Emotional Well-being and Interactions with Older Adults’ Close Social Partners: Daily Variation in Social Context Matters

Shannon T. Mejía and Karen Hooker

Oregon State University

Author Note:
Shannon T. Mejía, School of Social and Behavioral Health Sciences, Oregon State University, Corvallis, OR 97330, USA; Karen Hooker, School of Social and Behavioral Health Sciences, Oregon State University, Corvallis, OR 97330, USA.

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Correspondence concerning this article should be directed to Shannon T. Mejía, Institute for Social Research, University of Michigan, 426 Thompson Street, Ann Arbor, MI 48104. Email: stmejia@umich.edu.
Abstract

Close social partners may contribute to or detract from older adults’ health and well-being, in part because daily emotions are closely coupled to the quality of daily social interactions. This study examines variation in this sensitivity to interactions with social partners across the contexts of emotional closeness, interactions with others, and experienced relationship satisfaction across the study period. Using data from the 100-day web-based Personal Understanding of Life and Social Experiences (PULSE) study, we examine the unique contribution of older adults’ closest and other social partners to daily experiences of positive and negative affect, and consider transitory state-like aspects of sensitivity that vary within individuals across the context of social interactions on that day. Participants in this microlongitudinal study ($N = 99, M_{\text{age}} = 62.3$) identified their five closest social partners and then reported daily contact satisfaction with those partners as well as positive and negative affect. Multivariate multilevel analysis showed sensitivity of positive and negative affect to the quality of social interactions to vary across participant-defined hierarchies of closeness. Sensitivity to interactions with the closest partner also varied within individuals depending on the quality of interactions with others on that day, and also across individual differences in the level of experienced relationship satisfaction during the study period. Together, the findings suggest that emotional responses to social interactions vary according to the context of daily social experiences, as well as accumulated social experiences over time.

Key words: positive affect, negative affect, social regulatory processes, within-person processes, close social partners, microlongitudinal

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To what extent is daily emotional experience dependent on social experiences within the day? There is a rich and long-standing literature on the importance of social relationships for well-being, and the social domain may be more important for well-being later in life (Carstensen, Isaacowitz, & Charles, 1999; Rook, Mavandadi, Sorkin, & Zettel, 2007). Research on differences in the quality of older adults’ social relationships shows unequivocally that social relationships are tied to mental and physical health, and even length of life (Antonucci, Birditt, & Webster, 2010; House, Robbins, & Metzner, 1982; Uchino et al., 2012). This study was designed to examine short-term daily processes that – over weeks, months, and years – could link social relationships to differences in health and well-being. On the most basic level, we examine whether the quality of daily interactions with older adults’ five closest social partners is associated with affective experience on that day. Previous research suggests that days with satisfying interactions are coupled with higher positive affect and lower negative affect (see Bolger, Stadler, Paprocki, & DeLongis, 2010). Based on a growing literature on intraindividual variability (see Diehl, Hooker, & Sliwinski, 2015), we expect the coupling of daily interactions and emotional experiences to vary not only across, but also within individuals.

As discussed by Brose, Scheibe, and Schmiedek (2013), in addition to accumulated life experiences, day-to-day variation in life contexts are also instrumental for understanding emotional functioning. An important context to consider in understanding emotional variability and its coupling with daily social experiences is the dynamic social context of whom one interacts with on that day. For example, imagine a woman coming home to a husband who is vexing about his stressful experiences on that day. The context of her day may differentiate her emotional response. If she were returning from a satisfying time with her close friends, her
positive emotions may remain elevated and independent of his current state. Contrast this with a day when the same woman argued with a close friend that day. Now that same complaint from her husband may feel very different to the woman, and her negative emotions may become amplified in conjunction with her husband’s negative tone. It is in this sense that positive and negative affect and its coupling with social partners may wax and wane based on the social context of that day.

In this study we extend research on relationship processes in older adulthood by focusing on the interplay of older adults’ daily emotional experiences with the ebb and flow in the quality of interactions with close social partners across a 100-day time period. We employ the term sensitivity, a measure of responsiveness to the environment, to describe the coupling of emotions and daily social experiences. This agnostic term is intended to parallel the terms reactivity to interpersonal stressors (Bolger & Schilling, 1991), or responsivity to social support (Zautra, Affleck, Tennen, Reich, & Davis, 2005). Higher sensitivity would suggest a tighter coupling, whereas lower sensitivity would suggest a looser coupling of emotional experiences with the quality of social interactions on that day. In the present study, we focus not on the trait-like, but rather the more transitory state-like elements of sensitivity to daily social experiences. We conceptualize sensitivity as something that may vary from day-to-day within individuals to facilitate a broad repertoire of responses to experiences in the daily environment (Kashdan, 2010; Zautra et al., 2005). We therefore examine variation in sensitivity of positive and negative affect to the quality of interactions with older adults’ five closest social partners across the intraindividual contexts of emotional closeness and interactions with others, as well as across interindividual differences in general experiences of satisfaction.
Emotional Well-being in the Context of Close Social Ties

