effects. Therefore, I am able to assess whether one or both of these frameworks accurately describes associations among older husbands' and wives' reports of marital quality and loneliness over a two-year period, rather than at one particular timepoint.

Data for this study also come from The Irish Longitudinal Study on Ageing (TILDA), but were drawn from the 932 couples where both spouses responded at both of the first two waves of TILDA, conducted from 2009-2013 (Kenny 2014). This allowed for lagged dependent variable (LDV) modeling to analyze whether husbands' and wives' baseline reports of marital quality and loneliness predicted both spouses' loneliness after two years. Because of the data structure and analytic design, this paper is able to simultaneously examine direct partner effects of marital quality on loneliness *and* emotional contagion of loneliness over a two-year span. Potential gender differences were also explicitly tested. Therefore, this paper contributes to the literature on marital

quality and loneliness in later life, as well as the theoretical literature on emotional contagion and spousal interdependence in later life.

Article 3. Older Spouses' Dyadic Marital Quality Over Four Years

The final article in this dissertation project takes a different approach to emotional contagion among older married adults, focusing specifically on their reports of marital quality over four years. As has been noted, marital quality is an important predictor of well-being, especially in later life (Carr and Springer 2010; Carstensen et al. 1999; Mancini and Bonnano 2006; Proulx et al. 2007). Yet marital quality is typically treated as a predictor, and not as a personal experience subject to external influences, including influence from one's spouse. The purpose of this article is to determine whether older husbands' and wives' perceptions of marital quality are subject to mutual influence, or emotional contagion, over a four-year span.

Husbands' and wives' appraisals of their marriages tend to be significantly moderately correlated, with "his" marriage most often proving better than "her" marriage (Bernard 1972; Boerner et al. 2014; Carr and Boerner 2009; Jackson et al. 2014). Umberson and Williams (2004) note that gender differences in marital quality may lead to gender disparities in health trajectories for husbands and wives over time; in short, men may benefit more from their marriages than women do because husbands experience superior marital quality than their wives. Yet it is possible that reports of marital quality—and gender differences in those reports—may shift across the life course; further, "his" and "her" marriage may even impact one another over time.

Similarities in husbands' and wives' appraisals of their marriages could be largely endogenous and due to shared objective factors and circumstances (e.g., financial well-

being, parental status and children's problems, etc.) (Kenny 1996; Ledermann and Kenny 2012). Additionally, spouses are non-randomly coupled, and homogamy—or the tendency for persons with similar backgrounds and characteristics to couple—may also contribute to similarities in spouses' assessments of marital quality (Amato et al. 2003; Kenny 1996). An alternative explanation for the association between husbands' and wives' reports of marital quality is posited by emotional contagion theory (Hatfield et al. 1994). As with experiences of anxiety and loneliness, spouses' experiences of marital quality may be unconsciously expressed, and thereby spread, to their partners. The purpose of this article is to determine whether husbands' and wives' reports of marital quality predict *both* spouses' reports of marital quality four years later.

Data for this study came from the 209 older married couples where both spouses responded at both waves of the Disability and Use of Time (DUST) supplement to the Panel Study of Income Dynamics (PSID), 2009-2013 (Freedman and Cornman 2012; 2014). Although the PSID is administered approximately every two years, DUST was administered only at the 2009 and 2013 waves, and not at 2011, resulting in a four-year lag for the initial two waves of DUST (Freedman and Cornman 2012; 2014). Two-wave lagged dependent variable (LDV) models are used to analyze whether husbands' and wives' baseline reports of marital quality predicted both spouses' reports of marital quality after four years. Potential gender differences were also explicitly tested. This paper assesses emotional contagion among older married couples, focusing on their perceptions of marital quality rather than on mental health or emotional factors such as anxiety or loneliness. Therefore, this article extends the use of emotional contagion

theory, and contributes empirically to the literature on marital quality and spousal interdependence in later life.

Summary of Dissertation Aims

The three articles that comprise this dissertation project address three central research questions. Together, these articles form a coherent whole that contributes empirically and theoretically to the literature on marital quality, well-being, and spousal interdependence in later life, with a particular focus on emotional contagion as a potential pathway for dyadic partner effects.

RQ1: Are husbands' and wives' perceptions of marital quality linked with both spouses' well-being in later life?

Marriage and marital quality have long been linked with individual well-being (e.g., Carr and Springer 2010; Proulx et al. 2007). Further, a growing body of research suggests that the marital quality of each spouse may be influential for the well-being of both spouses in a marriage. This dissertation uses both cross-sectional and longitudinal data to examine whether—and how—older husbands' and wives' reports of marital quality are related with both spouses' well-being.

RQ2: Are older husbands' and wives' internal experiences subject to "emotional contagion" within marriage?

Dyadic research on marital quality and well-being has produced mixed results to date, and lacks a coherent theoretical foundation. This dissertation seeks to contribute to the development of theory in this area by examining emotional contagion as a potential explanation and pathway for dyadic partner effects (Hatfield et al. 1994).

RQ3: Are there any differences in effects according to gender?

Gender differences in marital quality are well-established (e.g., Bernard 1972; Boerner et al. 2014), and may have consequences for older adults' long-term health (Umberson and Williams 2005). Further, there is some evidence that marital quality may be more strongly linked with well-being for wives than for husbands (Proulx et al. 2007), though this may be unique to younger married persons (e.g., Carr et al. 2014; Carstensen et al. 1999; Kulik 2002). Additionally, prior evidence is mixed concerning gender differences in emotional contagion (e.g., Ayalon et al. 2013; Cacioppo et al. 2009). Thus, this dissertation will test and discuss the implications of potential gender differences in the effects of both marital quality and emotional contagion on older married adults' wellbeing.

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CHAPTER 2: MUTUAL INFLUENCE AND OLDER MARRIED ADULTS' ANXIETY SYMPTOMS

Mutual Influence and Older Married Adults' Anxiety Symptoms: Results from The Irish Longitudinal Study on Ageing

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Author Note

Researchers interested in using TILDA data may access the data for free from the following sites: Irish Social Science Data Archive (ISSDA) at University College Dublin http://www.ucd.ie/issda/data/tilda/ ; Interuniversity Consortium for Political and Social Research (ICPSR) at the University of Michigan http://www.icpsr.umich.edu/icpsrweb/ICPSR/studies/34315

ABSTRACT

Purpose of the study: This study analyzed dyadic data to examine the direct and indirect associations between husbands' and wives' reports of marital strain and generalized anxiety symptoms in later life.

Design and methods: Data were from 1,114 married couples with at least one spouse aged 60 or older, drawn from the initial 2009-2011 wave of The Irish Longitudinal Study on Ageing (TILDA). Structural equation modeling (SEM) was used to analyze dyadic data according to individual influence and mutual influence frameworks.

Results: Mutual influence exhibited better model fit than individual influence. Findings revealed that perceptions of marital strain were related with husbands' and wives' own generalized anxiety symptoms. Further, husbands' anxiety symptoms were significantly related with wives' anxiety symptoms, and vice versa, illustrating bi-directional feedback. Lastly, husbands' and wives' perceptions of marital strain were significantly indirectly related with their partners' anxiety symptoms, with these associations being mediated by spouses' own anxiety symptoms.

Implications: Anxiety is a relational experience, and may even be provoked by one's marriage. Mutual influence modeling indicated that husbands' and wives' perceptions of the marriage and reports of anxiety were influential for both spouses' anxiety symptoms. These results suggest that emotional contagion may be the pathway for partner effects of marital strain on spouses' well-being. Findings also suggest that efforts to reduce anxiety symptoms may be most effective when taking marital context and quality into account. **Keywords:** dyadic data; emotional contagion; marital strain; nonrecursive structural equation modeling

Generalized anxiety is a common experience in later life, and is related with a variety of negative mental and physical outcomes, including depression, cognitive decline, diminished physical functioning, and even mortality (Bierman et al. 2005; Mehta et al. 2003; Denollet et al. 2009). Generalized anxiety is also related with features of poor marital quality, such as a lack of emotional support, greater marital distress, and worse marital functioning (Hickey et al. 2005; Mehta et al. 2003; Whisman 2007). Aspects of adults' marriages, however, may also reduce symptoms of generalized anxiety (Brown, Lemyre, and Bifulco 1992; Hickey et al. 2005; Whisman, Uebelacker, and Weinstock 2004).

Yet relatively little research has examined associations between the quality of older adults' marriages and their generalized anxiety symptoms using dyadic data gathered from both partners. Spouses' reports of marital quality and mental health are closely related, and the characteristics, behaviors, and feelings of one spouse may have implications for both partners (Kenny and Cook 1999; Whisman et al. 2004). The present paper makes use of the emotion-in-relationships model (ERM) and emotional contagion theory to investigate how spouses' reports of marital strain and generalized anxiety symptoms are related in later life.

In this study, data from 1,114 married older couples who participated in the initial wave of The Irish Longitudinal Study on Ageing (TILDA) are analyzed according to two dyadic modeling strategies: "individual influence" and mutual influence (Kenny 1996). Individual influence tests expectations of the ERM, and posits associations between each spouse's reports of marital strain and his/her own anxiety symptoms. Mutual influence tests both emotional contagion and the ERM, and posits associations between each
spouse's reports of marital strain and his/her own anxiety symptoms, as well as between each spouse's anxiety symptoms and his/her partner's anxiety symptoms. Mutual influence also posits indirect associations between each spouse's reports of marital strain and his/her partner's anxiety symptoms, mediated by that spouse's own anxiety symptoms. Results of this study will inform both theory and practice concerning older spouses' perceptions of their marriages and their anxiety symptoms.

Marriage and Anxiety in Later Life

Marriage provides various benefits for adults' mental and physical health across the life course (Carr and Springer 2010). These benefits, however, are contingent upon marital quality: High-quality marriages can improve health and well-being, while lowquality marriages can be actively harmful for both spouses (Hawkins and Booth 2005; Proulx, Helms, and Buehler 2007). Likewise, experiences of generalized anxiety are linked with the quality of adults' marriages. Marital dissatisfaction, marital distress, and difficulties with marital functioning are all associated with generalized anxiety (Hickey et al. 2005; Whisman 2007; Whisman, Sheldon, and Goering 2000). Effective relationship adjustment and positive marital events that foster feelings of security and hope can protect against and even aid in recovery from anxiety symptoms and generalized anxiety disorders (Brown et al. 1992; Whisman, Davila, and Goodman 2011).

Research analyzing dyadic data has found some evidence of partner influences. For instance, husbands' anxiety symptoms are related with the marital adjustment of both husbands and wives, and both partners' psychological distress is related with marital conflict (Dehle and Weiss 2002; Papp, Goeke-Morey, and Cummings 2007). Among married couples where wives have an anxiety disorder, wives' anxiety is related with

both their own and their husbands' marital quality (Zaider, Heimberg, and Iida 2010). Whisman and colleagues (2004), however, found associations only between spouses' anxiety symptoms and their own marital satisfaction. Despite mixed results, prior research suggests that husbands' and wives' perceived marital strain and anxiety symptoms may be closely intertwined.

Many of these dyadic studies have relied on small sample sizes (e.g., Dehle and Weiss 2002; Zaider et al. 2010) or on samples of adults with diagnosed anxiety disorders (e.g., Zaider et al. 2010). Moreover, these studies have typically focused on younger or middle-aged married persons rather than older adults (e.g., Dehle and Weiss 2002; Papp et al. 2007; Whisman et al. 2004; Zaider et al. 2010). Little research has focused on marital strain and generalized anxiety symptoms among older married couples. Both the marital relationship and the experience of anxiety change across the life course (Byers et al. 2010; Carstensen 1991; Le Roux, Gatz, and Wetherell 2005), making this an important area for research.

Theoretical Framework: Anxiety as a Relational Emotion

Social relationships are important influences on adults' well-being, including anxiety (Litwin and Shiovitz-Ezra 2011). Further, marriage is the closest relationship in adulthood and later life (Carstensen 1991; Sarkisian and Gerstel 2008). Due to both structural and emotional closeness, husbands and wives are highly interdependent (Kenny and Cook 1999; Berscheid and Ammazzalorso 2001).

One theoretical approach to marital interdependence is the emotion-inrelationships model (ERM; Berscheid 1983; Berscheid and Ammazzalorso 2001). According to the ERM, close relationships such as marriage entail strong expectations for partner behaviors which, when violated, result in negative emotional responses (Berscheid and Ammazzalorso 2001). Moreover, spouses may react automatically to problems in the relationship that they are not consciously aware of (Berscheid and Ammazzalorso 2001). Thus, even if one partner does not consciously recognize the distress or dissatisfaction of a spouse, s/he may still be affected by that negative stimulus and experience emotional distress as a result. The ERM places focus on interaction and emotions within close relationships, and spouses' behaviors, demeanors, and interaction patterns may communicate their perceptions of marital strain, even if unconsciously (Berscheid and Ammazzalorso 2001; Berscheid and Reis 1998). The ERM therefore anticipates that husbands' and wives' perceptions of marital strain will be related with both their own and their partners' anxiety symptoms.

A complementary theory linking perceptions of marital strain with partners' anxiety symptoms is that of emotional contagion (e.g., Cacioppo, Fowler, and Christakis 2009; Hatfield, Cacioppo, and Rapson 1994). According to this theory, one's anxiety symptoms themselves may induce anxiety symptoms in one's partner. Emotions can affect how individuals comport themselves and treat others, unconsciously signaling and spreading the emotions they are experiencing throughout social networks (Cacioppo et al. 2009; Hatfield et al. 1994). Anxiety, for instance, is related with depression, poor psychosocial functioning, and even negative and hostile behavior (Berscheid and Reis 1998; Bierman et al. 2005; Cacioppo et al. 2009; Cacioppo et al. 2006; Mehta et al. 2003). Whether spouses recognize it or not, emotions such as anxiety are made manifest in their verbal and non-verbal communication with partners, and such manifestations can induce anxiety in a spouse (Cacioppo et al. 2009; Hatfield et al. 1994). Therefore,

emotional contagion theory anticipates that husbands' and wives' anxiety symptoms will be reciprocally related with one another and, further, that this bi-directional association will serve as the pathway for an indirect association between spouses' reports of marital strain and their partners' anxiety symptoms (i.e., mediation).

Summary of Study Aims

The present study uses dyadic data to examine the associations between husbands' and wives' reports of marital strain and generalized anxiety symptoms. Specifically, this study compares two dyadic modeling frameworks: Individual influence and mutual influence (Kenny 1996). These modeling strategies are compared on the basis of model fit statistics (see Hu and Bentler 1999; Raftery 1995).

The individual influence framework partially tests the ERM by examining the hypothesis that husbands' and wives' perceptions of marital strain are related with their own anxiety symptoms. It accounts for spousal interdependence by estimating the covariance of errors for husbands' and wives' anxiety symptoms. It does not hypothesize any direct association between husbands' and wives' anxiety symptoms, nor any indirect association between spouses' own perceptions of marital strain and their partners' anxiety symptoms. A conceptual diagram of the individual influence model is illustrated in Figure 1.

The mutual influence approach makes use of nonrecursive structural equation models (SEM), also known as bi-directional causal paths or feedback loops (Martens and Haase 2006). The mutual influence model tests both emotional contagion and the ERM, by examining whether (a) husbands' and wives' perceptions of marital strain are related with their own anxiety symptoms; (b) husbands' and wives' anxiety symptoms are related

with one another; and (c) husbands' and wives' perceptions of marital strain are indirectly related with their *partners*' anxiety symptoms via their own anxiety symptoms (i.e., mediation). A conceptual diagram of the mutual influence model is illustrated in Figure 2.

Both the individual influence and mutual influence frameworks account for spousal interdependence, but test different hypotheses. The purpose of this study is to examine whether and how husbands' and wives' perceptions of marital strain are related with both spouses' generalized anxiety symptoms. Results of individual influence and mutual influence models are compared, and implications for future research and practice concerning anxiety in older age are discussed.

DESIGN AND METHODS

Sample

Cross-sectional data for this study came from the initial wave of The Irish Longitudinal Study on Ageing (TILDA), conducted from 2009-2011 (Kenny 2014). TILDA is a nationally representative study of Irish adults aged 50 or older, with a study design based on that of other national longitudinal studies, such as the English Longitudinal Study on Ageing (ELSA) and the Health and Retirement Study (HRS) (Barrett et al. 2011; Kamiya et al. 2014; Kenny et al. 2010).

Information was gathered from participants using two instruments: in-person interviews and self-completion questionnaires (Kenny 2014; Kenny et al. 2010). TILDA reported a 62% response rate for interviews, with 83% of interviewees also completing questionnaires (Kamiya et al. 2014). Data on generalized anxiety symptoms and marital strain were collected via the questionnaires. TILDA contains dyadic data from 2,148 married couples. A total of 293 couples were dropped because at least one spouse failed to respond to the self-completion questionnaire. Of the remaining 1,855 couples with dyadic data, 60.1% (n = 1,114) included at least one spouse aged 60 or older. These 1,114 older married couples comprised the analytic sample for this study.

