In Your 20s it's Quantity, in Your 30s it's Quality:

The Prognostic Value of Social Activity Across 30 Years of Adulthood

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Abstract

Social connection, a leading factor in the promotion of health, well-being, and longevity, requires social knowledge and the capacity to cultivate intimacy. Lifespan development theorists have speculated that social information-seeking goals, emphasized at the beginning of early adulthood, give way to emotional closeness goals in later stages of early adulthood. Drawing on developmental theory (Baltes, 1997; Baltes & Carstensen, 2003), this 30-year prospective study assessed social activity at age-20 and age-30 with experience sampling methods, and psychosocial outcomes (social integration, friendship quality, loneliness, depression, and psychological well-being) at age-50. Results supported the hypothesis that the quantity (but not the quality) of social interactions at age-20, and the quality (but not the quantity) of social interactions at age-30 predict midlife psychosocial outcomes. Longitudinal structural models revealed that age-20 interaction quantity had a direct, unmediated effect on age-50 social and psychological outcomes. The effects of age-20 interaction quality on midlife outcomes, on the other hand, were mediated by age-30 interaction quality. Our findings are consistent with the idea that selection and optimization serve important functions in early adulthood, and that engaging in developmentally appropriate social activity contributes to psychosocial adjustment in the decades that follow.

Keywords: early adulthood, midlife, relationships, social activity, well-being

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In Your 20s it's Quantity, in Your 30s it's Quality:

The Prognostic Value of Social Activity Across 30 Years of Adulthood

Social connection is a leading behavioral factor in the promotion of health, well-being, and longevity (Berkman, Glass, Brissette, & Seeeman, 2000). For example, in Holt-Lunstad, Smith, and Layton's (2010) meta-analysis, poor social connection was associated with a larger increase in relative risk for premature mortality than tobacco use, obesity, and excessive alcohol use. Lifespan development theorists have speculated that early adulthood is a critical period for the development of social connections, especially close relationships (e.g., Arnett, 2000; Erikson, 1959; Levinson, 1978; Neugarten, Moore, & Lowe, 1965; White, 1966). Theorists have proposed that social relations in early adulthood may foster lifelong social connections by cultivating comfort with intimacy and laying a foundation for strong social networks through life (e.g., Erikson, 1959). Positive experiences in early adulthood may enhance midlife well-being in at least two ways. First, by advancing the development of personal skills when knowledge acquisition and identity development goals are prominent (Carstensen, 1995), social networks may help individuals acquire resources that can be drawn upon and applied to future challenges, regardless of later social circumstances. Second, developing the ability to initiate and maintain close relationships in early adulthood may facilitate the ongoing cultivation of close relationships, allowing individuals to fulfill emotional closeness goals that become increasingly important across adulthood (Carstensen, 1995). These emotionally close relationships have, in turn, been shown to ease adjustment to transitions throughout life (Hartup & Stevens, 1997), and promote healthy psychological adjustment.

This prospective study was designed to test the hypothesis that the quantity and quality of early adult social activity is associated with social connectedness and psychological outcomes in

midlife, up to 30 years later. We assessed midlife (age-50) social connection (social integration, friendship quality) and psychological outcomes (loneliness, depression, psychological well-being) in a group of individuals for whom early adult social activity had been assessed 20 and 30 years prior (at ages 20 and 30). We focused on loneliness, depression, and psychological well-being because of their established link to social functioning (see Argyle, 2002; Cacioppo & Patrick, 2008; Leary & Baumeister, 1995, for reviews), and because they are important indicators of psychological adjustment (Ryff & Keyes, 1995).