Emotional responses to social experiences connect individuals physiologically to their social worlds (Uchino, 2006), which has inspired a growing interest in the context in which interactions occur. Sensitivity to social interactions on a given day have been found to differ across relationship types (Birditt & Fingerman, 2005; Chui, Hoppmann, Gerstorf, Walker, & Luszcz, 2014), type of support (Stephens et al., 2013), response strategies (Charles, Piazza, Luong, & Ameida, David, 2009) and internal perceptions of control and coping effectiveness (Berg et al., 2008; Berg, Wiebe, & Butner, 2011; Diehl & Hay, 2010). Together, these findings suggest that responses are specific to the internal and external contexts of individuals’ lives. It’s also apparent that the magnitude of response may be either beneficial, by demonstrating a range of potential context-appropriate responses (Kashdan, 2010; Zautra et al., 2005), or harmful by representing dysregulated over responsiveness to the environment (Mroczek et al., 2013; Ong et al., 2013). In this study, we consider the context of interactions with older adults’ five closest social partners—individuals who together comprise a proximal social context that was, in part, constructed over time in an effort to meet social goals and personal needs (Carstensen et al., 1999; Lang, 2001).

The Social Convoy as the Outcome and Context of Social Experiences

The social convoy model, which describes stability and change in individuals’ close social relationships over time, guides our study of the variation in older adults’ responses to experiences with their close social partners (Antonucci, 2001; Kahn & Antonucci, 1980). The model proposes that a convoy of supportive relationships develops with individuals over time to meet changing needs, roles, and responsibilities. Social convoys in older adulthood reflect extended histories of selection and compensation for loss (Carstensen et al., 1999; Lang, 2001),
and therefore consist of not only expected relationship types such as spouse, adult children, and grandchildren, but also reflect idiosyncratic patterns of emotional closeness (Antonucci, Akiyama, & Takahashi, 2004; Hoppmann & Gerstorf, 2009). Specific convoy characteristics relevant to the present study include: a) its organization by emotional closeness, b) the concurrence of social interactions among social partners, and c) the contribution of accumulated social interactions to the context in which relationships are experienced.

**Intraindividual Context of Emotional Closeness**

In older adulthood, emotional closeness is one of the most salient features of relationships (Antonucci, 2001; Carstensen et al., 1999). From the perspective of the social convoy, closeness is defined with a language of interdependence, where individuals identify and support those with whom they could not live without (Kahn & Antonucci, 1980). Closeness is therefore individually defined, and carefully nurtured and maintained through processes of selection and investments of time and effort (Lang, Wagner, & Neyer, 2009; Lang, Wagner, Wrzus, & Neyer, 2013). Daily emotional experiences are known to be deeply connected to interactions with the closest social partner (Carstensen, Gottman, & Levenson, 1995; Hoppmann & Gerstorf, 2009), which translate into, for better or worse, interdependent trajectories of emotional well-being (Walker, Luszcz, Gerstorf, & Hoppmann, 2011).

Although a sound body of evidence shows individuals to be deeply connected to the closest social partner, less is known about how this sensitivity to interactions with close social partners varies within individuals across individually-defined hierarchies of closeness. Evidence suggests that sensitivity varies across relationship types (Birditt & Fingerman, 2005; Chui et al., 2014). Variation in sensitivity across emotional closeness—arguably more malleable and also more salient in older adulthood than relationship types—has, to our knowledge, not been examined.
Daily Experiences as an Ecology of Interactions

A second perspective on context presented in this study is the intraindividual context of with whom one interacts with on a given day. From the perspective of the convoy, daily social experiences do not occur in a vacuum, but rather in the context of interactions with others. When interacting with others, the potential for negative social experiences arise. How older adults avoid, appraise, react, and recover from negative social interactions has been the focus of a large body of research (e.g. August, Rook, & Newsom, 2007; Birditt, 2014; Sorkin & Rook, 2006). Together, these studies suggest that older adults are aware of their resources and limitations, and carefully shape their actions within the social environment in an effort to minimize exposure to and reaction from negative experiences (see also Charles, 2010).

Close social partners provide a potential resource to older adults (Kahn & Antonucci, 1980; Lang, 2001). Within-person examinations of the stress-buffering potential of social relationships, for example, have found daily satisfaction with spousal interactions to be associated with reduced coupling of pain and negative affect on that day (Holtzman & DeLongis, 2007). Similarly, the amount of quality time that couples spend together on a given day has been linked to lower reactivity to work stressors on that day (Ditzen, Hoppmann, & Klumb, 2008). The significance of these studies is not that interactions were intentionally sought out, but rather that the occurrence of positive interactions with a close social partner was associated with a lessened response to stress for that individual on that day. It is in this spirit that, in the present study, we examine the interplay of sensitivities to the closest and other close social partners. Instead of examining the reaction to a specific event, we consider whether sensitivity to interactions with close social partners varies as a function of the quality and quantity of interactions with others on that day.
The Constructed Social Context

The final perspective of context presented in this study is the social environment that is constructed, in part, through the accumulation of interactions over time (Kahn & Antonucci, 1980; Mejía & Hooker, 2013) and shaped by individuals across the life-span in an effort to meet one’s needs (Rook et al., 2007). In this study we examine differences in experienced relationship satisfaction to understand how patterns of social experiences may, over time, pattern sensitivity to interactions with close social partners. To the extent that extended experiences of low relationship satisfaction can be equated to a higher occurrence of negative interactions, we would expect, from research on interpersonal tensions, those in less satisfying environments to be more sensitive to the quality of their daily social experiences (Mroczek et al., 2006, 2013; Ong, Rothstein, & Uchino, 2012).