Measures

Generalized anxiety symptoms. Generalized anxiety symptoms were measured as a continuous latent variable with 7 observed indicators. The 7 indicators were the items comprising the Hospital Anxiety and Depression Scale's Anxiety Subscale (HADS-A) (Zigmond and Snaith 1983). Sample items include "I feel tense or 'wound up'" and "Worrying thoughts go through my mind". Response categories ranged from 1 (*Not at all*) to 4 (*Very often*).

Marital strain. Marital strain was measured as a continuous latent variable with 4 observed indicators (Walen and Lachman 2000). Sample items include "How much does [your spouse] criticise you?" and "How much does [your spouse] get on your nerves?" Response categories ranged from 1 (*Not at all*) to 4 (*A lot*).

Covariates. To ensure the validity of results, a number of factors related with both marital strain and anxiety symptoms were examined as potential confounds. *Marital support* was measured as a latent variable with 3 observed indicators (Walen and Lachman 2000). Response categories ranged from 1 (*Not at all*) to 4 (*A lot*). *Age* was measured continuously. *Self-rated health* was measured as a continuous variable, with values ranging from 1 (*Poor*) to 5 (*Excellent*). *Income* was measured continuously, and recoded into quintiles to correct for significant skew. *Number of children* was measured

continuously. *Living situation* was coded as a dichotomous indicator of *living with others* (reference) or *with a spouse only. Employment status* was measured using three dichotomous indicators, for *employed* (reference), *retired*, and *other. Region* was measured using three dichotomous indicators for *Dublin* (reference), *other city*, and *rural*. Lastly, *education* was measured using 7 dichotomous indicators, ranging from *some primary or less* (reference) to *postgraduate/higher degree*. Including these predictors did not alter the significance of any findings. Therefore all controls were removed for parsimony.

Analytic Plan

Descriptive statistics and missing data. Descriptive statistics were examined for all items, and are shown in Table 1. The vast majority of husbands (91.65%) and wives (92.28%) provided complete data on all marital strain and anxiety items. Missing data diagnostics revealed no predictable patterns of missingness. Missing data were addressed using maximum likelihood with missing values (MLMV). Models estimated using listwise deletion garnered the same significant findings; therefore, MLMV analyses are presented.

Statistical modeling. Structural equation modeling (SEM) was used to analyze dyadic data and account for non-independence of spouses' data. First, the measurement model was fit. This is illustrated in Figure 3. Factor scores were then generated for all latent variables, to guarantee that the structural models would have identical measurement models. This ensures that differences in model fit for the structural models (i.e., individual influence and mutual influence models) are due solely to differences in structural paths, and are not due to even minor differences in the fit of their respective

measurement models. Thus, the individual influence and mutual influence models can be directly compared with one another on the basis of model fit. The factor scores were treated as "observed" variables in all structural models. Structural path models were estimated according to both the individual influence and mutual influence frameworks (Kenny 1996).

Model fit was assessed using multiple fit statistics: The Root Mean Squared Error of Approximation (RMSEA), Comparative Fit Index, (CFI), and Tucker-Lewis Index (TLI) were jointly used to assess fit of the measurement model (Hu and Bentler 1999). CFI, TLI, and the Bayesian Information Criterion (BIC) were used to assess comparative fit of the structural models (Hu and Bentler 1999; Raftery 1995).

For both individual influence and mutual influence models, analysis began with fully unconstrained models. Mutual influence involves the estimation of an additional parameter compared with individual influence when the bi-directional feedback paths are freely estimated, which impacts the calculation of certain fit statistics (e.g., BIC). A posthoc Wald test revealed that these reciprocal feedback paths were not significantly different from one another, however ($\chi^2 = 3.07, p > .05$). Thus, the final mutual influence model constrained the bi-directional feedback paths to equality for husbands and wives. The final individual influence and mutual influence models therefore estimated the same number of parameters.

The central difference between the individual influence and mutual influence models is that individual influence estimates error covariance for husbands' and wives' anxiety symptoms to account for non-independence, whereas mutual influence posits bidirectional feedback between husbands' and wives' anxiety symptoms. If husbands' and

wives' marital strain and anxiety symptoms are represented as M_1 , M_2 , A_1 , and A_2 respectively, then the equations for the individual influence model can be expressed as:

$$A_{1} = \gamma_{A1M1} + \zeta_{A1} + \psi_{A1A2}$$
$$A_{2} = \gamma_{A2M2} + \zeta_{A2} + \psi_{A1A2}$$

Likewise, the equations for the mutual influence model can be expressed as:

$$A_1 = \gamma_{A1M1} + \beta_{A1A2} + \zeta_{A1}$$
$$A_2 = \gamma_{A2M2} + \beta_{A2A1} + \zeta_{A2}$$

where $\beta_{A1A2} = \beta_{A2A1}$. γ_{A1M1} and γ_{A2M2} represent the effects of husbands' and wives' perceptions of marital strain on their own generalized anxiety symptoms, while ζ_{A1} and ζ_{A2} represent the error variances for husbands' and wives' generalized anxiety symptoms. The key difference between the models is that individual influence estimates ψ_{A1A2} , the covariance of errors (ζ_{A1} and ζ_{A2}) for husbands' and wives' generalized anxiety symptoms, whereas mutual influence estimates β_{A1A2} and β_{A2A1} (constrained to equality), representing bi-directional feedback.

The final individual influence model estimated the direct effects of spouses' reports of marital strain on their own anxiety symptoms, as well as the error covariance of husbands' and wives' anxiety symptoms, to account for spousal interdependence. The final mutual influence model estimated the direct effects of spouses' reports of marital strain on their own anxiety symptoms; the direct effects of spouses' reports of anxiety symptoms on their partners' anxiety symptoms; and the indirect effects of spouses' reports of spouses' reports of marital strain on their partners' anxiety symptoms; and the indirect effects of spouses' reports of spouses' reports of marital strain on their partners' anxiety symptoms; and the indirect effects of spouses' symptoms. This allowed for an explicit test of mediation, rather than an indirect logic-based approach (e.g., Baron and Kenny 1986).

Additional considerations. Alternative dyadic modeling strategies were also considered. In particular, the actor-partner interdependence model (APIM; Kenny and Cook 1999) was examined, as it estimates direct partner effects in accordance with expectations of the ERM. However, no direct partner effects were significant, and model fit was poor in comparison with both individual influence and mutual influence models. Therefore, results of APIM models are not presented here.

RESULTS

Descriptive Statistics.

Descriptive statistics for all measures are displayed in Table 1. Overall, generalized anxiety symptoms were moderate, averaging slightly below 2 on the 1-4 scale. Wives reported more frequent generalized anxiety symptoms than husbands on 6 of the 7 HADS-A items, and spouses' reports of generalized anxiety symptoms were significantly but only modestly correlated (r ranged from 0.09 to 0.22, all p-values < .01). Husbands and wives both reported relatively little marital strain, as well. Spouses' ratings on the marital strain items were moderately positively correlated (r ranged from 0.20 to 0.36, all p-values < .001).

Analytic Results.

Table 2 presents the results of the measurement model. Factor loadings for all observed indicators were highly significant (p < .001). Further, the covariance of husbands' and wives' reports of marital strain was highly significant ($\varphi = 0.18$, p < .001). Fit statistics indicate good overall model fit (RMSEA = 0.05; CFI = 0.91; TLI = 0.90) (Hu and Bentler 1999). Figure 3 illustrates the measurement model.

Table 3 displays the results of the final individual influence and mutual influence models concerning the associations between husbands' and wives' perceptions of marital strain and generalized anxiety symptoms.

Individual influence. Husbands' perceptions of marital strain were significantly positively related with their own anxiety symptoms ($\gamma = 0.19$, p < .001). Likewise, wives' perceptions of marital strain were significantly positively related with their own anxiety symptoms ($\gamma = 0.23$, p < .001). Further, the error covariance was significant ($\psi = 0.01$, p < .001). Model fit for the individual influence model was very good overall (CFI = 0.99; TLI = 0.97; BIC = 3673.64). The individual influence model explained 9.14% and 13.05% of the variance in husbands' and wives' anxiety symptoms, respectively.

Mutual influence. Husbands' perceptions of marital strain were significantly positively related with their own anxiety symptoms ($\gamma = 0.18, p < .001$), and wives' perceptions of marital strain were significantly positively related with their own anxiety symptoms ($\gamma = 0.23, p < .001$). Further, husbands' and wives' reports of anxiety symptoms significantly predicted one another ($\beta = 0.07, p < .001$). This significant bi-directional path implies a feedback loop, as each spouse's anxiety symptoms predicted his/her partner's anxiety symptoms.

The mutual influence model also estimated the indirect effects of husbands' and wives' reports of marital strain on their partners' anxiety symptoms. The indirect effect of husbands' perceived marital strain on wives' anxiety symptoms was positive and significant ($\gamma = 0.01, p < .001$). The indirect effect of wives' perceived marital strain on husbands' anxiety symptoms was also positive and significant ($\gamma = 0.02, p < .001$). These results confirm that spouses' own anxiety symptoms mediate the association(s) between

their own perceptions of marital strain and their partners' anxiety symptoms. Model fit for the mutual influence model was also very good overall (CFI = 1.00; TLI = 0.99; BIC = 3671.64). CFI, TLI, and BIC all indicated better model fit for mutual influence than for the individual influence model (Hu and Bentler 1999; Raftery 1995). The mutual influence model explained 10.81% and 14.70% of the variance in husbands' and wives' anxiety symptoms, respectively.

DISCUSSION

This study examined the associations between husbands' and wives' reports of marital strain and generalized anxiety symptoms, using dyadic data from 1,114 older married couples. The key finding from the individual influence model was that perceived marital strain was related with spouses' own anxiety symptoms. Key findings from the mutual influence model were that (a) perceived marital strain was related with spouses' own anxiety symptoms; (b) husbands' and wives' anxiety symptoms were significantly related with one another; and (c) perceived marital strain was significantly indirectly related with a partner's anxiety symptoms, and this effect was mediated by one's own anxiety symptoms. Further, mutual influence exhibited better model fit than the individual influence model, justifying its use in this case. The remaining sections situate these results in the context of prior literature, describe limitations of this study, and discuss implications for practice concerning the treatment and reduction of anxiety symptoms in later life.

Anxiety as a Relational and Contagious Emotion

Married persons are highly interdependent, and their mutual influences on one another may even strengthen in older age, when the marital relationship becomes

increasingly central to adults' lives (Berscheid and Ammazzalorso 2001; Mancini and Bonanno 2006). Prior research has established that adults in higher-quality marriages report fewer anxiety symptoms (e.g., Hickey et al. 2005; Whisman 2007; Whisman et al. 2000). However, prior dyadic research has largely been limited to small sample sizes, clinical samples, and young- and middle-aged married couples (e.g., Dehle and Weiss 2002; Papp et al. 2007; Whisman et al. 2004; Zaider et al. 2010).

The present study compared individual influence and mutual influence models to assess marital interdependence in later life, and found mutual influence to be superior in this case. The findings support and extend both the ERM and emotional contagion frameworks. First, the significant association between perceptions of marital strain and spouses' own anxiety symptoms suggests that anxiety occurs as an emotional response to spousal violations of expectations within marriage (Berscheid and Ammazzalorso 2001). Moreover, the significant indirect effects of spouses' perceptions of marital strain on their partners' anxiety symptoms imply that anxiety may occur as an emotional response to problems in the relationship that spouses are not themselves consciously aware of (Berscheid and Ammazzalorso 2001). These results offer support for the ERM framework, and extend its application to the experience of anxiety.

This study also examined whether anxiety is an "emotional contagion" within marriage (Hatfield et al. 1994). Results of the mutual influence model demonstrated that husbands' and wives' anxiety symptoms were significantly reciprocally related, indicating feedback. Having an anxiety-ridden spouse resulted in experiencing greater anxiety symptoms oneself. Further, the significant mediation of the association(s) between spouses' perceived marital strain and their partners' anxiety symptoms by their

own anxiety symptoms serves as evidence that emotional contagion may be the mechanism whereby spouses communicate marital dissatisfaction to one another. This offers support for the emotional contagion framework and suggests its utility as a complement to the ERM, as a potential pathway for partner influences.

It is important to note, however, that the mutual influence model exhibited only slightly better model fit than the individual influence model. The difference in BIC values, for instance, constitutes weak-to-positive evidence of superior model fit for the mutual influence model (Raftery 1995). This is because the salient difference between the frameworks—bi-directional feedback vs. error covariance—accounted for relatively little explained variance in the outcome measures. By far the strongest predictor of husbands' and wives' anxiety symptoms in this study was spouses' own perceived marital strain. While the indirect effects of spouses' reports of marital strain on their partners' anxiety symptoms were statistically significant, the effect sizes were relatively small. Thus, while the results of the mutual influence model illustrate the significant impacts partners have on one another, they also indicate the greater importance of spouses' own perceptions of marital strain for their generalized anxiety symptoms.

Limitations

The current study is limited in several ways. First, the data analyzed are crosssectional, preventing a thorough examination of causality. Further research is needed to disentangle the complex associations between spouses' marital strain and anxiety symptoms, including direction of causality and existence of feedback loops over time. Future research analyzing longitudinal dyadic data will be better suited to assess these associations throughout later life. Second, there are limitations in the data set itself. The

HADS-A scale, for example, measures generalized anxiety symptoms, but TILDA lacks information on other types of anxiety, such as state anxiety and trait anxiety (e.g., Julian 2011). Therefore, the results of this study are limited to generalized anxiety symptoms. Future research is needed to determine whether older spouses' reports of marital strain and other forms of anxiety are related in similar ways. Lastly, the analytic sample used in this study was drawn from a nationally representative sample of older adults in Ireland, which has a unique history of marital patterns (see Kamiya et al. 2014; Kamiya and Sofroniou 2011). It is therefore possible that associations between marital strain and anxiety symptoms differ for older Irish couples in comparison with other national and sociocultural contexts. Researchers should seek to replicate and extend these findings using other samples.

Implications for Practice

Despite its limitations, this study contributes valuable information for practitioners concerned with anxiety in later life. First, results of the mutual influence model indicate that anxiety is in fact a relational experience. Spouses may be either supports or stressors in older age. Later-life anxiety is an important public health issue (van't Veer-Tazelaar et al. 2009), and practitioners should recognize that anxiety is not simply an individual mental health experience, but has relational causes and potentially—buffers. This study suggests the utility of marital therapy, as well as individual therapy geared towards the marital relationship, to combat mental health symptoms such as generalized anxiety (e.g., Beach et al. 1998; Snyder et al. 2006).

Second, for both husbands and wives marital strain was related with increased anxiety symptoms. This suggests that negative dimensions of marital quality may

particularly impactful for negative emotional experiences such as anxiety (see Baumeister et al. 2001; Horwitz, McLaughlin, and White 1998; Walen and Lachman 2000). A focus on reducing negative marital interactions, rather than enhancing positive marital behaviors, may therefore be most efficacious in reducing spouses' generalized anxiety symptoms.

To conclude, this study provides (a) useful information concerning relational factors associated with anxiety symptoms in older age; (b) evidence supporting emotional contagion as a complement to the ERM; and (c) implications for practice aimed at reducing anxiety symptoms in later life. Results indicated a strong association between spouses' perceptions of marital strain and their generalized anxiety symptoms. Further, mutual influence modeling revealed significant bi-directional feedback of husbands' and wives' anxiety symptoms, as well as significant mediation of the influence of perceived marital strain on a partner's anxiety symptoms by one's own anxiety symptoms. By examining emotional contagion as a potential pathway for the spousal influences anticipated by the ERM, the present study contributes to both theoretical and practical knowledge concerning how adults' marriages may impact their experiences of generalized anxiety in later life.