Although longitudinal studies have shown that early-adult social life is associated with later social and psychological outcomes (e.g., Sneed, Whitbourne, Schwartz, & Huang, 2012; Whitbourne, Sneed, & Sayer, 2009), prior studies have assessed early-adult social relations with global self-report measures, which are subject to biases (Schwarz, 2012). The current research offers a novel contribution in that experience-sampling methods were used to describe early adult social activity. Participants in the current study completed the Rochester Interaction Record (RIR; Reis & Wheeler, 1991), an event-contingent experience-sampling diary, for each interaction lasting 10 minutes or longer during each designated early-adulthood diary period (typically about 14 days). Experience-sampling tools provide a contextually grounded account of social life by capturing information about social activity as it occurs in the natural ebb and flow of daily life (Bolger, Davis, & Rafaeli, 2003), minimizing the impact of biases that are inevitable when people attempt to recall and summarize their experiences and perceptions using global self-report measures (Reis, Gable, & Maniaci, 2014; Schwarz, 2012).

In addition, prior research has focused almost exclusively on perceived interaction quality (Sneed et al., 2012; Whitbourne, Sneed, & Sayer, 2009) but quantitative aspects of social life are also important (Umberson, Chen, House, Hopkins, & Slaten, 1996). Our use of the RIR in the

current research provided a second novel contribution by simultaneously describing quantitative (number and length of interactions) and qualitative (interaction intimacy and satisfaction) aspects of early-adult social behavior. In so doing, we were able to test the previously unexamined hypothesis that these two aspects of early adult social experience have differential prognostic implications for social connectedness and psychological outcomes up to 30 years later. As explained below, we expected the quantity of social activity at age-20 to have a direct, unmediated, effect on all age-50 social and psychological outcomes, but we expected the quality of age-20 social activity on those outcomes to be mediated through age-30 interaction quality. Whereas age-20 interaction quality presages the development of a social competency that continues to crystallize across early adulthood, and becomes increasingly important by the time young adults reach age-30, the same is not necessarily true for age-20 interaction quantity.

The Prognostic Value of Interaction Quantity and Quality Is Context Dependent

According to the theory of *selective optimization with compensation* (SOC) (Baltes, 1997; Baltes & Baltes, 1990; Baltes & Carstensen, 2003; Freund & Baltes, 2002), successful development requires ongoing orchestration among three processes: selection (e.g., choosing goals), optimization (e.g., enhancing means to achieve selected goals), and compensation (e.g., counteracting loss of means to achieve selected goals). Selectively allocating resources to the most important goals, and "searching for enhancing contexts" (Baltes, Staudinger, & Lindenberger, 1999, p. 483) to promote their achievement is a hallmark of successful adaptation. The present research focuses on selection and optimization, which are particularly relevant in the early-adult social domain. Among young adults, selecting social activities that optimize the achievement of a particular social goal should be most advantageous when that goal is developmentally relevant.

Drawing on developmental theory (Baltes & Baltes, 1990; Baltes & Carstensen, 2003; Carstensen, 1995), we posit that midlife psychosocial adjustment is cultivated by first, emphasizing interaction quantity in the beginning stages of early adulthood (age-20), when social information-seeking goals are particularly salient (Arnett, 2000), and second, emphasizing interaction quality later in early adulthood (age-30), when emotional closeness goals become more influential. Socioemotional selectivity theory (SST) proposes that interacting with a wide variety of social contacts provides diverse opportunities for learning about the self, others, and the social world, and for developing social skills (Carstensen, 1995; Carstensen, Isaacowitz, & Charles, 1999). Having a *higher quantity* of social interactions at age-20 is therefore likely to help individuals accumulate social knowledge and skills. These resources may be employed throughout life to navigate a wide variety of social situations, thereby facilitating midlife well-being. However, as individuals approach their 30s, social information-seeking motives wane. Identity exploration goals diminish with the transition into better-defined and more enduring social roles (Arnett, 2000; Levinson, 1978; Neugarten et al., 1965; Settersten & Hägstede, 1996). Social networks become smaller from young adulthood on (Wrzus, Hänel, Wagner, & Neyer, 2013), and for most 30-year olds, emotional closeness with relationship partners becomes more important than knowledge acquisition (Carstensen, 1992). Choosing social situations that afford opportunities for satisfying, intimate, *high quality* experiences with fewer close others is likely to foster emotional closeness. Thus, at age-30, interaction quality, more than quantity, should help people achieve better social and psychological outcomes later in midlife.