Current Study

Social relationships in older adulthood are essential to health and well-being across the lifespan, and especially in old age. Older adults’ close social partners reflect ongoing and attentive selection, regulation, and compensation for loss. In this study, we expand research on close relationships and emotional well-being by examining emotional sensitivity to interactions with social partners in the context of daily life. Our study is guided by three aims:

Our first aim is to examine within-person variation in sensitivity to social interactions across the intraindividual context of emotional closeness. Guided by the social convoy model, we expect all social partners to contribute to daily emotional experiences, with participants most sensitive to interactions with the closest social partner. Our second aim is to examine the extent to which sensitivity to interactions with the closest social partner varies within individuals as a function of the quality and quantity of interactions with others on that day. Following previous
research on the stress-buffering potential of social relationships, we expect associations where positive interactions with others reduce, and negative interactions with others increase, sensitivity to satisfaction with the closest social partner on that day. Finally, we consider between-person differences in context by examining variation in sensitivity to social interactions across differences in individuals’ experienced relationship satisfaction over 100 days. Drawing from research on interpersonal tensions, we expect those who experience, on average, less-satisfying social interactions to be more sensitive to the quality of daily interactions with their close social partners.

**Method**

**Study Design**

Data from the initial and daily phases of the Personal Understanding of Life and Social Experiences (PULSE) Project were used to examine within- and between-person variation in older adults’ emotional sensitivity to interactions with their social partners (Hooker, Choun, Mejía, Pham, & Metoyer, 2013). Data were collected between June and October of 2010 using a web-application designed by the research team. The PULSE project began with an initial survey of individual characteristics and was followed by a daily survey of socioemotional experiences that spanned a 100-day time period to capture a representative distribution of participants’ behaviors and experiences. To meet an ancillary goal of comparing temporal measurement strategies, 25 percent of the sample was randomly assigned to a “burst measurement group” that completed four seven-day “bursts” of measurement that were spaced equally across the 100-day study period (Mejía, Hooker, Ram, Pham, & Metoyer, 2014). The burst and daily measurement groups did not significantly differ in age, gender, or partnered status, $T^2 = .05, F(3, 95) = 1.12, p > .10$. 


Participants and Procedure

Study participants were recruited from an existing human subjects registry of individuals age 50 and over who had expressed interest in healthy aging research. Emails were sent to the 400 registry members with email addresses, and 105 older adults ($M_{\text{age}} = 63.19$, Range $= 52 – 88$) signed up for the study and completed the initial online survey. Of these participants, 88% were women, 97% were white, 73% were married or partnered, and 47% were retired. From the original 105 participants, five withdrew from the study, and one was dropped for completing only five of the 100 daily surveys. Those who were excluded from the study did not differ in terms of age, gender, marital status, or the level of positive affect, negative affect, or satisfaction; $T^2 = .14$, $F(6, 92) = 1.78, p > .10$. The median survey completion rate was .91 (interquartile range [IQR] = .18). Participants received a gift card worth $50 upon completion of the study.

After participants completed the initial survey ($Mdn$ completion time $= 50$ minutes, $IQR = 36$), they began the series of daily surveys ($Mdn$ completion time $= 3.38$ minutes, $IQR = 2.56$). Participants were instructed to complete daily surveys during the evening and report on their experiences for that day. Time stamped data showed that, on average, surveys were completed at 7:30pm ($SD = 1$ hour 40 minutes).

Initial Survey Measures

**Close social partners.** Participants' closest social partners were identified using the hierarchical mapping technique (Antonucci, 1986). The web form included three concentric circles with “you” in the center. Participants were instructed to imagine that the diagram represented all their social contacts and to list them in the order of closeness within the concentric circles. Participants listed the name and relationship type of social partners they “could not live without” in the innermost circle ($M = 5.31$, $SD = 3.30$, range $= 0 – 15$), those with whom they felt
“close” in the middle circle (\( M = 6.90, SD = 4.59, \text{range} = 1 – 33 \)), and social partners with whom they felt “not quite that close” in the outer most circle (\( M = 5.70, SD = 4.45, \text{range} = 0 – 20 \)).

**Closest social partner and others.** The names of the five closest social partners were automatically forwarded to and populated the daily questionnaires. The first social partner listed in the inner most circle was identified as the closest partner. The remaining four social partners were categorized as other social partners (others). To adjust for differences in closeness among others, a variable was constructed to identify participants who had listed at least one of their five social partners in the middle circle (\( n = 47 \)).

**Partnered Status.** Partners, significant others, and life partners were coded as spouses. Three categories were created to characterize spouses’ closeness ranking: spouse is closest (\( n = 65 \)), spouse is not closest (\( n = 8 \)), and the reference group, participant is not partnered (\( n = 26 \)).

**Daily Measures**

Positive and negative affect and satisfaction of interactions with social partners were measured in the daily survey. Participants responded to each question using a slider interface with anchors at each end of the scale. To lessen the probability of answering with the same number each day (Hooker, 1991), numerical scores were recorded in the database, but the scale was not visible to participants. All time-varying covariates were person-centered by subtracting the raw score from the person’s mean.