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	Total	Husbands	Wives	Gender difference	Husband-wife correlation
	Mean (SD)	Mean (SD)	Mean (SD)	<i>p</i> -value	Rho (r)
	or n (%)	or n (%)	or n (%)	1	
Outcome items					
Anxiety symptoms					
Feel tense ^a	1.88 (.58)	1.79 (.57)	1.96 (.58)	***	0.10**
Something awful ^a	1.73 (.83)	1.60 (.77)	1.85 (.88)	***	0.18***
Worrying thoughts ^a	1.79 (.82)	1.68 (.77)	1.90 (.85)	***	0.21***
Sit at ease ^a	3.34 (.64)	3.38 (.61)	3.30 (.67)	**	0.12***
"Butterflies" in stomach ^a	1.55 (.60)	1.42 (.54)	1.67 (.62)	***	0.13***
Restless ^a	1.92 (.78)	1.91 (.78)	1.94 (.79)	-	0.09**
Sudden panic ^a	1.46 (.63)	1.39 (.58)	1.54 (.67)	***	0.22***
Average anxiety symptoms ^b	1.71 (.49)	1.63 (.45)	1.80 (.51)	***	0.21***
Predictor items	· · ·	\$ <i>č</i>			
Marital strain					
Too many demands ^c	1.73 (.87)	1.71 (.84)	1.75 (.91)	-	0.24***
Criticises you ^c	1.84 (.85)	1.94 (.84)	1.73 (.85)	***	0.32***
Lets you down ^c	1.34 (.71)	1.27 (.66)	1.40 (.76)	***	0.20***
Gets on nerves ^c	1.75 (.76)	1.65 (.73)	1.85 (.78)	***	0.36***
Average marital strain ^b	1.67 (.62)	1.64 (.59)	1.69 (.65)	*	0.43***
Other covariates	· ·		· ·		
Marital support					
Understands you ^c	3.53 (.74)	3.68 (.63)	3.38 (.80)	***	0.31***
Rely on ^c	3.82 (.55)	3.87 (.46)	3.77 (.62)	***	0.27***
Talk about worries ^c	3.59 (.73)	3.66 (.66)	3.53 (.79)	***	0.26***
Age	66.76 (6.93)	68.33 (6.47)	65.19 (7.02)	***	0.76***
Self-rated health ^d	3.33 (1.07)	3.28 (1.07)	3.38 (1.06)	**	0.19***
Income ^e	€37467 (€55260)	€38399 (€56356)	€36300 (€53871)	-	0.28***
Number of children	3.35 (1.94)	3.35 (1.94)	3.35 (1.94)	N/A	N/A
Living situation					
Lives with other family	504 (22.62%)	252 (22.62%)	252 (22.62%)	N/A	N/A

Table 1. Descriptive Statistics, The Irish Longitudinal Study on Ageing 2009-2011 (N = 1,114 married couples)

Lives with spouse only	1,724 (77.38%)	862 (77.38%)	862 (77.38%)	N/A	N/A
Employment status					
Retired	1,126 (50.54%)	722 (64.81%)	404 (36.27%)	***	0.31***
Employed	552 (24.78%)	302 (27.11%)	250 (22.44%)	**	0.29***
Other	550 (24.69%)	90 (8.08%)	460 (41.29%)	***	0.07*
Region					
Dublin	520 (23.34%)	260 (23.34%)	260 (23.34%)	N/A	N/A
Other city	586 (26.30%)	293 (26.30%)	293 (26.30%)	N/A	N/A
Rural	1,122 (50.36%)	561 (50.36%)	561 (50.36%)	N/A	N/A
Education					
Some primary or less	73 (3.28%)	49 (4.40%)	24 (2.15%)	**	0.18***
Primary or equivalent	627 (28.14%)	359 (32.23%)	268 (24.06%)	***	0.36***
Intermediate certificate or	514 (23.07%)	225 (20.20%)	289 (25.94%)	***	0.11***
equivalent					
Leaving certificate or	351 (15.75%)	152 (13.64%)	199 (17.86%)	**	0.08**
equivalent					
Diploma/certificate	347 (15.57%)	138 (12.39%)	209 (18.76%)	***	0.04
Primary degree	189 (8.48%)	107 (9.61%)	82 (7.36%)	*	0.11***
Postgraduate/higher degree	127 (5.70%)	84 (7.54%)	43 (3.86%)	***	0.19***

^a1 = Not at all; 4 = Very often. ^b Statistics of generated mean-score scales reported; anxiety symptoms and marital strain were modeled as latent variables for analysis. Items that loaded negatively onto latent factors were reverse-coded for mean-score scales. ^c1 = Not at all; 4 = A lot. ^d1 = Poor; 5 = Excellent. ^e Raw statistics reported. Income was converted to quintiles for analysis, in order to reduce skew.

* *p* < .05, ** *p* < .01, *** *p* < .001

Factor loadings	λ (SD)	λ (SD)	
	Husbands' anxiety symptoms	Wives' anxiety symptoms	
Feel tense ^a	1.00 (constrained)	1.00 (constrained)	
Something awful ^a	1.56*** (0.09)	1.54*** (0.09)	
Worrying thoughts ^a	1.54*** (0.09)	1.57*** (0.08)	
Sit at ease ^a	-0.86*** (0.07)	-0.96*** (0.06)	
"Butterflies" in stomach ^a	0.91*** (0.06)	1.14*** (0.06)	
Restless ^a	1.19*** (0.09)	1.27*** (0.08)	
Sudden panic ^a	1.22*** (0.07)	1.37*** (0.07)	
	Husbands' marital strain	Wives' marital strain	
Too many demands ^b	1.00 (constrained)	1.00 (constrained)	
Criticises you ^b	1.07*** (0.06)	$1.06^{***}(0.06)$	
Lets you down ^b	0.64*** (0.04)	0.86*** (0.05)	
Gets on nerves ^b	0.92*** (0.05)	0.94*** (0.05)	
Covariance of latent variables	φ (SD)		
	Husbands' marital strain	-	
Wives' marital strain	0.18*** (0.02)	-	
Variance of latent variables	φ (SD)	-	
Husbands' anxiety symptoms	0.12 (0.01)	-	
Wives' anxiety symptoms	0.14 (0.01)	-	
Husbands' marital strain	0.31 (0.03)	-	
Wives' marital strain	0.35 (0.03)	-	
Variance of observed indicator	ψ (SD)	ψ (SD)	
	Husbands	Wives	
Anxiety symptoms			
Feel tense ^a	0.21 (0.01)	0.19 (0.01)	
Something awful ^a	0.30 (0.02)	0.45 (0.02)	
Worrying thoughts ^a	0.31 (0.02)	0.38 (0.02)	
Sit at ease ^a	0.28 (0.01)	0.32 (0.01)	
"Butterflies" in stomach ^a	0.20 (0.01)	0.21 (0.01)	
Restless ^a	0.44 (0.02)	0.40 (0.02)	
Sudden panic ^a	0.16 (0.01)	0.19 (0.01)	
Marital strain			
Too many demands ^b	0.30 (0.02)	0.48 (0.03)	
Criticises you ^b	0.34 (0.02)	0.34 (0.02)	
Lets you down ^b	0.30 (0.01)	0.32 (0.02)	
Gets on nerves ^b	0.26 (0.02)	0.30 (0.02)	
Model Fit			
RMSEA ^c	0.05		
CFI^d	0.91		
TLI ^e	0.90		

Table 2. Measurement Model Concerning Husbands' and Wives' Marital Strain and Generalized Anxiety Symptoms (N = 1,114 couples).

^a 1 = Not at all; 4 = Very often. ^b 1 = Not at all; 4 = A lot. ^c Root Mean Squared Error of Approximation. ^d Comparative Fit Index. ^e Tucker-Lewis Index. * p < .05, ** p < .01, *** p < .001

	Individual In	fluence Model	Mutual Influence Model		
	Husbands'	Wives'	Husbands'	Wives'	
	Anxiety	Anxiety	Anxiety	Anxiety	
	γ (SE)	γ (SE)	$\gamma \text{ or } \beta$ (SE)	$\gamma \text{ or } \beta$ (SE)	
Direct Effects				· ·	
Marital Strain					
Husbands'	0.19*** (0.02)	-	0.18*** (0.02)	-	
Wives'	-	0.23*** (0.02)	-	0.23*** (0.02)	
Anxiety symptoms					
Husbands'	-	-	-	0.07^{***} (0.01)	
Wives'	-	-	0.07*** (0.01)	-	
Indirect Effects					
Husbands' marital strain	-	-	-	0.01*** (0.00)	
Wives' marital strain	-	-	0.02*** (0.00)	-	
Error covariance	ψ	(SE)			
Husbands' anxiety with	0.01***		_	_	
Wives' anxiety	(0.00)				
Model Fit					
\mathbf{R}^2	9.14%	13.05%	10.81%	14.70%	
CFI ^a	0.99		1.00		
TLI ^b	0.97		0.99		
BIC ^c	3673.64		3671.64		

Table 3. Individual Influence and Mutual Influence Models Predicting Husbands' and Wives' Generalized Anxiety Symptoms, (N = 1,114 married couples)

^aComparative Fit Index. ^bTucker-Lewis Index. ^c Bayesian Information Criterion. * p < .05, ** p < .01, *** p < .001

Figure 1. Individual Influence Model



Note: Husbands' and wives' marital strain and anxiety symptoms were generated as factor scores based on the measurement model. The factor scores were then treated as "observed" variables in the structural models.

Figure 2. Mutual Influence Model



Note: Husbands' and wives' marital strain and anxiety symptoms were generated as factor scores based on the measurement model. The factor scores were then treated as "observed" variables in the structural models.





Note: All factor loadings were highly significant (p < .001). Values for all parameters are reported in Table 2.

CHAPTER 3: TWO-WAVE DYADIC ANALYSIS OF MARITAL QUALITY AND LONELINESS IN LATER LIFE

Two-Wave Dyadic Analysis of Marital Quality and Loneliness in Later Life: Results From The Irish Longitudinal Study on Ageing

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Author Note

Researchers interested in using TILDA data may access the data for free from the following sites: Irish Social Science Data Archive (ISSDA) at University College Dublin http://www.ucd.ie/issda/data/tilda/ ; Interuniversity Consortium for Political and Social Research (ICPSR) at the University of Michigan http://www.icpsr.umich.edu/icpsrweb/ICPSR/studies/34315

ABSTRACT

This study examines dyadic reports of marital quality and loneliness over a twoyear period among 932 older married couples resident in Ireland. Data from the first two waves of The Irish Longitudinal Study on Ageing (2009-2013) were analyzed to determine whether husbands' and wives' marital quality and loneliness at baseline predicted both spouses' loneliness two years later. Two-wave lagged models tested the cognitive perspective on loneliness, the induction hypothesis, and actor-partner interdependence. Results indicated that perceptions of negative marital quality at baseline were related with greater loneliness two years later, supporting the cognitive perspective. Further, both spouses' reports of loneliness at baseline were related with loneliness two years later, supporting the induction hypothesis. Partners' reports of marital quality were not related with future loneliness, failing to support actor-partner interdependence. I discuss the implications of these findings for theory, practice, and future research concerning intimate relationships and loneliness in later life.

Keywords: dyadic relationships; emotional contagion; longitudinal analysis; loneliness; marriage

Two-Wave Dyadic Analysis of Marital Quality and Loneliness in Later Life:

Results From The Irish Longitudinal Study on Ageing INTRODUCTION

Loneliness is a subjective experience, distinct from objective "aloneness" or isolation (Dykstra, van Tilburg, and de Jong Gierveld 2005; Hughes et al. 2004). Moreover, feeling lonely is associated with a variety of negative mental and physical health outcomes for older adults, including depression, worse cognitive functioning, and even functional decline and death (Cacioppo et al. 2006; Hawkley and Cacioppo 2010; Luanaigh and Lawlor 2008; Perissinotto, Cenzer, and Covinsky 2012). While intimate social relationships such as marriage can protect against loneliness in later life (Fokkema, de Jong Gierveld, and Dykstra 2012; Sundström et al. 2009), married persons still experience loneliness relatively frequently (Perissinotto et al. 2012).

The experience of loneliness within marriage can be explained by the cognitive perspective (de Jong Gierveld 1987), which posits that loneliness is determined more by the quality than the quantity of one's social relationships (de Jong Gierveld 1998; Dykstra et al. 2005). More specifically, the cognitive perspective on loneliness asserts that discrepancies between desired and perceived relationship characteristics lead to greater loneliness (de Jong Gierveld 1987). Thus, intimate relationships that meet or exceed expectations may protect against loneliness, while intimate relationships that fail to meet one's desires may actually increase feelings of loneliness (e.g., Ayalon, Shiovitz-Ezra, and Palgi 2013). Furthermore, the induction hypothesis (Ayalon et al. 2013; Cacioppo, Fowler, and Christakis 2009) asserts that loneliness spreads socially, and thus loneliness in one spouse may contribute to loneliness in the other.

Prior research has found significant associations between aspects of marital quality and spouses' loneliness, as well as between spouses' reports of loneliness themselves (e.g., Ayalon et al. 2013; de Jong Gierveld et al. 2009; Liu and Rook 2013; Moorman 2016). However, these studies have been limited to cross-sectional data analysis, and are unable to determine whether these significant associations persist over time (Taris 2000). In this study I analyze dyadic data from 932 older married couples over two waves of The Irish Longitudinal Study on Ageing (TILDA), in order to determine whether individuals' reports of marital quality and loneliness at baseline predict their own and their spouses' reports of loneliness two years later.

LITERATURE REVIEW

Theoretical Framework

Social isolation and being alone are closely related with loneliness both conceptually and empirically (Dykstra et al. 2005; Victor et al. 2000), but loneliness itself is a distinct construct that refers to the subjective experience of *feeling* lonely (de Jong Gierveld 1987; de Jong Gierveld et al. 2009; Perlman and Peplau 1981). Loneliness is a relatively common experience for older adults, and increases in later life (Dykstra et al. 2005; Sundström et al. 2009). Moreover, while intimate social relationships such as marriage protect against loneliness (Fokkema et al. 2012; Sundström et al. 2009), they certainly do not prevent it. In fact, a recent study found that over a third of married adults participating in the Health and Retirement Study reported experiencing loneliness (Perissinotto et al. 2012).

The cognitive perspective on loneliness explains the gap between objective characteristics of social isolation and subjective experiences of loneliness by focusing on

individuals' cognitive evaluations of the quantity and quality of their social relationships (de Jong Gierveld 1987; de Jong Gierveld et al. 2009). Thus, loneliness depends in part upon individuals' standards and desires concerning the number and closeness of their social attachments (de Jong Gierveld et al. 2009). Some individuals are satisfied with small social networks, while others feel lonely despite myriad social relationships. According to the cognitive perspective, subjective loneliness results from discrepancies between perceived and desired characteristics of relationships (Ayalon et al. 2013; de Jong Gierveld et al. 2009). When social relationships fail to meet adults' needs, desires, and expectations, individuals experience greater loneliness.

Concerning the marital relationship in particular, high-quality marriages that meet spouses' needs and expectations protect against loneliness, whereas low-quality marriages that fail to meet spouses' needs and desires engender dissatisfaction and loneliness (e.g., Ayalon et al. 2013; de Jong Gierveld et al. 2009). The cognitive perspective therefore hypothesizes an association between perceptions of marital quality and loneliness over time, with dissatisfied spouses experiencing greater loneliness than satisfied spouses (de Jong Gierveld 1987; Perlman and Peplau 1981).

The induction hypothesis (Cacioppo et al. 2009) contributes further to the study of loneliness within marriage, viewing loneliness as a social and emotional "contagion" that spreads from person to person within social networks (Hatfield, Cacioppo, and Rapson 1994). Loneliness can affect how a person treats and interacts towards others, making one more anxious, negative, and hostile (Berscheid and Reis 1998; Cacioppo et al. 2006; 2009). This may be particularly true within marriage, as perceived deficiencies in the

marital relationship itself may be primary contributors to the loneliness one experiences (e.g., Ayalon et al. 2013; Moorman 2016).

In addition to perceived marital quality influencing one's loneliness, the induction hypothesis predicts that one's loneliness will engender loneliness in *both* spouses over time. Implications regarding gender are unclear. Women are more likely to discuss and spread loneliness to others, but they are also more strongly affected by others' reports of loneliness (Cacioppo et al. 2009). Yet prior dyadic research has not found any gender differences concerning the influence of a partner's loneliness on one's own loneliness (e.g., Ayalon et al. 2013). The gender differential in the induction of loneliness within social networks may be driven by differences in the social ties and relationships that men and women maintain (Cacioppo et al. 2009). Within the context of marriage, there is some evidence that wives experience greater loneliness than husbands (Pinquart and Sörensen 2001). This gender difference, however, may be driven by differences in the induction of loneliness in husbands' and wives' appraisals of their marital quality, rather than by differences in the induction of loneliness within marriage (Pinquart and Sörensen 2001; Umberson and Williams 2005).

Loneliness may spread to and from spouses due to the interdependence of the marital relationship (e.g., Cacioppo et al. 2009; Kenny and Cook 1999). Similarly, perceptions of marital quality may influence both spouses, as dis/satisfaction impacts feelings, emotions, and behaviors towards a partner (Berscheid and Ammazzalorso 2001; Cacioppo et al. 2009; Kenny and Cook 1999; Moorman 2016). Prior research has found significant actor and partner effects of perceived marital quality on married older adults' loneliness (Moorman 2016). Marital dissatisfaction may therefore induce loneliness not
only in oneself, but in a spouse as well, due to the interdependent nature of the marital relationship. The use of two-wave longitudinal dyadic data allows for an analysis of marital quality, loneliness, and marital interdependence over time.