Reductions in network size (Wrzus et al., 2013) and social interaction quantity from age-20 to age-30 (Reis, Lin, Bennett, & Nezlek, 1993) are selectively aimed at optimizing salient social goals at both developmental stages (Carstensen, 1992; Charles & Carstensen, 2009).

People in their teens and early 20s have a relatively stronger preference than midlife or older

adults for diverse social experiences with a variety of partners, presumably because such

diversity offers access to information that promotes social knowledge and self-knowledge, and is

useful to identity development. Conversely, most 30-year-olds prefer to interact with familiar

partners (Fredrickson & Carstensen, 1990), presumably to enhance emotional closeness.

Optimizing the chief social goal at each developmental phase (social knowledge acquisition at

age-20, emotional closeness at age-30) by orienting social activities toward fulfilling those goals

should, consistent with SST (Carstensen, 1995) and the SOC meta-model (Baltes, 1997),

promote positive future outcomes.

   Direct and Indirect Effects of Early Adult Interaction Quantity and Quality. Given

that the social competencies acquired at age-20 are typically retained, if not crystallized across

adulthood (e.g., Blanchard-Fields, 2007), and that social knowledge acquisition goals tend to

give way to emotional closeness goals by age-30 (Carstensen, 1992), the importance of the

quantity of social activity is expected to diminish from age-20 to age-30. By the time individuals

reach age-30, frequent interaction (unlike high quality interaction) should have less prognostic

significance for midlife well-being because it would not facilitate the achievement of now-salient

emotional closeness goals. Hence, we hypothesized that interaction quantity at age-20 will be

positively associated with age-50 outcomes (i.e., a *direct effect* of age-20 interaction quantity).

   For interaction quality, we expected a somewhat different pattern. High quality

interactions are beneficial at all stages of life (Erikson, 1959; Glick & Rose, 2011; Hartup &

Stevens, 1997; Leary & Baumeister, 1995; Reis et al., 1993). Research on the trajectory of

intimacy development across adulthood shows that people whose close relationships are

characterized by high levels of intimacy (a common exemplar of relationship quality) at age-20

continue to report high levels of intimacy at age-30 (Reis et al., 1993), and into their mid-50s (Sneed et al., 2012; Whitbourne, Sneed, & Sayer, 2009).

With age, interpersonal challenges become increasingly complex and difficult to navigate (Arnett, 2000). In order to exhibit stable levels of high interaction quality from age-20 to age-30, interpersonal skills must be refined and enhanced. These improved skills can foster well-being at future developmental stages (e.g., age-50). We therefore expected high quality interactions at age-20 to promote sustained high quality social experiences at age-30, which will in turn lead to better social and psychological outcomes at midlife. Thus, we hypothesized that the effect of age-20 social interaction quality on age-50 outcomes will be mediated by age-30 interaction quality (i.e., an *indirect effect* of age-20 interaction quality).

Method

Participants

Participants were recruited from a pool of 222 eligible adults who had provided event-contingent diary data between 1974 and 1980 while they were 18 – 22 year old undergraduates (age-20) at the University of Rochester (for the original studies from which current participants were drawn see Reis, Nezlek, & Wheeler, 1980; Reis, Wheeler, Spiegel, Kernis, Nezlek, & Perri, 1982; Wheeler & Nezlek, 1977; and Wheeler, Reis & Nezlek, 1983[1]). Between May 2007 and October 2008, 133 people (59.9% of the original sample) took part in the current research when they were 48-52 year olds (M_{age} = 49.28; 73 female, 59 male, and 1 transgender). The majority of the sample self-identified as White/Caucasian (n = 126; 94.7%). One participant (.8%) was American Indian or Alaska Native, one participant (.8%) was Asian, two participants (1.5%) were Black or African-American, and three participants (2.3%) selected the "other" category. The remaining 89 potential participants could not be located (n = 42, 18.9%), explicitly (n = 15,

6.8%) or tacitly (i.e., did not respond to contact attempts) declined to participate ($n = 23$, 10.4%),

or were deceased ($n = 9$, 4.1%). Age-20 data for four participants could not be recovered

resulting in a sample of 129 participants with age-20 and age-50 data. Eighty-five of the

participants with complete age-20 and age-50 data also took part in a follow-up experience-

sampling study of early adult social life (Reis et al., 1993) between 1985 and 1986, when they

were 27-31 years old (age-30).