**Positive and negative affect.** Participants' daily positive and negative affect were measured using the 10-item affect scale (Kleban, Lawton, Nesselroade, & Parmelee, 1992). Participants reported the extent to which the words happy, interested, energetic, content, and warm (positive affect), and also sad, worried, annoyed, irritated, and depressed (negative affect)
described their feelings on that day by moving the slider interface between the anchors “not at all” (0) and “extremely” (49). The items were summed to construct measures of positive and negative affect; \(iM_{PA} = 171.51, SD = 37.97; iM_{NA} = 47.44, SD = 39.26.\) Across the 100 days, Cronbach’s \(\alpha\) ranged from .83 to .96 \((M = .92)\) and .82 to .96 \((M = .90)\) for positive and negative affect, respectively.

**Quality of social interactions.** A measure of social satisfaction (Rook, 1987) was used to measure the quality of daily interactions with the participants’ social partners (satisfaction). The daily survey included the names of the five closest social partners as ranked, in the order of closeness, by participants in the initial survey. Each day, participants reported which of their five closest partners they interacted with on that day, and on a sliding scale indicated their satisfaction with each interaction from “unsatisfied” (0) to “satisfied” (100). The closest partner was identified in the initial survey as the first social partner listed in the social convoy measure \((iM \text{ satisfaction} = 80.70, SD = 14.55).\)

The remaining four social partners comprised the other social partners (others). Interactions with others were measured individually and also aggregated into two variables: the daily count of others whom participants interacted with and the mean satisfaction of interactions with others on that day \((\sum \text{contact satisfaction}_t) / \sum \text{contacted}_t); iM \text{ satisfaction} = 80.60, SD = 13.17; iM \text{ interactions with others} = 1.48, SD = .72.\)

To facilitate the comparison of estimates, person-centered measures of satisfaction were standardized. Days when participants did not interact with the closest or other social partners coded as zero (average), respectively. Two dummy variables were constructed to indicate days that participants did not interact with the closest partner and other partners.

**Experienced Relationship Satisfaction.** Intraindividual means of daily satisfaction with
the closest social partner and daily satisfaction with others were used as measures of experienced relationship satisfaction. The intraindividual mean number of daily interactions with others measured between-person differences in the quantity of interactions with others.

**Covariates**

Age and gender were included as covariates because of their association with differences in emotion and relationship regulatory processes (Birditt & Fingerman, 2003; Carstensen et al., 1995; Charles, 2010). A linear time effect was estimated to adjust for potential growth or decline in positive and negative affect across the 100-day study period. To control for differences in exposure to the 100-day study, a variable representing membership in the measurement burst group was also included. Covariates were tested for direct effects and also individually as cross-level moderators of daily satisfaction with the closest partner and others.

**Analytic Strategy**

We addressed our research aims by estimating a series of multivariate multilevel models (Hox, 2010), which concurrently estimate variation in positive and negative affect within (level 1) and between (level 2) individuals. Time-varying covariates were decomposed into within-person (person centered) and between-person (person mean) components, and were included in the respective level 1 and level 2 models. For example, within-person variation in sensitivity to closest partner satisfaction was modeled as:

\[
\text{affect}_{ijk} = p_{ijk} \left[ b_{0,pi} + b_{1,pi} (\text{Day}_{ijk}) + b_{2,pi} (\text{ClosestPartnerSatis}_{ijk}) + e_{ijk} \right] +
\]

\[
n_{ijk} \left[ b_{0,ni} + b_{1,ni} (\text{Day}_{ijk}) + b_{2,ni} (\text{ClosestPartnerSatis}_{ijk}) + e_{mk} \right]
\]

Where \( \text{affect}_{ijk} \) represents affect for individual \( i \) in affective domain \( j \) (\( j = 1 \) for positive affect, and \( j = 2 \) for negative affect) on day \( k \), resulting in two observations for each individual on each day. Thus, affect for person \( i \) in domain \( j \) on day \( k \) was modeled as the intercept \( (b_0) \), a
linear time trend \((b_1)\), variation in satisfaction with the closest partner \((b_2)\), and a within-person residual \((e)\). Level 1 coefficients can be interpreted as the estimated increase/decrease in positive or negative affect as the independent variable rises above and falls below its person mean.

The level 2 model estimated between-person differences in sensitivity to interactions with the closest partner and others. For example, between-person differences in the intercept and sensitivity of positive affect to closest partner satisfaction was modeled as:

\[
\begin{align*}
    b_{0pi} &= \gamma_{0p0} + \gamma_{0p1}(\text{CPsatis}_i) + \gamma_{0p2}(\text{spouse}_i) + \gamma_{0p3}(\text{age}_i) + \gamma_{0p4}(\text{gender}_i) + u_{0pi} \\
    b_{2pi} &= \gamma_{2p0} + \gamma_{2p1}(\text{CPsatis}_i) + \gamma_{2p2}(\text{spouse}_i) + u_{2pi}
\end{align*}
\]

In equation (2) the intercept \((b_{0pi})\) varied across individuals as a function of the grand mean of positive affect \((\gamma_{0p0})\), the person mean of closest partner satisfaction \((\gamma_{0p1})\), whether the closest partner was a spouse \((\gamma_{0p2})\), age \((\gamma_{0p3})\), gender \((\gamma_{0p4})\), and a person-level error term \((u_{0pi})\). Time-invariant covariates were grand-mean centered so that the intercept represents positive or negative affect on an average day for an average person. Equation (3) modeled variation in sensitivity to interactions with the closest partner \((b_{2pi})\) beyond the average effect \((\gamma_{2p0})\) with the person mean of satisfaction with the closest partner \((\gamma_{2p1})\), partnered status of the closest partner \((\gamma_{2p2})\), and a person-level error term \((u_{2pi})\).