Loneliness Within Marriage

Marriage is the most central and salient relationship in adulthood (Sarkisian and Gerstel 2008), and one of the strongest protective factors against loneliness in later life (Fokkema et al. 2012; Sundström et al. 2009). Yet married persons still experience loneliness, and aspects of their marriages may either protect against or even induce loneliness (e.g., Cacioppo et al. 2009; Moorman 2016; Perissinotto et al. 2012). Additionally, marriage and marital quality may be particularly important in older age, as men and women leave the work force, trim their social networks, and focus their time and attention on their closest and most emotionally meaningful relationships, such as marriage (Carr et al. 2014; Carstensen, Isaacowitz, and Charles 1999; Mancini and Bonanno 2006; Umberson et al. 2006).

Prior research has identified various relational characteristics associated with loneliness in later life. For instance, both greater support and lesser strain from a spouse are related with reduced loneliness (Chen and Feeley 2014). Further, insensitive behavior, frequent arguing, and a lack of emotional support within marriage are all significantly associated with increased loneliness (de Jong Gierveld et al. 2009; Liu and Rook 2013; Shiovitz-Ezra and Leitsch 2010).

Research utilizing dyadic data from both partners is more limited, but has garnered interesting results. The use of dyadic data is particularly important when assessing marital effects, since spouses' characteristics, opinions, and emotions are

highly interdependent (Kenny and Cook 1999). Loneliness within marriage may be influenced by both spouses (e.g., Ayalon et al. 2013; Moorman 2016). For instance, an insecure attachment orientation is related with greater loneliness for both spouses (Givertz et al. 2013), although feeling constrained in a marriage affects only one's own loneliness (Burke and Segrin 2014). Ayalon and colleagues (2013) found that positive marital quality, negative marital quality, and marital closeness were all related with loneliness, but did not assess whether one spouse's reports of marital quality influenced the other's loneliness. They did find, however, that husbands' and wives' reports of loneliness were significantly related with one another (Ayalon et al. 2013). Moorman (forthcoming) directly examined both actor and partner effects, and found that positive and negative marital quality independently influenced husbands' and wives' loneliness, individually and dyadically.

The current study expands upon this field of research by examining whether older married adults' reports of positive marital quality, negative marital quality, and loneliness at baseline influence their own and their spouses' loneliness after two years. Lagged analysis of two-wave dyadic data will help clarify whether the significant effects of marital quality and spouses' loneliness on older married adults' loneliness persist over time, or are merely cross-sectional.

Study Context

The present study analyzes two-wave dyadic data from 1,864 married older adults resident in Ireland concerning their marital quality and loneliness. Experiences of loneliness differ across countries, though these differences are largely attributable to marital, economic, and health characteristics (Fokkema et al. 2012). However, marriage

in Ireland has a unique cultural history (Kennedy 1973). Ireland has the highest proportion of adults in Western Europe who have never married or married late in life, and divorce is particularly rare due to its legalization only in 1996 (Kamiya and Sofroniou 2011; Kamiya et al. 2013; 2014). Marriage rates in Ireland increased rapidly in the 1960s and 1970s, however, and adults who married during the Irish "marriage boom" are now entering later life (Kamiya and Sofroniou 2011). The current study assesses dyadic relationships between marital quality and loneliness in the specific social context of aging in Ireland.

Study Aims

The present study has three primary aims: First, to extend research on the cognitive perspective on loneliness by analyzing two-wave dyadic data to determine whether perceptions of positive marital quality and negative martial quality at baseline are related with older married adults' reports of loneliness two years later. Second, to test the induction hypothesis by assessing whether individuals' reports of loneliness at baseline are related with their own and their spouses' reports of loneliness two years later. Third, to evaluate actor-partner interdependence in marriage by examining whether married older adults' perceptions of positive and negative marital quality at baseline are related with their partners' reports of loneliness two years later. In each case, I use lagged analysis of two-wave dyadic data to examine associations over time.

RESEARCH DESIGN

Data and Sample

Data for this study came from the first two waves of The Irish Longitudinal Study on Ageing (TILDA). The initial 2009-2011 wave included a nationally representative

sample of 8,504 adults aged 50 or over and their spouses/partners resident in Ireland (Barrett et al. 2011; Kenny 2014; Kenny et al. 2010). The study design for TILDA is based on other national longitudinal studies of aging, such as the Health and Retirement Study (HRS) and the English Longitudinal Study on Ageing (ELSA), with data collection approximately every two years (Kamiya et al. 2014; Kenny et al. 2010). In both the 2009-2011 and 2012-2013 waves, in-person interviews and self-completion questionnaires were used to gather information (Kenny 2014; Kenny et al. 2010; Nolan et al. 2014). At wave 1, the response rate for in-person interviews was 62%, and 83% of interviewees also completed questionnaires (Kamiya et al. 2014). Information on the variables of interest in this study came from the self-completion questionnaires, so couples where either spouse failed to complete the questionnaire were not included in the analytic sample. Because the focus of this study is on marital quality and loneliness in later life, the analytic sample was restricted to couples with at least one spouse aged 60 or older at baseline.

In the 2009-2011 wave of TILDA, there were 1,855 married couples where both spouses completed the questionnaire, and 1,114 of these couples had at least one spouse aged 60 or older (see Stokes forthcoming). The overall attrition rate for wave 2 of TILDA was 15.25%. In the 1,114 older married couples identified as the wave 1 analytic sample, 11.85% of husbands and 10.77% of wives did not participate at wave 2. Participants who were missing data on all loneliness items were dropped (couple n = 8). The couple-level attrition rate (i.e., the proportion of couples where one or both spouses failed to participate at wave 2) was 16.34%, leaving a final analytic sample of 932 married couples with at least one spouse who was aged 60 or older at baseline.

Respondents who participated at both waves were significantly wealthier ($\mu =$ 2.85 vs. 2.42 on a 5-point quintile scale, p < .001); healthier ($\mu = 3.38$ vs. 2.98 on a 5point scale, p < .001; better educated ($\mu = 3.87$ vs. 3.05 on a 7-category scale, p < .01); and younger ($\mu = 66.56$ vs. 68.35 years old, p < .001) than respondents who participated only at wave 1. Further, wives who participated at both waves were significantly less lonely ($\mu = 1.49$ vs. 1.89 on a 0-10 scale, p < .05); more likely to be employed (23.74%) vs. 11.67%, p < .01); more likely to live with others in addition to a spouse (23.54% vs. 15.00%, p < .05); and had more children ($\mu = 3.40$ vs. 2.95, p < .05) than wives who participated only at wave 1. Husbands who responded at both waves were also less likely to report that a spouse lets them down ($\mu = 1.26$ vs. 1.39 on a 4-point scale, p < .05). Sensitivity analyses revealed that controlling for these factors did not influence crosssectional associations between positive marital quality, negative marital quality, and both spouses' reports of loneliness at wave 1 for the complete wave 1 analytic sample (n =1,114). Moreover, cross-sectional results at wave 1 were consistent across the complete wave 1 (n = 1,114) and the restricted two-wave (n = 932) analytic samples. These and other control measures were also examined in this study, but did not impact results. Measures

Outcome measure.

Loneliness. Loneliness was measured at wave 2 using the 5-item UCLA loneliness scale (Kenny 2014; Russell 1996). Sample questions include "How often do you feel isolated?" and "How often do you feel lonely?" Response categories ranged from 0 (*Hardly ever or never*) to 2 (*Often*). Husbands and wives evaluated their loneliness independently of one another. Loneliness was constructed as a sum score scale, and was set to missing for participants who failed to answer any of the five items (Kenny 2014). The loneliness scale was transformed using the natural logarithm, to address significant positive skew. The version 2.1 release of TILDA wave 2 data includes this constructed loneliness scale, but not the individual loneliness items; therefore, loneliness is treated as an observed variable rather than a latent variable.

Predictor measures.

All independent variables were measured at wave 1 and serve as lagged predictors of loneliness at wave 2. Husbands and wives reported on all variables independently of one another.

Positive marital quality. Positive marital quality at wave 1 was measured as a continuous latent variable with three observed indicators (Walen and Lachman 2000). Sample items include "How much does [your spouse] really understand the way you feel about things?" and "How much can you rely on [your spouse] if you have a serious problem?" Response categories ranged from 1 (*Not at all*) to 4 (*A lot*), with higher values indicating greater positive marital quality.

Negative marital quality. Negative marital quality at wave 1 was measured as a continuous latent variable with four observed indicators (Walen and Lachman 2000). Sample items include "How much does [your spouse] let you down when you are counting on him/her?" and "How much does [your spouse] get on your nerves?" Response categories ranged from 1 (*Not at all*) to 4 (*A lot*), with higher values indicating greater negative marital quality.

Loneliness. The same loneliness scale was measured and constructed at wave 1, and is used to assess husbands' and wives' loneliness at baseline. Loneliness at wave 1 was transformed using the natural logarithm, to address significant positive skew.

Control measures.

A variety of control measures were examined during data analysis. Controls were tested for *age, self-rated health, income, depressive symptoms, living situation, employment status, number of children, region,* and *education* (see Burholt and Scharf 2014; Dykstra et al. 2005; Pinquart and Sörensen 2001; Victor et al. 2000). Including these control measures did not significantly impact results. Therefore, all control measures were excluded for parsimony.

Analytic Strategy and Missing Data

I used two-wave lagged dependent variable (LDV) structural equation models (SEM) to address my research questions. There was evidence of "regression to the mean" in reports of loneliness, making LDV preferable to a difference score approach (Allison 1990). Models estimated actor and partner effects using the actor-partner interdependence model (APIM) framework (Kenny and Cook 1999). In accordance with the APIM framework, husbands' and wives' reports of positive marital quality, negative marital quality, and loneliness at baseline were used to predict *both* spouses' loneliness at wave 2.

Analysis began with a fully unconstrained APIM model, with parameter constraints then examined for improved model fit. These parameter constraints were used to test for differences in effects for husbands and wives, as well as differences in actor and partner effects. Constraints for the equivalence of coefficients for husbands and

wives resulted in the best overall fit. Constraints of actor and partner effects were tested but resulted in worse fit; therefore, they were excluded. The final analytic model presents actor and partner effects of positive marital quality, negative marital quality, and loneliness at wave 1 on husbands' and wives' loneliness at wave 2, with equal effects for husbands and wives.

The majority of husbands (85.62%) and wives (84.66%) provided complete data on all items of interest. Missing data diagnostics revealed no clear patterns of missingness. Therefore, I used multiple imputation to address missing data (Rubin 1987; Schafer 1997). Loneliness at wave 2 was included in the imputation command and used in analyses (Johnson and Young 2011). Models that removed couples where either spouse was missing data on wave 2 loneliness were substantively similar to those presented; therefore, the maximum sample size was used. Listwise analyses were also substantively similar to those using imputed data. Imputation enhanced final sample size and protected against potential bias from listwise deletion of cases, but did not substantially alter findings. A total of 10 imputed data sets were created and analyzed using Mplus 7.31.

A series of robustness checks were conducted. First, analyses were conducted that included all control measures, with no substantive effect on findings. Therefore, all controls were excluded for parsimony. Second, analyses were conducted using the raw, skewed loneliness items. No significant findings were altered, but model fit statistics were worse. Therefore, the transformed loneliness measures were used. Third, additional constraints were examined for improved model fit. Constraining non-significant coefficients to equality (since none were significantly different from zero), as well as

removing non-significant effects from the model, resulted in improved fit, but did not alter any significant findings. There was also no clear trend for these constraints (e.g., equivalence of actor and partner effects). Therefore, the final analytic model using constraints for the equivalence of coefficients for husbands and wives is presented here, for clarity of interpretation.

RESULTS

Descriptive Statistics

Descriptive statistics for all measures of interest are reported in Table 1. Loneliness was relatively low among both husbands and wives at both waves, averaging between 1 and 2 on the 0-10 scale. More than half of husbands and wives reported some level of loneliness at both waves, however. Loneliness increased slightly from wave 1 to wave 2 for both husbands and wives. Wives reported greater loneliness than husbands at wave 2, though there were no gender differences at baseline. Husbands and wives reported being relatively satisfied concerning both positive and negative dimensions of marital quality. Spouses' reports of both positive and negative marital quality were moderately positively correlated. Husbands reported better quality than wives on all three positive marital quality items, and on two of four negative marital quality items.

[Table 1 about here]

Analytic Results

Table 2 presents the results of the final analytic structural equation model (SEM) concerning the associations between husbands' and wives' reports of positive marital quality, negative marital quality, and loneliness at baseline with their loneliness two years later. Coefficients for all effects concerning both husbands' and wives' loneliness were

estimated simultaneously. The model was estimated using the APIM framework, with all actor and partner effects constrained to equivalence for husbands and wives. Results of the final analytic model are illustrated in Figure 1.

[Table 2 about here]

[Figure 1 about here]

Positive Marital Quality. Neither one's own nor a partner's appraisal of positive marital quality at baseline was related with loneliness two years later.

Negative Marital Quality. Negative marital quality at baseline was significantly related with greater loneliness two years later (B = 0.14, p < .01). However, there was no significant relationship between a spouse's reports of negative marital quality at baseline and one's own loneliness two years later. That is, there was a lagged actor effect of negative marital quality on loneliness, but no lagged partner effect.

Loneliness. Both one's own (B = 0.51, p < .001) and a spouse's (B = 0.07, p < .01) loneliness at baseline were related with greater loneliness two years later. That is, there were lagged actor and partner effects of baseline loneliness on future loneliness. DISCUSSION

The present paper examined the lagged influences of husbands' and wives' positive marital quality, negative marital quality, and loneliness at baseline on both spouses' loneliness two years later. This study followed 1,864 individuals from 932 older married couples from the 2009-2011 to the 2012-2013 wave of The Irish Longitudinal Study on Ageing. The key findings were that (a) for both husbands and wives, negative marital quality was associated with greater loneliness two years later; and (b) for both husbands and wives, loneliness at baseline was related with greater loneliness for *both*

spouses two years later. In the remaining sections, I discuss the implications of these findings for theory and practice, note the limitations of the current study, and provide suggestions for future research on loneliness among married older adults.

The Cognitive Perspective on Loneliness

The cognitive perspective on loneliness (de Jong Gierveld 1987; Perlman and Peplau 1981) asserts that discrepancies between adults' desired and perceived social relationships lead to greater loneliness. Cognitive evaluations of intimate social relationships result in dis/satisfaction, with those who feel their relationships are lacking in quality experiencing feelings of loneliness and isolation (e.g., de Jong Gierveld 1987; de Jong Gierveld et al. 2009). Prior research has found significant cross-sectional associations between adults' perceptions of intimate relationship quality and loneliness in later life (e.g., Ayalon et al. 2013; de Jong Gierveld et al. 2009; Liu and Rook 2013; Moorman 2016). In this study, perceived negative relationship quality was significantly related with future loneliness. This supports the cognitive perspective on loneliness, and offers evidence that older adults' subjective evaluations of relationship quality are related with their loneliness over time (de Jong Gierveld 1987; Taris 2000). This finding also implies that negative aspects of marital quality may be stronger determinants of loneliness than positive aspects are (Baumeister et al. 2001).

The Induction Hypothesis

According to the induction hypothesis, loneliness is subject to emotional contagion, spreading from person to person within social networks (Ayalon et al. 2013; Cacioppo et al. 2009; Hatfield et al. 1994). Prior research indicates that husbands' and wives' reports of loneliness are significantly related to one another, lending credence to

this theory (Ayalon et al. 2013). In this study, both spouses' reports of loneliness at baseline predicted loneliness two years later. That is, after accounting for one's own loneliness at baseline, greater baseline loneliness in a spouse was related with experiencing greater loneliness after two years. This finding offers support for the induction hypothesis, and again demonstrates a significant association over time: Having a lonely partner results in feeling lonelier later on, as loneliness spreads from one spouse to the other.

Interdependence within Marriage

While the lagged effect of one's own loneliness at baseline on a spouse's loneliness after two years illustrates the interdependence of partners within the marital relationship, the lack of significant findings concerning partners' appraisals of positive and negative marital quality fails to support the hypothesis that both spouses' perceptions of marital quality impact married older adults' loneliness (e.g., Berscheid and Ammazzalorso 2001; Moorman 2016). Prior research identifies significant cross-sectional associations between spouses' appraisals of positive and negative marital quality and their partners' loneliness (Moorman 2016). The lack of significant findings in the present two-wave lagged analysis suggests that such cross-sectional associations may not persist over time (e.g., Taris 2000). However, the potential influence of partners' marital quality on their spouses' loneliness may be accounted for in lagged analysis by baseline loneliness. Moreover, it is possible that *changes* in partners' perceptions of marital quality, rather than baseline perceptions of marital quality, influence changes in loneliness over time. Future research analyzing changes in spouses' marital quality and

loneliness over longer periods of time may provide further information regarding these associations (Johnson 2005; Taris 2000).