Procedure

Current contact information was gathered from prior assessments, as well as online

locator services (e.g., University of Rochester alumni database, online phone books, Yahoo

people search, www.zabasearch.com, and www.merlindata.com). Recruitment invitations were

mailed to potential participants beginning in May 2007. Respondents were given an overview of

the project over the telephone. Those who agreed to participate were emailed links to the web

survey (described below), along with detailed instructions for completing the surveys, and a

numerical code to use as an identifier. Upon completion of the study, participants received a $50

honorarium. Non-respondents were sent repeat invitations in the mail, and were periodically

contacted by phone if a number was available until recruitment ended in October 2008.

Age-20 Measures (1974-1980)

The RIR (Reis & Wheeler, 1991; see Appendix A) assessed social activity during the

diary period by having participants report on any social interaction lasting 10 minutes or more

immediately following the interaction (or as soon afterwards as was feasible). Social interaction

was defined as any encounter with another person or persons in which participants were attentive

to each other and modified their behavior in response to one another. Examples were provided

until the researchers were satisfied that participants understood the instructions. To encourage

timely responding, participants were asked to return their completed forms and obtain new ones every few days. To further encourage timeliness, a collaborative atmosphere was maintained throughout the study.

Consistent with the original research, two items were selected to represent interaction quantity: average *time per day* spent interacting ($M = 353.10$ min, $SD = 122.80$), and average *number per day* of interactions ($M = 5.45$, $SD = 3.37$). Two items asked about participants' subjective experience of the interaction, and these were used to represent interaction quality. The *intimacy* and *unpleasantness* of each interaction were rated on a 7-point scale. Unpleasantness was reverse-scored to match the direction of the intimacy item. The *M (SD)* scores were 3.55 (0.96) and 3.82 (1.20), respectively. Pleasantness scores served as an indicator of *satisfaction*. Items were aggregated across the diary period. *Time per day* and *number per day* were significantly correlated ($r(129) = .42$, $p < .001$), and were standardized and combined into an age-20 interaction quantity variable. Similarly, *intimacy* and *satisfaction* were significantly correlated ($r(129) = .43$, $p < .001$) and combined into an age-20 interaction quality variable. The correlation between interaction quantity and quality at age-20 was not significant; $r(129) = .04$, $p = .68$.

Age-30 Measures (1985-1986)

Identical social activity data were available for 85 of the 133 age-50 participants ($n = 48$ missing) who completed the RIR for a 14-day period in 1985-86 (Reis et al., 1993). At this wave, the two items assessing interaction quantity: average *time per day* spent interacting ($M = 279.51$ min, $SD = 125.01$), and average *number per day* of interactions ($M = 5.18$ $SD = 2.25$) were again significantly correlated ($r(85) = .70$, $p < .01$), and combined into a single age-30 interaction quantity variable. Likewise, *intimacy* ($M = 4.03$, $SD = 0.80$) and *satisfaction* ($M = 4.95$, $SD =$

0.43) were also significantly correlated at this time ($r(85) = .55$, $p < .01$), and combined into an age-30 interaction quality item The correlation between interaction quantity and quality at age-20 was not significant; $r(85) = .09$, $p = .41$.

Age-50 Measures (2007-2008)

Outcome and demographic data were assessed with a questionnaire hosted on surveymonkey.com. Participants logged into the survey with a unique identifying code and completed the self-paced questionnaires at their convenience. Only those measures relevant to the present analyses are described below. We had two social connectedness outcomes (social integration and friendship quality) and one psychological outcome (a composite of loneliness, depression, and psychological well-being)

Social integration. The Social Network Index (Cohen, Doyle, Skoner, Rabin, & Gwaltney, 1997) assessed social network size (i.e., number of different social contacts; $M = 26.77$; $SD = 14.20$; $n = 132$; $n = 1$ missing), and diversity (i.e., number of social roles filled; $M = 7.27$; $SD = 2.10$; $n = 132$; $n = 1$ missing) based on the number of different types of relationships participants reported having. The two social integration measures were highly correlated ($r(132) = .69$, $p < .001$), and combined into a composite *social integration* score.