Models were constructed sequentially, beginning with an unconditional model to establish a baseline of within and between-person variation in positive and negative affect. Results from the final model are presented in the text. Model fit was assessed using the log likelihood test \((-2*\text{LL})\) and the proportional reduction of estimated variance

\[
    R^2 = \left(\frac{\sigma^2_{\text{unb}} - \sigma^2_{\text{unb}}}{\sigma^2_{\text{unb}}}\right) \quad \text{(Raudenbush & Bryk, 2002)}
\]

To meet the assumption of weak stationarity, models were adjusted for growth, weekend
effects, and a first order autoregressive term. Level 1 residuals were also adjusted for heterogeneity across gender; $F(1, 92) = 6.91, p < .01$. Data were analyzed using the PROC MIXED procedure in SAS 9.3. Predicted values were exported to construct figures using Stata 13.

**Results**

We begin with descriptions of social partners and daily social experiences. As shown in Figure 1, spouses were the most common relationship type among closest partners (66%) and children the most common among the second (67%) and third (53%) closest partners. A child (35%) or friend (28%) was most often reported as the fourth closest partner. Multiple relationship types, most commonly a friend (38%), were listed as the fifth closest partner. Parents, siblings, grandchildren, cousins, aunts, and spiritual teachers were also included among the five social partners. A summary of intra and interindividual characteristics in the quality of daily socioemotional experiences is presented in Table 1. Those who interacted with other social partners more frequently tended to be younger ($r(99) = -.21$), partnered ($r(99) = .25$), and more likely to rank all five social partners in the inner most circle ($r(99) = .26$). The proportion of within-person variation ($1 - \text{intraclass correlation}$) showed daily reports of positive and negative affect to be more variable for women (PA = .41, NA = .42) than for men (PA = .22, NA = .24). Women also varied more than men in their reports of satisfaction with their closest and other social partners (closest = .53; others = .48) compared to men (closest = .33, others = .32).

**Sensitivity to Social Interactions Varies Across Emotional Closeness**

To examine variation in sensitivity to social interactions within individuals across emotional closeness, we began with estimating the covariation of positive and negative affect with the quality of closest partner interactions. Consistent with our expectations and previous research, positive affect was higher ($\beta = 7.03$, $SE = 0.64$, $p < .001$) and negative affect was lower
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(\beta = -7.79, SE = 0.79, p < .001) on days that participants reported interactions with the closest partner that were more satisfying than usual. The magnitude of this effect varied significantly across participants ($\chi^2(7) = 309.3, p < .001$).

We then added interactions with the four other social partners to the model. Higher satisfaction with the second, third, fourth, and fifth social partners was significantly associated with higher positive affect (range $\beta: 1.60 - 2.48, p < .001$) and lower negative affect on that day (range $\beta: -1.72 - -2.25, p < .001$). Tests of equality showed the magnitude of effects to not vary systematically across other social partners, but to be consistently lower in magnitude than sensitivity to satisfaction with the closest social partner (range $|\delta| = 5.13 - 6.69, p < .001$). We then aggregated interactions with others into the mean satisfaction with others on that day and the number of others interacted with on that day. Higher mean satisfaction with others was associated with higher positive affect ($\beta = 4.30, SE = 0.54, p < .001$) and lower negative affect ($\beta = -3.51, SE = -.62, p < .001$) on that day, and the magnitude of this effect varied significantly across individuals ($\chi^2(11) = 118.3, p < .001$). Interacting with more social partners than usual was associated with higher positive, but not negative, affect on that day ($b = 0.91, SE = .32, p = .005$). For both positive and negative affect, interacting with more social partners than usual increased sensitivity to satisfaction with others on that day. Together, these findings suggest that interactions with up to five social partners contribute uniquely to variation in daily experiences of positive and negative affect. Sensitivity to satisfaction with social partners also increased with emotional closeness as well as the number of interactions with others on that day.

**Sensitivity to Closest Partner Satisfaction in the Context of Interactions with Others**

To understand within-person variation in sensitivity across the context of interactions with others on that day, we modeled sensitivity to satisfaction with the closest social partner to
vary as a function of the quality and quantity of interactions with others on that day. As shown in Figure 2, the sensitivity of participants’ negative affect decreased on days that interactions with others were more satisfying and increased on days that the interactions with others were less satisfying than usual ($\beta = -0.56$, $SE = -0.62$, $p < .001$). The effect was similar, but nonsignificant, for positive affect. The sensitivity of positive affect to satisfaction with the closest social partner decreased on days that participants interacted with more others than usual on that day ($b = -0.83$, $SE = 0.32$, $p = .006$). These findings suggest that in addition to varying within individuals across emotional closeness, sensitivity to satisfaction with social partners also varies depending on the quality and quantity of interactions with others on that day.