Gender

There is some evidence that marriage protects against loneliness more strongly for husbands than for wives. For example, among older married couples, wives experience greater loneliness than husbands (Pinquart and Sörensen 2001). In the present study there were no gender differences in effects. The best-fitting model constrained all effects to equality for husbands and wives. This is consistent with prior research on marital quality and loneliness among married older adults (Ayalon et al. 2013; Moorman 2016). However, wives in this sample reported greater loneliness than husbands at wave 2 (see Table 1). This may be due in part to husbands' more positive appraisals of various marital quality items (see Table 1; Umberson and Williams 2005). Even if the association between negative marital quality and loneliness is equivalent for husbands and wives, husbands may benefit more over time from high-quality marriages due to their sunnier perceptions of marital quality (Umberson and Williams 2005). Research following trajectories of marital quality and loneliness over longer periods of time will help determine whether husbands and wives experience differing levels of protection against loneliness from their marriages.

Limitations

The present study is limited in several ways. First, there are limitations in the data. For example, the version 2.1 release of TILDA wave 2 data lacks information on a number of variables of interest. Positive marital quality, negative marital quality, and the individual loneliness items were measured at wave 1, but are not currently available for

wave 2. Therefore, loneliness was treated as an observed sum scale variable rather than a latent construct, and two-wave data analysis was limited to LDV models rather than change-score models (Johnson 2005). It is possible that changes from wave 1 to wave 2 on a number of factors—including variables of interest and control measures—would account for changes in loneliness. Future waves and releases of TILDA data will allow for a wider variety of longitudinal analyses and a more thorough investigation of associations between variables over time.

Second, there are limitations with the present sample. Attrition patterns revealed that younger, healthier, better educated, and wealthier respondents were more likely to participate at both waves, although controlling for these factors did not impact results. Further, while cross-national differences in loneliness are explained by marital, economic, and health characteristics (Fokkema et al. 2012), marital trends and patterns in Ireland are unique in comparison with other developed countries, which may result in unique associations between aspects of marital quality and loneliness among older adults (e.g., Kamiya et al. 2013; Kamiya and Sofroniou 2011). However, little research has examined potential cross-national differences in the influence of marital quality on loneliness. Researchers should seek to replicate the present findings among cohorts of older married adults in other countries in order to assess their validity across national contexts.

Lastly, there are clear limitations to causal inference in the present analysis. First, while two-wave LDV models allow for stronger assessments of causality than cross-sectional analyses (Taris 2000), they neither directly test nor prove causality in non-experimental data. Moreover, the two-year gap in data collection waves may obscure

causal associations that have shorter—or longer—causal lags (Taris 2000). Furthermore, a precise examination of the cognitive perspective on loneliness would require information both on relationship standards and evaluations (de Jong Gierveld et al. 2009), but data in the present study are limited to the latter. Positive and negative marital quality are subjective measures of relationship satisfaction, allowing for a direct examination of the influence of adults' cognitive evaluations of their marital relationships on loneliness, but hypothesized mediation of objective characteristics of social networks and relations by those cognitive processes could not be analyzed in the present study (e.g., Ayalon et al. 2013; de Jong Gierveld 1987).

Implications and Future Directions

Despite these limitations, the current study contributes to the literature both empirically and theoretically, and suggests a number of implications for practice and future research concerning intimate relationships and loneliness in later life. First, the findings of this study offer support for the cognitive perspective on loneliness (de Jong Gierveld 1987; Perlman and Peplau 1981) and illustrate a significant relationship between subjective evaluations of marital quality and loneliness over time. Specifically, perceptions of negative marital quality were related with loneliness two years later for both husbands and wives. This finding suggests that interventions to reduce loneliness ought to focus on older adults' marriages, including reducing marital strain rather than simply promoting marital support (e.g., Masi et al. 2011). Future investigations of the cognitive perspective should take advantage of multi-wave longitudinal data, in order to determine whether the lagged effects found in this study remain significant over longer periods of time. Moreover, researchers should analyze data on both cognitive evaluations of marital quality and adults' standards and desires for their social relationships, in order to investigate the mediation hypothesized by the cognitive perspective.

Second, this study finds support for the induction hypothesis (Cacioppo et al. 2009). Prior research established that husbands' and wives' experiences of loneliness are significantly related (Ayalon et al. 2013). The current analysis revealed that spouses' reports of loneliness were significantly related over a two year span: Having a lonelier spouse at baseline resulted in experiencing greater loneliness two years later. This finding suggests that interventions to reduce loneliness should concentrate not only on the focal individual, but also on salient social partners, particularly spouses, whose loneliness may be "contagious" (Ayalon et al. 2013; Cacioppo et al. 2009; Masi et al. 2011). Again, future research analyzing multi-wave longitudinal data can assess whether these effects are consistent over longer spans of time, and may determine whether there are any gender differences in induction across the life course (e.g., Ayalon et al. 2013; Cacioppo et al. 2009).

Third, it is worth noting that there were no significant partner effects of marital quality on loneliness in the present study, in contrast with prior cross-sectional research (e.g., Moorman 2016). This suggests that cross-sectional associations between partners' appraisals of marital quality and experiences of loneliness may not persist over time. However, it would be premature to interpret these null findings as disproving or discounting a significant relationship over time. Future analysis of multi-wave longitudinal dyadic data will help determine whether changes in spouses' perceptions of marital quality predict changes in loneliness over extended periods of time. *Conclusion*

The current study made use of two-wave dyadic data in order to assess whether husbands' and wives' reports of marital quality and loneliness at baseline were related with both spouses' reports of loneliness two years later. The significant findings offer support for the cognitive perspective on loneliness and the induction hypothesis, but offer no evidence concerning partner effects of marital quality on loneliness. While this study should be approached as a first step rather than the final word on associations between older spouses' perceptions of marital quality and loneliness over time, the results offer empirical and theoretical contributions to the literature and should spur further longitudinal analysis of dyadic data in order to more comprehensively examine loneliness within marriage throughout later life.

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			Gender	Husband-wife
	Husbands	Wives	difference	correlation
	Mean (SD)	Mean (SD)	<i>p</i> -value	Rho (r)
Loneliness				
Wave 1 ^{a,b}	1.32 (1.78)	1.48 (1.89)	-	0.20***
Wave 2 ^{a,c}	1.37 (1.75)	1.59 (1.95)	*	0.28***
Positive Marital Quality				
Understands you ^{b,d}	3.69 (.60)	3.38 (.80)	***	0.30***
Rely on ^{b,d}	3.88 (.43)	3.79 (.59)	***	0.23***
Talk about worries ^{b,d}	3.67 (.65)	3.53 (.78)	***	0.27***
Negative Marital Quality				
Too many demands ^{b,d}	1.70 (.83)	1.73 (.90)	-	0.24***
Criticises you ^{b,d}	1.95 (.84)	1.73 (.85)	***	0.32***
Lets you down ^{b,d}	1.26 (.64)	1.41 (.76)	* * *	0.16***
Gets on nerves ^{b,d}	1.65 (.73)	1.86 (.79)	***	0.35***

Table 1. Descriptive Statistics, The Irish Longitudinal Study on Ageing, 2009-2013. (N = 1,864 individuals from 932 couples)

Wave 1. ^cMeasured at Wave 2. ^d1 = Not at all; 4 = A lot.

* p < .05, ** p < .01, *** p < .001

^aRaw variable presented. 0 = Lowest loneliness; 10 = Greatest loneliness. ^bMeasured at

	Husbands' Loneliness		Wives' Loneliness			
	at Wave 2		at Wave 2			
Predictors at Wave 1	В	SE	В	SE		
Positive marital quality						
Husbands'	-0.02	0.04	-0.05	0.04		
Wives'	-0.05	0.04	-0.02	0.04		
Negative marital quality						
Husbands'	0.14**	0.05	-0.00	0.05		
Wives'	-0.00	0.05	0.14**	0.05		
Loneliness at baseline						
Husbands' ^a	0.51***	0.02	0.07**	0.02		
Wives' ^a	0.07**	0.02	0.51***	0.02		
Model Fit						
RMSEA ^b	0.04					
CFI ^c	0.96					
$\operatorname{BIC}^{\operatorname{d}}$	30,386					

Table 2. Lagged Analysis of Husbands' and Wives' Loneliness Over Two Years (N = 1,864 individuals from 932 couples)

^a Transformed variable. ^b Root Mean Square Error of Approximation. ^c Comparative Fit

Index. ^d Bayesian Information Criterion.

* p < .05, ** p < .01, *** p < .001

Figure 1. Results of the Final Analytic Model Concerning Husbands' and Wives' Marital Quality and Loneliness Over Two Years.



Note: Only significant associations shown.

CHAPTER 4: DO "HIS" AND "HER" MARRIAGE INFLUENCE ONE ANOTHER?

Do "His" and "Her" Marriage Influence One Another? Older Spouses' Marital Quality Over Four Years

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Author Note

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ABSTRACT

Husbands and wives differ in their evaluations of marital quality, with "his" marriage typically proving better than "her" marriage. However, spouses' perceptions of marital quality tend to be significantly moderately correlated with one another. Prior research has addressed the existence and implications of gender differences in marital quality, but has focused less on spouses' similarities in their perceptions. In particular, prior studies have not examined the extent to which spouses' assessments of marital quality may be mutually interrelated. In short, do "his" and "her" marriage influence one another? This study analyzes longitudinal dyadic data from 209 older married couples who participated in the first two waves of the Disability and Use of Time supplement to the Panel Study of Income Dynamics (2009-2013). Two-wave lagged models tested emotional contagion theory by examining whether husbands' and wives' reports of marital quality at baseline predicted both spouses' marital quality after four years. Results indicated that (a) husbands reported better marital quality than their wives in both 2009 and 2013, (b) for both husbands and wives, baseline marital quality was significantly related with both one's own *and* one's partner's marital quality four years later, and (c) there were no differences in effects according to gender. These findings offer support for the framework of "his" and "her" marriage, as well as emotional contagion theory. I discuss implications for theory, practice, and future research concerning marital quality in later life.

Keywords: dyadic data; emotional contagion; later life; longitudinal analysis; marital quality

Do "His" and "Her" Marriage Influence One Another?

Older Spouses' Marital Quality Over Four Years

INTRODUCTION

Marriage is a shared dyadic relationship, but husbands and wives do not necessarily experience or evaluate their marriages equivalently (e.g., Boerner, Jopp, Carr, Sosinsky, and Kim 2014; Umberson and Williams 2005). In fact, since Bernard (1972) there has been an awareness that "his" and "her" marriages may be quite distinct, with "his" being superior (e.g., Boerner et al. 2014; Jackson, Miller, Oka, and Henry 2014). Prior research has focused on such issues as the generalizability, potential causes, and long-term repercussions of these gender differences (e.g., Jackson et al. 2014; Spotts, Prescott, and Kendler 2006; Umberson and Williams 2005). Yet spouses' perceptions of marital quality tend to be significantly, if moderately, correlated with one another, including in later life (e.g., Carr and Boerner 2009; Carr, Freedman, Cornman, and Schwarz 2014; Stokes forthcoming-b, forthcoming-c). However, little research has examined the extent to which "his" and "her" marriages may in fact influence one another over time. In other words, are husbands' and wives' distinct appraisals of their marriages truly separate, or does one spouse's perception of the relationship matter for his/her partner's assessment?

There are a number of possible explanations for significant covariation of spouses' reports of marital quality. For instance, similarities in husbands' and wives' appraisals of their marriages may be largely endogenous and due to shared objective factors and circumstances (e.g., financial well-being, parental status and children's problems, marital activities, household roles and duties, etc.) (Kenny 1996; Ledermann

and Kenny 2012). Additionally, spouses are non-randomly coupled, and homogamy—or the tendency for persons with similar backgrounds and characteristics to couple—may contribute to similarities in spouses' assessments of marital quality (e.g., Amato, Johnson, Booth, and Rogers 2003; Kenny 1996). However, the fact that spouses' reports of marital quality are only moderately correlated with one another suggests that these shared circumstances and background characteristics do not fully explain spouses' perceptions. Discrepancies in spouses' appraisals may be due in part to gendered roles and expectations within marriage (e.g., Rogers and Amato 2000). An alternative explanation for the moderate association between husbands' and wives' reports of martial quality is posited by emotional contagion theory, which asserts that spouses' emotional experiences—in this case, perceived marital quality—may induce those same emotions in close social partners, such as spouses (Hatfield, Cacioppo, and Rapson 1994).

Debate concerning husbands' and wives' distinct appraisals of their marriages is not merely academic. Marital quality is an important influence on individuals' health and well-being (Proulx, Helms, and Buehler 2007). Perceived marital quality impacts adults' psychological and physical health, including experiences of anxiety, loneliness, life satisfaction, self-rated health, and heart disease (Carr et al. 2014; Carr and Springer 2010; de Vogli, Chandola, and Marmot 2007; Stokes forthcoming-b, forthcoming-c; Umberson and Williams 2005). Additionally, marriage and marital quality are particularly important in later life, as older adults focus more of their time and energy on their closest and most emotionally rewarding relationships (Carstensen, Isaacowitz, and Charles 1999; Mancini and Bonanno 2006; Umberson, Williams, Powers, Liu, and Needham 2006). Thus, even if the effects of marital quality on health and well-being are comparable for men and

women, husbands may reap greater benefits from their marriages than their wives do because of their rosier perceptions of marital quality (Proulx et al. 2007; Umberson and Williams 2005). Uncovering associations between husbands' and wives' appraisals of marital quality over time may therefore be of importance for both theory and practice concerning older adults' marital, physical, and psychological well-being. In this study, I analyze two-wave dyadic data from 209 older married couples in the United States in order to determine whether husbands' and wives' reports of marital quality at baseline predict both spouses' marital quality four years later.

Theoretical Framework

Emotional contagion theory, also called the induction hypothesis, approaches individuals' emotions not as personal experiences, but as interpersonal experiences (Cacioppo, Fowler, and Christakis 2009; Hatfield et al. 1994). Emotional and psychological well-being do not exist in isolation, but rather within a network of social connections and relationships (e.g., Christakis and Fowler 2013; Fowler and Christakis 2008). Emotional experiences impact the ways in which individuals present and comport themselves, how they behave, and how they treat and interact with others (Cacioppo et al. 2009; Hatfield et al. 1994). These manifestations of one's emotions may be either conscious or unconscious, and can signal, communicate, and even induce those emotional experiences in social partners (Ayalon, Shiovitz-Ezra, and Palgi 2013; Cacioppo et al. 2009; Hatfield et al. 1994).

Empirical evidence has demonstrated that emotional experiences spread throughout social networks (e.g., Christakis and Fowler 2013). For instance, happiness, loneliness, and depression are all "contagious" up to three degrees of social separation

(Cacioppo et al. 2009; Fowler and Christakis 2008; Rosenquist, Fowler, and Christakis 2011). Having happy, lonely, or depressed social partners results in experiencing greater happiness, loneliness, and depression in the future. Further, the induction of these emotional experiences appears dependent in part upon face-to-face interactions (Christakis and Fowler 2013).

Recent research has also examined emotional contagion within the marital dyad specifically. For instance, spouses' anxiety symptoms and loneliness are both mutually influential cross-sectionally, while loneliness is also contagious among spouses over time (Ayalon et al. 2013; Stokes forthcoming-b, forthcoming-c). Additionally, wives' depressive symptoms impact their husbands' future depressive symptoms (Thomeer, Umberson, and Pudrovska 2013). Particularly in later life, husbands' and wives' thoughts, feelings, and perceptions do not occur in a vacuum, but are relational and interpersonal experiences. Likewise, spouses' appraisals of marital quality may also be "contagious". This study makes use of two-wave longitudinal data in order to assess whether husbands' and wives' reports of marital quality at baseline are related with their own and their partner's marital quality after four years.

Gender

Beyond differences in husbands' and wives' reported levels of marital quality (e.g., Boerner et al. 2014; Jackson et al. 2014; Umberson and Williams 2005), there is some evidence that the induction of emotions both throughout social networks and within marriages may differ for men and women. For instance, Cacioppo and colleagues (2009) found that women were stronger vectors of loneliness in social networks: Women were more susceptible to the loneliness of their friends and neighbors, yet also more likely to

spread their own loneliness to other people. Additionally, Rosenquist and colleagues (2011) found that women were more likely to spread their own depression to others, though there were no differences between men and women concerning their susceptibility to social partners' depression. In contrast, however, Fowler and Christakis (2008) found no gender differences concerning the spread of happiness throughout social networks.

As concerns marital dyads in particular, the evidence is also mixed. Thomeer and colleagues (2013) found that wives' depressive symptoms predicted their husbands' future depressive symptoms, but found no reciprocal influence of husbands' depressive symptoms on wives' future depressive symptoms. In contrast, a number of studies examining the induction of anxiety symptoms and loneliness between spouses have found no gender differences in effects (Ayalon et al. 2013; Stokes forthcoming-a, forthcoming-b, forthcoming-c). The current study examines not only whether husbands' and wives' levels of perceived marital quality differ, but also whether the contagion of perceived marital quality differs according to gender.

Study Aims

The purpose of the present study is to determine whether older husbands' and wives' appraisals of marital quality are "contagious". I address this question using longitudinal dyadic data from 209 married older couples in the United States who participated in the 2009 and 2013 waves of the Disability and Use of Time (DUST) supplement to the Panel Study of Income Dynamics (PSID). Lagged analysis of two-wave dyadic data tests expectations of emotional contagion theory by examining the associations between husbands' and wives' reports of marital quality over four years. Implications for theory, practice, and future research are discussed.

METHODS

Data and Sample.

Data for this study came from the first two waves of The Disability and Use of Time (DUST) supplement to the Panel Study of Income Dynamics (PSID), administered in 2009 and 2013. The larger PSID sample from which the DUST sample was drawn is nationally representative. The PSID began in 1968 with a sample of over 18,000 persons from 5,000 families in the United States, and ensuing waves collected data from those individuals and their descendants (Panel Study of Income Dynamics 2015). In 2009, the DUST sample was restricted to married couples from the PSID sample wherein at least one spouse was 60 or older, and both spouses were at least 50 years old (Freedman and Cornman 2012). Sample restrictions were changed for 2013 (Freedman and Cornman 2014), but the longitudinal sample of couples who participated in both waves of DUST is necessarily limited to those who were eligible and participated in both 2009 and 2013.

In 2009, 543 of 832 eligible couples were sampled (Freedman and Cornman 2012). Of these, 394 couples (73%) had at least one spouse participate, and 361 (66%) gathered data from both spouses (see, e.g., Carr et al. 2014). A total of 209 couples (58% of those from the 2009 wave) had *both* spouses participate at *both* waves of DUST. These 209 older married couples comprised the analytic sample for this study.

A total of 263 (72.85%) of the 361 husbands from the wave 1 dyadic sample responded again at wave 2, while 227 (62.88%) of the 361 wives from the wave 1 dyadic sample also responded at wave 2. In 80 (22.16%) of 361 couples from the wave 1 dyadic sample, both spouses dropped out between waves. Wives who dropped out between 2009 and 2013 were older (68.23 vs. 64.95 years, p < .001) than those who participated at both

waves. Husbands who dropped out between 2009 and 2013 were more likely to be nonwhite (25.51% vs. 13.31%, p < .01) than husbands who participated at both waves. There were no other differences found between spouses who dropped out between 2009 and 2013 compared with spouses who participated at both waves, nor were there any couple-level correlates of attrition. However, marital histories were reported as of 2013 and therefore could not be examined as potential correlates of attrition. Baseline marital quality was not significantly related with attrition for husbands or wives.

Measures

Outcome.

Marital quality in 2013. Marital quality was measured in DUST using a six-item, two-dimensional (support & strain) scale (Walen and Lachman 2000). Cronbach's alpha = 0.80. Factor analysis confirmed that all 6 items loaded onto a single factor (e.g., Carr et al. 2014). Sample items include "How often does your spouse argue with you?" and "How much does your spouse understand you?", with response categories ranging from 1 (*not at all*) to 4 (*a lot*) (Panel Study of Income Dynamics 2015). Negative items were reverse-coded. Marital quality was generated as a mean-score scale with higher values indicating better relationship quality. The scale was set to missing if an individual failed to answer more than half of the scale items. Husbands and wives reported their marital quality independently of one another.

Predictors.

Marital quality in 2009. Marital quality at baseline was measured using the same six-item scale (Walen and Lachman 2000). Cronbach's alpha = 0.82. Factor analysis confirmed that the six marital quality items loaded onto a single factor at baseline, as
well. Negative items were reverse-coded, and marital quality at baseline was generated as a mean-score scale with higher values indicating better relationship quality. The scale was set to missing if an individual failed to answer more than half of the scale items. Husbands and wives reported their baseline marital quality independently of one another. Baseline marital quality was mean-centered for both husbands and wives.

Control variables. A number of potential confounds related with husbands' and wives' marital quality were considered. I tested controls for individuals' age, race, education, self-rated health, health satisfaction, life satisfaction, disability status, employment status, and whether current marriage was a first or a remarriage, as well as for couple-level marital duration, wealth, and income. First, *individual age* at baseline was measured as a continuous variable, and ranged from 51 to 86 years. Husbands' and wives' primary racial identification was measured using a dichotomous indicator for Nonwhite. Spouses' education was measured using dichotomous indicators for less than high school, high school degree (reference), college degree, and education beyond college. Self-rated health was measured using a scale ranging from 1 (Poor) to 5 (*Excellent*). *Health satisfaction* and *life satisfaction* were both measured using a scale ranging from 1 (Not at all satisfied) to 7 (Very satisfied). Disability status was measured using a dichotomous indictor of whether an individual reported suffering from any of the following: difficulty hearing; difficulty seeing; difficulty concentrating, remembering, or deciding; difficulty walking and climbing; difficulty dressing and bathing; or difficulty running errands alone. *Employment status* was measured using a dichotomous indicator for *currently employed*. Whether a marriage was a first or a higher order marriage was measured using a dichotomous indicator for first marriage. Couple-level marital duration

was measured in years. There were 12 couples where husbands and wives reported different marital durations, with the difference always equaling 1 (e.g., a husband reported 37 years of marriage, the wife 38 years of marriage). In these cases, spouses' reports were averaged (e.g., 37.5 years of marriage). Couple-level *wealth* was measured as total household wealth, including equity, in U.S. dollars. Wealth was recoded into quartiles for analysis in order to address significant positive skew. Couple-level *income* was measured as total family income, in U.S. dollars. Income was recoded into quartiles for analysis in order to address significant positive skew. All control variables were measured at baseline, in keeping with the lagged modeling framework, and were treated as observed variables.

Analytic Strategy.

Two-wave lagged dependent variable (LDV) structural equation models (SEM) were estimated according to the actor-partner interdependence model (APIM; Kenny and Cook 1999) framework. In LDV modeling, the outcome at wave 2 is regressed on predictors measured at wave 1, including the baseline level of the outcome itself. In this case, husbands' and wives' reports of marital quality in 2013 were regressed on baseline (i.e., 2009) reports of marital quality. All control measures listed were examined jointly, but their inclusion did not impact any significant associations. Therefore, all control measures were excluded for parsimony. In accordance with the APIM framework, husbands' and wives' reports of baseline marital quality were used to predict *both* spouses' reports of marital quality at 2013. That is, APIM models tested both lagged actor and lagged partner effects (Kenny and Cook 1999).

Structural equation modeling (SEM) was used in order to test model constraints for improved model fit. Unconstrained SEM models are equivalent to seemingly unrelated regression models (e.g., Carr, Cornman, and Freedman 2016; Carr et al. 2014). Model constraints were examined to assess gender differences by constraining husbands' and wives' coefficients to equality. Analysis began with an unconstrained APIM model. Constraints were then tested first for the equivalence of lagged actor effects, and secondly for the equivalence of lagged partner effects. Comparative model fit was assessed using the Bayesian Information Criterion (BIC; Raftery 1995). The best-fitting model constrained lagged actor and partner effects to equivalence for husbands and wives. Constraints were also tested for the equivalence of lagged actor and partner effects, but resulted in worse model fit and were therefore rejected.

Missing data were not a major issue in these data. In 203 (97%) of 209 couples, husbands and wives had complete data on all six marital quality items at both waves. There was no missingness on the mean-score scales at either timepoint for husbands or wives. Concerning control measures, 94% of husbands and 96% of wives provided complete data, with 93% of couples having complete data for both husbands and wives on all measures. The greatest amount of missingness was on total household wealth, with 3% of couples lacking valid data. Missing data were addressed using maximum likelihood with missing values (MLMV). Listwise analyses that included all control measures were also examined and garnered the same significant results. Since all control measures were excluded for parsimony, there were no cases missing data on the measures of interest in the final analysis. *Robustness checks*. A number of supplemental analyses were also conducted, and are available from the author upon request. First, in addition to LDV modeling, I examined change-score models (Johnson 2005), with similar substantive results. There was some minor evidence of regression to the mean in husbands' and wives' reports of marital quality, so LDV models were preferred (Allison 1990). Second, I modeled support and strain dimensions of marital quality separately. Substantive results were similar to those using the one-dimensional marital quality scale; therefore, the single sixitem marital quality scale was retained. Third, a measurement model using confirmatory factor analysis estimated husbands' and wives' reports of marital quality as latent variables. Significant results were unchanged; therefore, the mean-score scales were used. A measurement model was also estimated to examine marital support and marital strain as separate latent constructs, and significant results were again unchanged compared with mean-score scales.

RESULTS

Descriptive Statistics.

Descriptive statistics for the items of interest are reported in Table 1. Overall, husbands and wives both reported relatively high marital quality in 2009 and 2013, with mean-score scales averaging between 2.99 and 3.30 on the 4-point scale. Husbands' and wives' reports of marital quality were moderately positively correlated at both timepoints (r ranged from 0.16 to 0.52, p < .05 for all items). Husbands reported better marital quality on four of six items in 2009, on four of six items in 2013, and on the mean-score scales in both 2009 and 2013, in keeping with prior literature (e.g., Carr et al. 2014; Stokes forthcoming-c; Umberson and Williams 2005). Marital quality also dropped

significantly from 2009 to 2013 for both husbands and wives (p < .001 for husbands, p < .01 for wives; not reported in Table 1) (see Bookwala 2012; Umberson, Williams, Powers, Chen, and Campbell 2005). These changes were not significantly different from one another, suggesting that the declines in marital quality from 2009 to 2013 were similar for husbands and wives. Descriptive statistics for all control measures examined are reported in Table 2.

[Table 1 about here]

[Table 2 about here]

Analytic Results.

Table 3 presents the results of the final analytic model concerning the associations between husbands' and wives' reports of marital quality in 2009 and 2013. The model was estimated according to the APIM framework, with husbands' and wives' baseline reports of marital quality used to predict *both* spouses' marital quality four years later. All coefficients were constrained to equality for husbands and wives.

Husbands' and wives' own reports of marital quality at baseline were significantly positively related with marital quality after four years (B = 0.67, p < .001), indicating stability in marital quality over time. That is, greater marital quality in 2009 was related with greater marital quality in 2013.

Husbands' and wives' reports of marital quality at baseline were also significantly positively related with their partners' marital quality after four years (B = 0.16, p < .001). This significant lagged partner effect indicates that greater marital quality in 2009 was related with greater marital quality for one's spouse in 2013. The results of the final analytic model are illustrated in Figure 1.

[Table 3 about here] [Figure 1 about here]

DISCUSSION

The present study examined the associations between husbands' and wives' reports of marital quality over four years. The study followed 418 older husbands and wives from 209 married couples from the 2009 to the 2013 wave of DUST, a supplement to the PSID. The key findings were that (a) in both 2009 and 2013, husbands' and wives' reports of marital quality were significantly moderately correlated, with husbands consistently reporting better marital quality, (b) for both husbands and wives, baseline marital quality was significantly related with both one's own *and* one's partner's marital quality four years later, and (c) there were no differences in effects according to gender. I discuss the implications of these findings for theory, practice, and future research concerning marital quality in later life.

"His" and "Her" Marriage

Although husbands and wives are partners in marriage, they may perceive, experience, and evaluate aspects of their marriages differently from one another (Bernard 1972; Boerner et al. 2014; Umberson and Williams 2005). While a recent meta-analysis suggested that differences between husbands' and wives' appraisals of marital quality may be overstated (Jackson et al. 2014), the present study found significant differences in husbands' and wives' reports of marital quality in both 2009 and 2013, with husbands reporting superior marital quality than their wives. This is in keeping with recent dyadic research concerning older married couples (e.g., Carr et al. 2014, 2016; Stokes forthcoming-a, forthcoming-c). It is possible that the persistence of this gender difference

is due to the age and cohort(s) of participants, as gender roles within marriage have shifted substantially in recent decades (Amato et al. 2003; Rogers and Amato 2000). Future research and meta-analysis should examine potential differences in discrepancies between husbands' and wives' reports of marital quality among cohorts of younger, midlife, and older married couples.

Emotional Contagion

According to emotional contagion theory, individuals' psychological and emotional experiences may spread to social partners and throughout social networks, even up to three degrees of separation (Christakis and Fowler 2013; Hatfield et al. 1994). The manners in which individuals present themselves, communicate, and interact with others may be impacted by the emotions they experience, and can result in both signaling and spreading those emotions to others (Cacioppo et al. 2009; Hatfield et al. 1994). Prior research has shown that emotions such as happiness, loneliness, and depression spread through social networks (Cacioppo et al. 2009; Fowler and Christakis 2008; Rosenquist et al. 2011), while loneliness, depression, and anxiety are "contagious" within marriage (Ayalon et al. 2013; Stokes forthcoming-b, forthcoming-c; Thomeer et al. 2013). The current study found that spouses' perceptions of marital quality were also subject to contagion: Both spouses' reports of marital quality at baseline predicted marital quality after four years. In other words, even after accounting for one's own baseline reports of marital quality, a partner's reports of marital quality at baseline were related with one's own marital quality in the future. Having a more satisfied spouse in 2009 resulted in feeling more satisfied with one's marriage in 2013.

The results of the present study indicate that the significant moderate correlations between husbands' and wives' reports of marital quality in 2009 and 2013 are not fully explained by spouses' shared circumstances nor by homogamy, as these explanations are accounted for in the current analysis by the lagged dependent variable itself (i.e., one's own reports of marital quality at baseline). Rather, this study suggests that perceptions of marital quality are "contagious," with one spouse's thoughts and feelings concerning his/her marriage influencing his/her spouse's opinions in the future. This additive influence supports the theory of emotional contagion, and suggests that future research be attentive to the reciprocal influences that husbands and wives exert on one another's assessments of their own marriages. It is worth noting, however, that the lagged partner effect was significantly weaker than the lagged actor effect for both husbands and wives $(\chi^2 = 96.46, p < .001)$, implying limits to the strength of contagion regarding husbands' and wives' marital quality. The present findings have implications for practice, as well. Given the importance of marital quality for adults' well-being, the influence that husbands and wives exerted on one another's marital quality over time suggests the importance of couple therapy rather than individual therapy for addressing issues concerning marital quality and mental health (e.g., Beach, Fincham, and Katz 1998; Snyder, Castellani, and Whisman 2006; Stokes forthcoming-b).

Gender

Marriage is a gendered relationship, and husbands and wives hold differing statuses, roles, and expectations within marriage (e.g., Rogers and Amato 2000). In keeping with theory and much prior research on "his" and "her" marriages, this study found that husbands reported better marital quality than their wives on four of six individual items and on mean-score scales in both 2009 and 2013 (Bernard 1972; Boerner et al 2014; Carr et al. 2014). This suggests that—at least among older adults—marriage very much remains better for "him" than for "her".

Additionally, while there is some evidence that marital quality is a stronger influence on well-being for women than for men (Proulx et al. 2007), this too may differ for older and younger couples. As adults enter later life they often reduce external social ties, shed gendered family roles, and make their most emotionally meaningful and rewarding relationships their central focus (Bookwala 2012; Carr et al. 2014; Carstensen et al. 1999). In keeping with much prior research concerning emotional contagion among older married couples (e.g., Ayalon et al. 2013; Stokes forthcoming-a, forthcoming-b, forthcoming-c), no gender differences in effects were found.

The implications of these results are twofold: First, husbands may reap greater rewards from their marriages than wives do because of their more optimistic assessments of marital quality (Umberson and Williams 2005). Second, although husbands' and wives' appraisals of marital quality were mutually influential over time, the comparatively weak partner effect failed to appreciably reduce the gap between husbands' and wives' perceptions of marital quality over four years. That is, even though spouses' reports of marital quality in 2009 influenced their partners' reports of marital quality in 2013, husbands' sunnier appraisals at baseline did not result in their wives experiencing notably greater increases—or smaller declines—in marital quality than their husbands four years later. Not only were husbands' perceptions of marital quality significantly better than their wives' in both 2009 and 2013, but *changes* in perceived marital quality from 2009 to 2013 were not significantly different for husbands and wives. Thus, despite significant contagion of spouses' appraisals of marital quality over time, "his" and "her" marriages did not meaningfully converge to equality.

Limitations

This study retains a number of limitations worth mentioning. First, there was a four year lag between the first and second waves of DUST. PSID data are collected every two years, but DUST was administered only in 2009 and 2013. This not only results in a relatively long timespan for assessing lagged effects, but also heightens attrition. Although marital quality was not related with attrition for either husbands or wives, a substantial proportion of couples who participated in DUST at the 2009 wave did not provide dyadic data in 2013. Future research should examine dyadic data from longitudinal samples with briefer time lags and, as a result, less attrition (e.g., Stokes forthcoming-c).