**Variation in Sensitivity Across Accumulated Social Experiences**

We concluded by examining the extent to which the sensitivity varied between-persons across differences in accumulated social experiences during the 100-day study. For positive affect, sensitivity to satisfaction with both the closest social partner and others differed across the average number of others participants interacted with each day (see Figure 3). Those who interacted with others more frequently were, in general, less sensitive to satisfaction with the closest social partner and more sensitive to satisfaction with others. In contrast, for negative affect, the level of experienced relationship satisfaction differentiated sensitivity to satisfaction with both the closest social partner and others. Consistent with our expectations, those who experienced lower satisfaction across the study period were the most sensitive to satisfaction with their social partners. Additionally, for those who experienced lower relationship satisfaction with others during the study period, interacting with more others than usual was associated with greater negative affect on that day.
Discussion

Close relationships are shaped across the life-span through selection, social interactions, and exchanges of support and also comprise the proximal social environment in which individuals age (Antonucci, 2001; Carstensen et al., 1999). To understand processes that may contribute to older adults’ capacity to construct their social well-being, we examined the extent to which older adults’ sensitivity to interactions with their five closest social partners is patterned by the context of their social experiences. We found the sensitivity of emotions to daily social experiences to vary within-persons across individually defined hierarchies of emotional closeness and the quality of interactions with others on that day, as well as between-persons across accumulated social experiences. Our findings suggest a potential for sensitivity to social experiences to vary along axes that, according to theory and previous research, are within the purview of control—emotional closeness and interactions with others (Carstensen et al., 1995, 1999; Kahn & Antonucci, 1980; Lang, 2001; Lang et al., 2009, 2013). Relationship processes therefore appear to operate within an ecology of social interactions—both momentary and also accumulated over time.

Emotional Closeness Matters

Consistent with conceptualizations of relationships organized by a hierarchy of emotional closeness (Antonucci, 2001), our results suggest that, in addition to relationship type, emotional closeness also differentiates sensitivity to social interactions. In the context of older adulthood, where perceptions of future time decrease and social priorities shift toward emotional closeness (Carstensen et al., 1999), our findings emphasize the urgency of relationship regulation (Lang, 2001; Lang et al., 2009). In this study, it was the closest social partner who bore the most influence on daily experiences of emotional well-being. Unlike relationship types such as spouse
or family, older adults maintain control over appraisals of emotional closeness. Previous research suggests that older adults actively shape their inner social networks (Fung, Yeung, Li, & Lang, 2009; Lang, Staudinger, & Carstensen, 1998; Rook et al., 2007), and that selective winnowing of less-close relationships protects emotional well-being over time (English & Carstensen, 2014). Our study illustrates a process by which regulating emotional closeness may protect well-being, as decreased emotional closeness was found to translate to a weaker influence on daily emotional experiences. We acknowledge that emotional closeness was measured only once in this study by placement in the social convoy. An important next step is to examine longitudinally whether decreasing a social partner’s ranking of emotional closeness also dampens sensitivity to interactions with that individual.

Our findings also suggest that measures of emotional closeness would assist in identifying how relationship types function among older adults’ close social ties. For example, although the level of interdependence among spouses is unique to other relationship types (Hoppmann & Gerstorf, 2009), interactions with spouses are not consistently found to be associated with momentary variation in affective well-being above and beyond time spent alone (e.g. Chui et al., 2014). The results from this study suggest that, consistent with the convoy model, emotional closeness may account for some of the heterogeneity in affective responses to interactions within relationship types.

**Importance of Interactions with Other Social Partners**

An important contribution of our study was that interactions with the closest partner were appraised within the context of interactions with others on that day. In agreement with previous evidence that highlights the importance of looser social ties (Birditt & Fingerman, 2005; Rook, Luong, Sorkin, Newsom, & Krause, 2012; Sandstrom & Dunn, 2014; Sorkin & Rook, 2006), we
found others to uniquely contribute to daily experiences of emotional well-being. The quality of interactions with others also explained variation in positive and negative affect above and beyond the quantity of interactions with others on that day. The quantity of interactions was also found to be important. Interacting with more social partners than usual intensified sensitivity to the quality of those interactions on that day. That quantity intensifies the import of quality makes sense in the context of older adulthood, where social goals shift from toward maintaining and increasing emotional closeness (Carstensen et al., 1999; Charles, 2010).

**Sensitivity in the Context of Interactions with Close Others**

To further examine the interplay of interactions with the closest partner and others, we also examined the extent to which sensitivity to interactions with the closest partner may vary within individuals depending on the quality of interactions with others on that day. Our findings suggest a modulation of sensitivity where lower satisfaction with others intensifies and greater satisfaction with others dampens sensitivity to interactions with the closest partner on that day. This is important because heightened sensitivity can be a double-edged sword – it increases responsiveness to support and positive interactions, but also vulnerability to negative experiences. That sensitivity to interactions with the closest social partner was found to be shaped, in part, by other social experiences on that day suggests that access to positive social experiences may facilitate maintaining emotional closeness in the context of less-satisfying interactions.

Although we were not able to identify the time-ordered processes of the effect, our study provides strong evidence that sensitivity to interactions with the closest social partner and others is shaped in part by experiences on that day. Previous research suggests that older adults may dampen emotional sensitivity through retrospectively reappraising interactions, restructuring
their coping goals, or seeking support (Bisconti, Bergeman, & Boker, 2006; Charles & Carstensen, 2008; Martire et al., 2006; Sorkin & Rook, 2006). Evidence from studies of spouses and emotions suggest that sensitivity may be amplified during moments of increased emotional closeness (Ditzen et al., 2008; Holtzman & DeLongis, 2007) or collaborative coping (Berg et al., 2011). Whether the interplay of sensitivity to the closest partners and interactions with others is a characteristic of intentional action (i.e. individuals reaching out to others on less satisfying days with the closest social partner) or of a more implicit dynamic system (i.e., a process of maintaining homeostasis in overall sensitivity), and whether this capacity changes with age is beyond the scope of this study, but an important direction for future research.

Variation in Sensitivity Across the Accumulated Social Experiences

Finally, we moved from examining within-person variation in sensitivity to social interactions to between-person differences in the level of sensitivity during the study period. Consistent with the proposition that the social context in which social interactions occur reflects accumulated social experiences (Antonucci, 2001), we found between-person differences in sensitivity to interactions with social partners to be patterned by social experiences during the 100-day study. Those who interacted with, on average, the fewest others each day were most sensitive to interactions with the closest social partner. Alone, this observation is innocuous, but to the extent that infrequency of social interactions signals limited access to others, those with fewer daily social interactions may be more vulnerable to loss (Rook, 2009) and less able to decouple their emotions from strained interactions with the closest social partner.

Consistent with studies of reactivity to interpersonal tensions (Mroczek et al., 2006, 2013), general experiences of lower relationship satisfaction characterized individuals who were most sensitive to the quality of social interactions. Satisfaction with daily social interactions was
relatively high across the sample, and less satisfying interactions did not, therefore, unequivocally reflect interpersonal tensions. Nevertheless, the findings from this study suggest that prolonged exposure to unsatisfying social experiences supports an environment that favors heightened sensitivity to the quality of daily social interactions. How extended periods of lower relationship satisfaction translate to differences in emotional closeness is an important direction for future research.

**Limitations**

Although this study benefited from rich data of older adults’ daily socioemotional experiences, it is not without its limitations. First, our study was designed to examine variation within individuals, rather than between individual differences in characteristics such as age and gender. The generalizability of our findings are limited by the selection of our sample, which was comprised of relatively healthy older adults, who were mostly women, somewhat savvy with computers, and also willing to engage in a 100-day study. Yet even within this homogenous sample, we found considerable variability in daily socioemotional experiences. How sensitivity to interactions with close social ties varies across age, gender, and over time is an important avenue for future research.

Our study was also limited by its measures and analytic approach. The use of end of day measurements precluded our ability to examine time-ordered processes within the day of sensitivity to interactions with others. We also acknowledge error in the measurement of emotional closeness to the participants’ social partners. Finally, although multilevel models facilitate the identification of average within-person processes, our estimates assumed a unidirectional association at the mean level. An important direction for future research is to further investigate within-person variation in sensitivity from a perspective that builds from the
individual up (Molenaar, Sinclair, Rovine, Ram, & Corneal, 2009; Nesselroade, 1991; Ram & Gerstorf, 2009). Such a program may identify that some emotional states or social interactions—such as the sadness of loss, or the joy of reminiscing with a close friend—may hold more traction, and therefore result in some states of sensitivity being more enduring than others.

Finally we were not able to differentiate the direction of causality in our results. It is also possible that individuals experienced more satisfying interactions with their closest social partners on days that positive affect was higher and negative affect was lower. Examining the role of emotions in engaging or disengaging the closest social partner would be essential for understanding the feedback loop that drives socioemotional processes (Carver & Scheier, 1998; Reis et al., 2010).

**Conclusion and Future Directions**

That sensitivity to social interactions maps onto individuals’ hierarchies of emotional closeness, and furthermore varies within individuals opens many promising and necessary directions for future research. An important first step is to identify the psychological mechanisms that regulate within-person variation in sensitivity to daily social experiences. Studies that link sensitivity to interactions with others on the following day, or use momentary ecological assessment, would assist in identifying the sequencing of emotions, social interactions, and recovery. It would also be important to study variation in sensitivity during stressful events or specific transitions such as retirement or widowhood. Finally, sensitivity and the extent to which it varies within individuals needs to be studied over extended time periods to understand its change over time and association with health and well-being outcomes.

Across the life-span, individuals shape their social relationships by regulating their closeness to others. By studying relationships in the context of daily life, we were able to
identify how older adults’ five closest social partners uniquely contribute to daily emotional experiences. We found closeness to translate directly to sensitivity to interpersonal experiences. But most importantly, the findings from the study suggest that sensitivity varies within individuals relative to the context of their daily social experiences, which may have important implications for understanding the dynamic aspects of building and maintaining one’s social ties to enhance well-being in later life.
References


House, J. S., Robbins, C., & Metzner, H. L. (1982). The association of social relationships and


http://doi.org/10.1037/a0032221


http://doi.org/10.1080/15427609.2014.906728


Table 1. Correlations and descriptive characteristics of time invariant and time variant study covariates.