Second, while this study identified significant lagged partner effects for both husbands and wives, the data analyzed lack information necessary to determine the mechanism for these effects. For instance, while this study posits that partners' appraisals of marital quality are mutually influential via emotional contagion (i.e., a satisfied spouse exudes and thereby induces satisfaction in a partner), it is also possible that spouses who felt supported, appreciated, and understood by their partners also became more supportive, appreciative, and understanding of their partners over time (i.e., a satisfied spouse becomes a better spouse because of that satisfaction), causing their partners' appraisals of marital quality to improve after four years. Future research should use both quantitative and qualitative data sources to identify mechanisms underlying the lagged partner effects identified in this study.

Lastly, there are limitations with the measures used in this study. The marital quality scale examined here was originally designed as a two-dimensional scale of support and strain, but all items loaded onto a single factor (e.g., Carr et al. 2014). Additionally, DUST data do not include information on other aspects of marital quality, such as sexual intimacy and satisfaction (e.g., Galinsky, McClintock, and Waite 2014). Therefore, I was unable to examine the differential influences of various aspects of marital quality. Future research should examine not only whether different aspects of marital quality are more or less "contagious" than others, but also whether these different aspects are influential for one another over time (e.g., Galinsky and Waite 2014). *Conclusion*

The present study analyzed two-wave dyadic data from 209 older married couples in the United States in order to determine whether husbands' and wives' reports of marital quality at baseline were related with both spouses' reports of marital quality four years later. Findings offer support for framework of "his" and "her" marriage, as well as for emotional contagion theory. The results offer empirical and theoretical contributions to the literature; underscore the importance for theorists, researchers, and practitioners to approach married older adults within the relational context of their marriages; and should spark further longitudinal dyadic research concerning older adults' marital quality and its implications for their lives and well-being.

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Table 1. Descriptive Statistics for Items of Interest, Disability and Use of Time (DUST)Supplement to the Panel Study of Income Dynamics (PSID), 2009-2013 (N = 418

husbands and wives from 209 couples)

	Total	Unabanda	Wines	Gender	Husband-wife
	Total	nusbands	wives	difference	correlation
	Mean	Mean	Mean	<i>p</i> -value	Rho (r)
	(SD)	(SD)	(SD)	-	
Marital quality (2013)	`,				
Appreciates you ^a	3.67	3.74	3.60	**	0.41***
	(0.69)	(0.60)	(0.76)		
Argues with you ^{a,b}	2.21	2.22	2.19	-	0.47***
	(0.90)	(0.89)	(0.91)		
Understands you ^a	3.26	3.49	3.03	***	0.25***
·	(0.87)	(0.72)	(0.94)		
Makes you tense ^{a,b}	2.16	2.04	2.28	**	0.22**
	(0.94)	(0.87)	(1.00)		
Open to talk ^a	3.32	3.39	3.24	-	0.18**
-	(0.92)	(0.86)	(0.97)		
Gets on nerves ^{a,b}	2.31	2.17	2.44	***	0.32***
	(0.85)	(0.82)	(0.86)		
Mean-score scale ^c	3.09	3.20	2.99	***	0.52***
	(0.61)	(0.55)	(0.66)		
Marital quality (2009)	. ,				
Appreciates you ^a	3.68	3.74	3.63	-	0.16*
	(0.64)	(0.58)	(0.70)		
Argues with you ^{a,b}	2.12	2.07	2.16	-	0.24***
с .	(0.83)	(0.85)	(0.82)		
Understands you ^a	3.34	3.52	3.16	***	0.22**
·	(0.82)	(0.75)	(0.85)		
Makes you tense ^{a,b}	1.99	1.86	2.11	***	0.24***
·	(0.91)	(0.87)	(0.93)		
Open to talk ^a	3.46	3.56	3.36	**	0.17*
	(0.83)	(0.75)	(0.90)		
Gets on nerves ^{a,b}	2.21	2.05	2.36	***	0.25***
	(0.79)	(0.76)	(0.79)		
Mean-score scale ^c	3.19	3.30	3.09	***	0.38***
	(0.58)	(0.53)	(0.61)		

(0.58) (0.53) (0.61)^a1 = Not at all; 4 = A lot. ^bRaw coding reported; reverse-coded for mean-score scale. ^c1 =

Lowest quality; 4 = *Highest quality.*

* p < .05, ** p < .01, *** p < .001

Table 2. Descriptive Statistics for Control Variables, Disability and Use of Time (DUST) Supplement to the Panel Study of Income Dynamics (PSID), 2009-2013 (N = 418

	Total	Husbands	Wives	
-	Mean (SD) or %	Mean (SD) or %	Mean (SD) or %	
Age	66.86 (7.56)	68.53 (7.49)	65.20 (7.27)	
Race:				
White	86.12%	86.12%	86.12%	
Nonwhite	13.88%	13.88%	13.88%	
Education:				
Less than HS	13.16%	13.88%	12.44%	
HS degree	50.72%	44.98%	56.46%	
College degree	23.92%	27.27%	20.57%	
Beyond college	12.20%	13.88%	10.53%	
Self-rated health ^a	3.14 (0.90)	3.25 (1.16)	3.03 (1.11)	
Health satisfaction ^b	5.28 (1.32)	5.30 (1.33)	5.28 (1.33)	
Life satisfaction ^b	6.01 (1.12)	6.05 (1.01)	5.97 (1.22)	
Disability status:				
Disabled	47.95%	51.21%	44.71%	
Not disabled	52.05%	48.79%	55.29%	
Employment status:				
Employed	38.04%	41.15%	34.93%	
Not employed	61.96%	58.85%	65.07%	
Remarriage status ^c				
First marriage	63.92%	64.88%	62.98%	
Remarriage	36.08%	35.12%	37.02%	
Marital duration ^c	35.66 (15.57)	35.66 (15.57)	35.66 (15.57)	
Wealth ^d	\$1,325,818	\$1,325,818	\$1,325,818	
	(\$7,204,121)	(\$7,204,121)	(\$7,204,121)	
Income ^d	\$86,659	\$86,659	\$86,659	
	(\$88,384)	(\$88,384)	(\$88,384)	

husbands and wives from 209 couples)

Note: All control variables measured at baseline (2009).

^a1 = *Poor*; 5 = *Excellent*. ^b1 = *Not at all satisfied*; 7 = *Very satisfied*. ^cMarital histories were reported as of 2013, but refer to the same marriages as in 2009. Marital duration is calculated in reference to 2009. ^dRaw statistics presented in U.S. dollars.

Table 3. Lagged Analysis of Husbands' and Wives' Marital Quality Over Four Years (N = 418 individuals from 209 couples)

	Husbands' Marital Quality		Wives' Marital Quality	
	in 2013		in 2013	
Predictors at baseline (2009)	В	SE	В	SE
Husbands' marital quality ^a	0.67***	0.04	0.16***	0.04
Wives' marital quality ^a	0.16***	0.04	0.67***	0.04
Model Fit				
R^2	54.0%		49.2%	
BIC ^b	1174			

^aMean-centered variable. ^bBayesian Information Criterion.

* p < .05, ** p < .01, *** p < .001



Figure 1. Lagged Analysis of Husbands' and Wives' Marital Quality, 2009-2013.

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* p < .05, ** p < .01, *** p < .001
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CHAPTER 5: DISCUSSION AND CONCLUSION

DISCUSSION

The articles comprising this dissertation project examined associations between older husbands' and wives' reports of marital quality and well-being, using multiple sources of dyadic data, different samples and measures, and various analytic strategies. The key findings from this project were that (a) perceived marital quality was related with spouses' own well-being, (b) spouses' reports of well-being and marital quality were significantly related with one another, both cross-sectionally and over time, (c) perceived marital quality was significantly indirectly related with a partner's well-being, and this was mediated by one's own well-being, and (d) all results were similar for older husbands and wives, with no clear gender differences in effects. The remaining sections situate the results of these three articles within the broader literature; discuss the implications and contributions of this research; and outline the limitations of these three studies, both individually and taken together.

Dyadic Marital Quality and Well-Being

Research has long established the benefits of marriage for adults' health and wellbeing (Carr and Springer 2010). Moreover, these benefits are largely contingent upon the quality of one's marriage: Healthy and supportive marriages are beneficial for husbands and wives, whereas negative and straining marriages can be harmful (Hawkins and Booth 2005; Proulx, Helms, and Buehler 2007). Increasingly, social science researchers have turned their attention to the ways in which *both* spouses' perceptions of marital quality may have implications for husbands' and wives' mental, emotional, and physical health.

The results of this dissertation project build off of and further contribute to this growing literature on the dyadic effects of marital quality on partners' well-being.

In particular, this dissertation project establishes dyadic partner effects concerning older husbands' and wives' generalized anxiety symptoms, loneliness, and perceived marital quality. Additionally, the three articles offer consistent support for emotional contagion as a pathway for dyadic partner effects.

The use of mutual influence modeling, or nonrecursive SEM, in the first article allowed for the detection of significant partner effects that were not found using either actor-partner interdependence modeling (APIM) or individual influence modeling. Prior research concerning anxiety symptoms and marital quality using the APIM framework (e.g., Whisman, Uebelacker, and Weinstock 2004) found no evidence of significant partner effects. Likewise, APIM modeling produced no significant direct partner effects in the first article of this dissertation project either. However, the use of mutual influence modeling to test the significance of *indirect* partner effects revealed that (a) marital strain was related with greater anxiety symptoms, (b) one's own anxiety symptoms were significantly related with a partner's anxiety symptoms, and (c) one's own anxiety symptoms significantly mediated the indirect effect of marital strain on a partner's anxiety symptoms. Moreover, mutual influence modeling provided better model fit than individual influence modeling, which tested actor effects of marital strain on anxiety symptoms and included a covariance term concerning spouses' anxiety symptoms. Thus, this article established a significant association between marital strain and a partner's generalized anxiety symptoms, an association not detected using the APIM framework (see Kenny 1996). This not only contributes empirically to the literature on marital

quality and mental health, but offers a theoretical foundation for examining indirect partner effects, even in the absence of direct partner effects. Mutual influence modeling and emotional contagion theory may serve as a useful alternative to the APIM framework concerning spouses' marital quality and well-being (e.g., Stokes forthcoming).

The second article concerning marital quality and loneliness over two years builds off of the findings from the first study. Specifically, this article finds support for the cognitive perspective on loneliness (de Jong Gierveld 1987; Perlman and Peplau 1981), which concerns the association between marital quality and loneliness. As with anxiety, marital strain was associated with greater loneliness; in this case, the association persisted over two years. Additionally, one's own loneliness was significantly associated with a partner's loneliness, again over a two year span. This offers even stronger evidence for emotional contagion, or the induction hypothesis, than the first article, because these effects remained significant across a two-year period rather than at a single timepoint (Ayalon, Shiovitz-Ezra, and Palgi 2013; Hatfield, Cacioppo, and Rapson 1994; Taris 2000). Due to the structure of the data and the analytic strategy used, this article was not able to explicitly test for mediation, or for the significance of indirect effects. However, the theoretical explanation for findings mirrors that from the first article: Marital strain is associated with experiencing greater loneliness, and loneliness is associated with one's partner experiencing greater loneliness. Thus, this study not only offers support for the theory of emotional contagion, it also offers support for emotional contagion as a pathway for dyadic partner effects.

The final article uses a similar approach to the article concerning marital quality and loneliness, examining actor and partner effects of marital quality over two waves of

data. In this case, marital quality serves as both predictor and outcome, much like loneliness served as both predictor and outcome in the second article. This study made use of a different sample, and thus included only 209 older married couples, with a time lag of four rather than two years. Despite this, results indicated significant actor and partner effects of marital quality for both husbands and wives. That is, marital quality appears to be subject to emotional contagion over time among older married spouses, much like anxiety and loneliness. Again, while mediation could not be tested in this study, the findings imply another potential link between marital quality and a partner's well-being due to emotional contagion: Marital quality is associated with a partner's marital quality, which in turn is associated with that partner's well-being (e.g., anxiety, loneliness, etc.).

In sum, the three articles that comprise this dissertation provide consistent evidence that husbands and wives are important influences on one another's well-being in later life. Moreover, they underline the importance of examining various methodological and theoretical approaches in order to uncover the ways in which spouses may impact one another, cross-sectionally and over time. Even in the absence of direct partner effects, dyadic marital quality can remain influential for both spouses' experiences of well-being. *Theoretical Implications*

One of the fundamental aims of this dissertation project was to contribute to theory-building in the area of dyadic marital quality and well-being. Empirical research has established the validity of actor and partner effects, though analytic results have been inconsistent (e.g., Carr et al. 2014; Carr, Cornman, and Freedman 2016; Choi, Yorgason, and Johnson 2016; Moorman 2016). Further, dyadic analysis has been dominated by the

APIM framework, to the detriment of other dyadic approaches (Ledermann and Kenny 2012). Social scientists have used theories such as the emotion-in-relationships model (ERM), the "reflected self", and systems theory to explain actor and partner effects (e.g., Carr et al. 2014; 2016; Choi et al. 2016; Moorman 2016). The mixed results and multitude of theoretical approaches extant in the literature underscore the need for research to focus clearly on theoretical foundations as well as mechanisms for dyadic effects.

The three articles in this dissertation propose emotional contagion as a pathway for dyadic partner effects. While emotional contagion theory has existed for decades (Hatfield et al. 1994), and continues to be important in research on social networks (e.g., Cacioppo, Fowler, and Christakis 2009; Christakis and Fowler 2013; Fowler and Christakis 2008; Rosenquist, Fowler, and Christakis 2011), it has received relatively little attention concerning marital dyads (Ayalon et al. 2013). By examining a specific theoretical approach; identifying a potential mechanism for dyadic effects; and comparing these results with alternative approaches, this dissertation makes both an empirical and a theoretical contribution to the literature on dyadic marital quality and well-being.

The first article in this dissertation, concerning marital strain and generalized anxiety symptoms, explored numerous analytic strategies using cross-sectional dyadic data in order to assess emotional contagion as a mediating pathway for dyadic partner effects. Unlike prior research using mutual influence modeling to examine married older adults' well-being (e.g., Ayalon et al. 2013), this article both (a) explicitly tested the significance of indirect partner effects, and (b) compared model fit between mutual

influence and alternative modeling strategies. This is important because it is possible for different modeling strategies to garner significant findings, even if one approach fits the data better than others (see Stokes forthcoming). Comparing various analytic strategies with one another allows researchers to better adjudicate among numerous competing theories and frameworks.

In this first article, findings offered support for emotional contagion theory, including as a pathway for dyadic partner effects of marital strain on generalized anxiety symptoms. In this way, emotional contagion theory is not necessarily incompatible with other theoretical approaches used in dyadic marital research (e.g., ERM), but may be a useful complement to those theories as a mechanism for anticipated partner effects. Importantly, mutual influence modeling provided better model fit than the individual influence and APIM models. That is, emotional contagion better fit the data than did alternative theories. Individual influence examined whether one's own marital strain influenced anxiety symptoms, with no causal associations between spouses' and their partners' marital strain and/or anxiety symptoms; actor-partner interdependence examined whether spouses' marital strain directly influenced partners' generalized anxiety symptoms, without mediation via spouses' own anxiety symptoms; and mutual influence examined whether spouses' marital strain influenced partners' generalized anxiety symptoms via spouses' own anxiety symptoms. The final mutual influence model not only garnered significant findings, but provided the best model fit. Therefore, findings offered clear support for the emotional contagion framework, even as spouses' own reports of marital strain remained more influential for their generalized anxiety symptoms than their partners' marital strain reports were. Of particular note is the fact

that mutual influence modeling identified significant indirect partner effects, even when APIM modeling found no significant direct partner effects. This underscores the importance of exploring and comparing various methodological and theoretical frameworks in order to more fully understand associations between spouses' marital quality and well-being. The lack of significant direct partner effects was in keeping with prior research on marital quality and anxiety symptoms (e.g., Whisman et al. 2004), but mutual influence modeling revealed significant indirect associations that were mediated by spouses' anxiety symptoms themselves.

The second article in this dissertation used two-wave longitudinal data to examine emotional contagion, as well as direct actor and partner effects of marital quality, concerning married older adults' loneliness. Loneliness is an especially interesting aspect of well-being for theory-building, since prior cross-sectional research has found significant dyadic results supporting both emotional contagion / mutual influence modeling *and* ERM / APIM modeling (Ayalon et al. 2013; Moorman 2016; see Stokes forthcoming). The data structure and analytic strategy used in this article allowed for a simultaneous examination of emotional contagion and direct actor and partner effects of marital quality on loneliness over a two-year span. As noted, the findings offered support for the cognitive perspective on loneliness (de Jong Gierveld 1987; Perlman and Peplau 1981) via significant actor effects of baseline marital strain on future loneliness for both husbands and wives. The findings also offered support for emotional contagion of loneliness (Hatfield et al. 1994; Ayalon et al. 2013) via significant direct partner effects of baseline loneliness on a spouse's future loneliness. The findings did not offer support

for traditional actor-partner interdependence, as there were no significant partner effects of marital quality on spouses' future loneliness.