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<td>3. Partnered</td>
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<td>- .16</td>
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<td>.05</td>
<td>.17</td>
<td>- .26**</td>
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<td>6. Inner Circle &lt; 5</td>
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<td>- .02</td>
<td>- .05</td>
<td>- .36***</td>
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<td>.21*</td>
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<td>- .19*</td>
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<td></td>
<td>- .56***</td>
<td>.35***</td>
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<td>.27***</td>
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<td>- .65***</td>
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<td>- .02</td>
<td>.00</td>
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<td>- .03</td>
<td>- .27**</td>
<td>.76***</td>
<td>- .60***</td>
<td>.83***</td>
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<td>11. Interactions Closest</td>
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<td>- .10</td>
<td>.49***</td>
<td>- .03</td>
<td>.01</td>
<td>- .02</td>
<td>.20*</td>
<td>- .27**</td>
<td>.30**</td>
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<td>12. Interactions Others</td>
<td>- .21*</td>
<td>.03</td>
<td>.25**</td>
<td>.07</td>
<td>.15</td>
<td>- .26**</td>
<td>.10</td>
<td>.04</td>
<td>.12</td>
<td>.09</td>
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Mean  
63.29  
88  
73  
17.91  
31.90  
47.91  
171.51  
47.44  
81.70  
80.59  
78.75  
1.47

Standard Deviation  
7.98  
9.07  
16.96  
38.16  
39.45  
14.62  
13.24  
31.77  
1.72

Note. Between-person correlation matrix of time invariant study covariates is below diagonal (N = 99). Within-person correlation matrix of study covariates is above the diagonal (observations = 7,024). % close = number of social partners in inner circle proportional to total social partners listed in the social convoy. Inner circle < 5 = 1 if there are fewer than five social partners listed in the inner most circle. Intraindividual mean of days closest and other partner contact is proportional to the total number of observations for that person.

*** p < .001, **p < .01, *p < .05
Figure 1. Relationship Types Among Participants’ Five Closest Social Partners (N = 99)
Table 2. Multivariate Multilevel Model of Interactions with the Closest and Other Social Partners on Within- and Between-Person variation in Positive and Negative Affect.

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<th>Negative Affect</th>
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<td>( b )</td>
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<td>Closest Partner Satisfaction</td>
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<td>( \times ) Spouse is Closest</td>
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<tr>
<td>Others Satisfaction</td>
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<td>N Interactions with Others</td>
<td>0.91**</td>
<td>0.33</td>
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<tr>
<td>( \times ) Closest Partner Satisfaction</td>
<td>-0.83**</td>
<td>0.31</td>
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<tr>
<td>( \times ) Others Satisfaction</td>
<td>2.06***</td>
<td>0.41</td>
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<tr>
<td>Closest Partner Mean Satisfaction</td>
<td>11.46***</td>
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<tr>
<td>( \times ) Closest Partner Satisfaction</td>
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<tr>
<td>Others Less Close</td>
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<td>5.24</td>
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<td>( \times ) Closest Partner Satisfaction</td>
<td>3.40**</td>
<td>1.22</td>
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<tr>
<td>Others Mean Satisfaction</td>
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<td>Mean N Interactions with Others</td>
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<td>( \times ) N Interactions with Others</td>
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Random Effects

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<th>( u(\text{Intercept}) )</th>
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<th>( u(\text{Closest Satis}) )</th>
<th>( u(\text{Others Satis}) )</th>
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<td>( \text{SE} )</td>
<td>( \text{est.} )</td>
<td>( \text{SE} )</td>
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<td>294.90</td>
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<td>Negative affect</td>
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<td>(115.70)</td>
<td>302.61</td>
<td>(15.57)</td>
<td>825.73</td>
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<td>covariance</td>
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<td>(78.22)</td>
<td>-164.40</td>
<td>(12.06)</td>
<td>-391.10</td>
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<td>( R^2 ) positive affect</td>
<td>.62</td>
<td>.24</td>
<td>.24</td>
<td>.40</td>
<td>.04</td>
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<tr>
<td>( R^2 ) negative affect</td>
<td>.47</td>
<td>.18</td>
<td>.21</td>
<td>.40</td>
<td>.04</td>
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</table>

Note. Continuous variables are standardized. Estimates are adjusted for age, gender, measurement group, gender, weekend effect, linear time trend, and measurement group x CP satisfaction. \( R^2 \) = proportional reduction in modeled variance and estimated in comparison to unconditional model. Observations = 7,024.
Figure 2. Within-person Variation in Sensitivity to Satisfaction with the Closest Partner

Figures represent fitted values of sensitivity in positive and negative affect to satisfaction with the closest social partner on a given day. Daily satisfaction is person-centered.
Figure 3. Forest plot of variation in standardized coefficients across subsets of high/low mean satisfaction with closest social partner, high/low mean satisfaction with others, and high/low mean number of others contacted. High/low identified via median split.