The second article in this dissertation therefore compares two theoretical frameworks that have found support in prior literature (Ayalon et al. 2013; Moorman 2016; Stokes forthcoming). It also extends cross-sectional research to a two-wave longitudinal setting, offering stronger evidence of causality (Taris 2000). In so doing, this article contributes more than just another set of empirical results to an already inconsistent literature on dyadic marital quality and well-being (see Carr et al. 2014); rather, it builds off of prior research in a coherent way and offers useful evidence in an ongoing theoretical debate (see Stokes forthcoming). Specifically, this article suggests that emotional contagion spreads loneliness between older married adults, and may serve as the mechanism for dyadic partner effects of marital quality on loneliness (Stokes forthcoming). Whereas cross-sectional research has found support for both direct partner effects (i.e., APIM) and indirect partner effects, mediated by emotional contagion (i.e., MI), this longitudinal study offers support only for the latter framework. This contributes valuable theoretical information to the field, and underscores the importance of comparing various alternative approaches to dyadic marital research.

The third article in this dissertation project does not compare theoretical approaches, as in this case the APIM framework actually tests emotional contagion theory. However, this article does make an important theoretical contribution concerning the way researchers should think about—and, potentially, analyze—husbands' and wives' perceptions of marital quality over time. Although marital quality is typically considered as an influence on well-being—including in this dissertation project—it can

also be approached as an emotional experience, subject to emotional contagion just as generalized anxiety symptoms and loneliness are.

Results from this article offer support yet again for emotional contagion theory: Spouses' baseline reports of marital quality were significantly associated with both their own and their partners' reports of marital quality after four years. Statistical significance in this case is noteworthy given the relatively small sample size (N = 209 couples, vs. N = 1,114 and N = 932 in the first two articles of this dissertation) and the extended fouryear time lag (Freedman and Cornman 2012; 2014). However, gender differences in reported marital quality persisted at both waves. That is, despite significant evidence of emotional contagion concerning older spouses' perceptions of marital quality, these partner effects were not large enough to substantially bridge the gap between husbands' and wives' appraisals of their marriages (Bernard 1972; Boerner et al. 2014; Umberson and Williams 2005). Therefore, this article suggests the applicability of emotional contagion to spouses' appraisals of marital quality, but with the caveat that this contagion effect does not result in husbands and wives reaching an equilibrium in their reports of marital quality; gender differences in marital quality may marginally reduce over time, but appear unlikely to dissipate even over the course of multiple years.

Taken together, the articles in this dissertation make a clear and consistent contribution to theory-building in the area of dyadic marital research. Husbands and wives remain important influences for one another's well-being in later life, with the opinions, perceptions, and emotional experiences of each impacting the well-being of both. In particular, emotional contagion appears to be a useful and accurate theoretical framework for explaining many of these dyadic partner effects. Not only did each of the

three articles find support for emotional contagion, but two of the articles explicitly compared emotional contagion with alternative theories and found emotional contagion to be superior in those cases. Future dyadic research should seek to continue the process of theory-building, particularly by comparing different theoretical and methodological approaches to studying married dyads.

Gender

An additional focus of this dissertation project was on the potential for gender differences. Marriage is not necessarily an equal partnership, and husbands and wives may have different roles, expectations, and levels of satisfaction with their marriages (Carr and Springer 2010; Carr et al. 2014; Jackson et al. 2014; Umberson and Williams 2005). The implications of these gender differences are unclear. For instance, husbands may benefit more from marriage itself than wives do (Carr and Springer 2010; Gardner and Oswald 2004; Johnson et al. 2000). On the other hand, prior research indicates that marital quality may have a stronger influence on well-being for wives than for husbands (e.g., Proulx et al. 2007), although this particular gender difference may be more applicable to young and midlife married couples than to older adults, since gender roles and norms within marriage shift across the life course, and the importance of the marital relationship may become stronger and more equal for husbands and wives in later life (Carstensen, Isaacowitz, and Charles 1999; Mancini and Bonanno 2006; Umberson et al. 2006). As Umberson and Williams (2005) note, however, gender equality concerning the influence of marital quality on well-being does not necessarily imply equal outcomes for husbands and wives, particularly if gender differences in appraisals of marital quality persist in later life.

The three papers in this dissertation assess gender differences concerning associations among—and reports of—marital quality, generalized anxiety symptoms, and loneliness among older married couples. The findings of these studies indicate that (a) the influence of marital quality on older adults' anxiety symptoms and loneliness did not differ significantly according to gender, (b) the emotional contagion of anxiety symptoms and loneliness between older spouses did not differ significantly according to gender, and (c) the persistence of gender differences in marital quality results in overall differences in husbands' and wives' reports of anxiety symptoms and loneliness, despite the significance of partner effects that might be expected to reduce gender differences.

The first of these outcomes is in contrast with some prior research (Proulx et al. 2007) but supports evidence from recent dyadic research concerning older married couples (e.g., Ayalon et al. 2013; Moorman 2016; Stokes forthcoming). While marital quality may be more influential for wives than for husbands at earlier stages in the life course, changes in husbands' and wives' lives, roles, and time horizons—such as the cessation of child-rearing, transitions out of the work force, and the trimming of broader social networks in order to focus more on one's closest relationships—result in the reduction of such gender differences among older married couples (Carstensen et al. 1999; Mancini and Bonanno 2006). This not only contributes to theory regarding marriage in later life, it also highlights the distinctness of older married persons compared with their younger counterparts. Much prior dyadic research has focused on younger samples of couples (Beach et al. 2003; Proulx et al. 2007; Whisman et al. 2004; see Carr et al. 2014). The results of these three articles illustrate the importance of examining older samples of married persons, as well (e.g., Ayalon et al. 2013; Moorman 2016).

The second of these outcomes is in keeping with the limited prior research on emotional contagion within the marital dyad (Ayalon et al. 2013; Stokes forthcoming). However, prior research on emotional contagion within broader social networks has found evidence of gender differences. For example, women are more likely to discuss and spread loneliness to others, but they are also more strongly affected by others' reports of loneliness (Cacioppo et al. 2009). Yet gender differences in the contagion of loneliness in larger social networks may be due to differences in the number and types of social relationships that men and women maintain (Cacioppo et al. 2009). Women also tend to spread depression more strongly through social networks than men, though men and women show equivalent contagion of happiness in social networks (Fowler and Christakis 2008; Rosenquist et al. 2011). The results of this dissertation suggest that—at least as concerns generalized anxiety symptoms, loneliness, and marital quality husbands and wives transmit their emotional experiences to one another equally. Differences in results concerning contagion effects in social networks and in marital dyads raises empirical and theoretical questions for future researchers, including whether the gender equality of emotional contagion within married couples is driven primarily by wives' greater tendency to spread *and* receive emotions to and from others, or whether husbands and wives truly have similar tendencies when it comes to expressing emotions, at least to intimate partners (Cacioppo et al. 2009; Christakis and Fowler 2013; Fowler and Christakis 2008; Rosenquist et al. 2011).

The third outcome regarding gender reveals that the equivalence of *effects* may not result in equivalent *outcomes* for older husbands and wives (Umberson and Williams 2005). In all three articles, husbands reported significantly better marital quality than

their wives at every timepoint. In fact, the third article illustrates that despite significant emotional contagion of marital quality over time, this partner effect was not strong enough to substantially reduce gender differentials in perceived marital quality. "His" and "her" marriage remain distinct among older married couples, and "his" marriage tends to be much better than "hers" (Bernard 1972; Boerner et al. 2014; Jackson et al. 2014). The upshot of this persistent gender difference is just what one might expect (e.g., Umberson and Williams 2005): Wives reported significantly greater generalized anxiety symptoms than husbands in the cross-sectional study, and reported significantly greater loneliness than husbands at wave 2 in the longitudinal study. Figures 1 and 2 illustrate the two-wave trajectories of husbands' and wives' loneliness (from TILDA, Chapter 3) and marital quality (from DUST, Chapter 4).

Figure 1. Trajectories of Husbands' and Wives' Loneliness Over A Two-Year Span



Figure 2. Trajectories of Husbands' and Wives' Marital Quality Over A Four-Year Span



These findings are in keeping with prior research on mental health and well-being in later life (e.g., Mehta et al. 2003; Pinquart and Sörensen 2001). It also reveals the limitations of marriage as a protective factor against negative aspects of well-being in later life, particularly for women. Even as the gender roles and norms of men and women converge in later life, along with the importance of marriage in their lives, older women remain at a disadvantage concerning the benefits of marital quality due to their poorer experiences and evaluations of their marriages (Carstensen at al. 1999; Mancini and Bonanno 2006; Umberson and Williams 2005; Umberson et al. 2006). Emotional contagion may result in the sharing of emotional and mental health experiences between husbands and wives, but it does not necessarily serve to equalize the symptomology of older husbands and wives across later life.

Limitations and Future Directions

Although this dissertation makes a meaningful contribution to the empirical and theoretical literature on dyadic marital quality and well-being in later life, there are a number of limitations that require attention.

First, each of the individual articles has particular limitations. These are described within the articles themselves, but deserve some mention here as well. For instance, the first article is limited by cross-sectional data analysis, preventing a thorough examination of causality (Taris 2000). There are a number of potential confounds for cross-sectional emotional contagion effects, which are discussed in the third article. These include assortive mating and shared experiences and circumstances (e.g., Amato et al. 2003; Kenny 1996). Mutual influence illustrated better model fit than individual influence, but the evidence provided in this article is not fully conclusive and will require future replication. Future research should examine marital quality and emotional contagion influences on anxiety among different samples of married older couples, and should also seek to extend these findings using longitudinal data. The second article includes limitations in the data, as well, particularly as concerns the lack of marital quality and individual loneliness items at wave 2. This limited the range of analytic techniques available, and required the use of observed rather than latent scales for loneliness. Future research should examine whether different operationalizations of loneliness alter findings, as well as whether the results of this study hold for different samples of older married couples from different sociocultural contexts. Additionally, future waves of TILDA data will allow for multiwave longitudinal analysis of marital quality and loneliness among older married couples in Ireland. The third article had a relatively long
time lag (four years), due to the fact that DUST was administered at the 2009 and 2013 waves of PSID, but not at the 2011 wave. This also resulted in substantial attrition, as potential respondents dropped out at the 2011 as well the 2013 wave. Moreover, DUST altered its criteria for inclusion in the sample, but the longitudinal sample was necessarily constrained to those couples who were eligible at both waves (Freedman and Cornman 2012; 2014). Additional waves of DUST data will allow for multiwave longitudinal studies, as well as for longitudinal analysis of the expanded 2013 sample.

Beyond the limitations of each individual article, there are limitations to the overarching dissertation project, as well. The first concerns one of the primary aims and strengths of this dissertation: The clear and consistent evidence supporting emotional contagion theory as an explanation and pathway for dyadic partner effects among older married adults. This is a limitation as well as a strength because the applicability of emotional contagion theory to prior dyadic research is unclear (e.g., Carr et al. 2014; 2016; Choi et al. 2016). First, without replicating prior findings and explicitly comparing them with models that test emotional contagion (e.g., Stokes forthcoming), it is difficult to know whether and when emotional contagion may play a role in spouses' interdependence. Moreover, emotional contagion *does not* explain instances of significant direct partner effects of marital quality on well-being, unmediated by spouses' own wellbeing (e.g., Carr et al. 2014; 2016; Choi et al. 2016). Thus, although the three articles in this dissertation are consistent with one another and offer evidence in support of emotional contagion theory, the contribution of this dissertation to theory-building in the broader literature on dyadic marital quality and well-being is limited by the very inconsistencies in findings that have made coherent theory-building difficult. In other

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words, while this dissertation offers support for emotional contagion concerning older spouses' anxiety, loneliness, and marital quality, it cannot address questions of when or why emotional contagion *does not* apply, while direct partner effects may.

A related limitation concerns the outcomes of these three articles. Emotional contagion explains associations among older married spouses' reports of marital quality, generalized anxiety symptoms, and loneliness, but it is unclear whether and to what extent outcomes such as anxiety and loneliness are representative of other aspects of mental health and emotional well-being. For instance, anxiety and depression are closely linked and often overlap (Beekman et al. 2000; Mehta et al. 2003). However, prior research suggests that the emotional contagion of depressive symptoms may be gendered in a way that the contagion of anxiety symptoms was not (Thomeer, Umberson, and Pudrovska 2013). Additionally, prior research has found evidence of direct associations between spouses' marital quality and their partners' depressive symptoms (i.e., direct partner effects), with no such significant direct partner effects concerning anxiety symptoms (Whisman et al. 2004). Thus, while this dissertation establishes emotional contagion as an important factor in spousal interdependence regarding *certain* aspects of mental health and emotional well-being, its applicability to other aspects of well-being remains uncertain. This includes potential differences in associations regarding positive rather than negative aspects of well-being (see Carr et al. 2014; 2016). Future research is required that examines emotional contagion concerning a wider variety of mental and emotional health outcomes, and which explicitly compares alternative theoretical and methodological frameworks in order to determine which approach best describes associations among older husbands' and wives' reports of marital quality and well-being.

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Another remaining question for future research is the extent to which emotional contagion can overlap with different aspects of well-being. For instance, given that anxiety and loneliness are both related with depression (Beekman et al. 2000; Cacioppo et al. 2006; Mehta et al. 2003), is it possible for loneliness in one spouse to influence depression in a partner? Or for anxiety in one spouse to influence loneliness in the other? This dissertation has established the domain-specific importance of emotional contagion for older spouses' well-being, but does not address more complex questions concerning possible "spillover" of emotional contagion effects. Relatedly, future research is needed to determine the practical and translational applications of this dissertation research, such as the use of marital rather than individual therapy for improving mental health in older age (Beach et al. 1998; Snyder et al. 2006).

Finally, there are limitations with the data and samples analyzed in these three articles. For instance, both TILDA and DUST lack sufficient numbers of non-white respondents to examine potential differences in findings according to older adults' race or ethnicity. Additionally, the use of older samples is a crucial development in the literature, as the importance and the experience of marriage can change over the life course (Carstensen at al. 1999; Mancini and Bonanno 2006; Umberson et al. 2006). However, the lack of longitudinal data concerning marriage and well-being across the life course prevents an investigation of whether these are truly *age* differences or are instead cohort effects. Long-term longitudinal data on marriage and well-being would also allow for an examination of whether emotional contagion can be a precursor to marital dissolution (e.g., Wade and Pevalin 2004). Given recent developments in marital trends, gender norms, and gendered expectations within marriage, differences in husbands' and wives'

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appraisals of marital quality in later life may also dissipate as newer cohorts of married adults attain older age (Amato et al. 2003). The growing diversity of older adults, including the diversity of marital patterns—including later life remarriage, unmarried cohabitation and long-term monogamous dating, as well as same-sex marriage—raises a rich set of questions that were not able to be addressed in this dissertation project, or using these sources of data (see Brown et al. forthcoming; Brown and Wright 2016; Manning and Brown 2015).

Conclusion

Despite its limitations, this dissertation project—and its three constituent articles—makes a clear, coherent, and important contribution to the literature on dyadic marital quality and well-being among older adults. First, these articles indicate that anxiety, loneliness, and marital quality are *relational* experiences, and are subject to influence on the part of one's spouse in later life. This underscores the importance of using dyadic data to analyze married persons, as spouses remain interdependent across the life course (Kenny 1996; Kenny and Cook 1999). Second, these articles highlight the role of emotional contagion as a pathway for dyadic partner effects of marital quality on spousal well-being. The consistent support provided for emotional contagion theory in these three articles makes clear its value for future research concerning married dyads, in later life as well as at younger ages. Although findings in the dyadic literature remain mixed (e.g., Ayalon et al. 2013; Carr et al. 2014; 2016; Choi et al. 2016; Moorman 2016), emotional contagion may play an important role in theory-building regarding spousal interdependence. Third, these articles directly assessed potential gender differences in the influence(s) of both marital quality and emotional contagion on spousal well-being (e.g.,

Cacioppo et al. 2009; Carr et al. 2014; Proulx et al. 2007), and found no evidence of gender differences in effects among the older married couples studied. However, the equivalence of effects in these studies does not imply gender equity in outcomes: Husbands' and wives' divergent appraisals of marital quality resulted in persistent gender differences in mental and emotional health, with "his" marriage—and "his" well-being—proving better than "hers" (Bernard 1972; Umberson and Williams 2005). In sum, this dissertation addresses important questions in the field concerning marital quality and well-being in later life. In answering these questions, it makes substantial contributions to empirical and theoretical knowledge, yet also raises new and interesting questions for future research. REFERENCES

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