Friendship quality. Participants were asked to think about their core network of close friends, described as "the people they see and interact with most often, participate in activities with (e.g., dinner, shopping, golf, etc.), and would include in the planning of a get-together." Participants completed four 6-item subscales (social, emotional, recreational, and intellectual intimacy) of the Personal Assessment of Intimacy in Relationships (PAIR; Schaefer & Olson, 1981) to measure how intimately connected they felt to this core group of friends. Ratings were made on a 9-point scale ranging from *not at all true* through *completely true* ($M = 6.90$; $SD =$

0.97; n = 129; n = 4 missing; α = .90). Participants additionally reported closeness to this group

using the 1-item Inclusion of Other in the Self (IOS) scale (Aron, Aron, & Smollan, 1992), in

which they select one of seven pairs of increasingly overlapping circles to represent feelings of

closeness to the group (M = 4.50; SD = 1.30; n = 129; n = 4 missing). The two friendship quality

measures were highly correlated (r(129) = .65, p < .001), and combined into a single *friendship*

quality composite outcome. To account for differential scaling of the individual measures, z-

scores were computed to create a unit-weighted composite score.

       Psychological outcomes. A 10-item version of the revised UCLA loneliness scale

(UCLA; Russell, 1996) measured current feelings of social isolation (M = 2.03; SD = 0.41; n =

130; n = 3 missing; α = .89). Responses were given on a 4-point scale from *never* to *often*. The

20-item Center for Epidemiological Studies-Depression (CES-D; Radloff, 1977) assessed

depression symptom severity (M = 1.33; SD = 0.35; n = 126; n = 7 missing; α = .90) in the prior

week. Responses were rated on a 4-point scale from *rarely or none of the time (less than 1 day)*

through *most or all of the time (5-7 days)*. The 13-item depression subscale of the Hopkins

Symptom Checklist 90 (HSCL; Derogatis, 1977) captured depressive symptomatology during

the four weeks preceding assessment (M = 1.44; SD = 0.45; n = 126; n = 7 missing; α = .88).

Responses were given on a 5-point scale from *not at all* through *extremely*. Ryff and Keyes'

(1995) 54-item measure of psychological well-being (PWB) assessed current well-being in six

positive domains (autonomy, environmental mastery, self-acceptance, positive relations with

others, personal growth, and purpose in life) with 9 items each. Ratings were made on a 6-point

scale ranging from *disagree strongly* to *agree strongly* (M = 4.85; SD = 0.61; n = 129; n = 4

missing; α = .95). These four measures (UCLA, CES-D, HSCL, and PWB) were highly

correlated (rs range from .50 to .83, all ps < .001), and combined into a unit-weighted

psychological outcomes composite score.

Analysis Strategy

To first establish that early adult social activity was related to midlife social and psychological outcomes, bivariate correlations were computed between early adult social activity variables (i.e., age-20 and age-30 interaction quantity and quality), and the three age-50 composite outcomes.

Next, a series of structural equation models was estimated in which the identical quantity and quality social activity variables collected at age-20 and age-30 were included as predictors of age-50 outcomes. Three structural equation models were estimated with Amos18; one for each age-50 outcome: social integration (Figure 1), friendship quality (Figure 2), and psychological outcomes (Figure 3). Means and intercepts were estimated because each outcome had missing observations. AMOS uses Full Information Maximum Likelihood (FIML) to handle missing data, which is preferred to other methods (Baraldi & Enders, 2010; Enders & Bandalos, 2001) because it yields relatively unbiased parameter estimates when upwards of 25% (Collins, Schafer, & Kam, 2001) of the data are missing at random (MAR) (Enders, 2010). Even when data are not missing at random, bias to parameter estimates is limited to certain parameters rather than spread throughout the model (Enders, 2010), and this rarely invalidates the results of an analysis making MAR assumptions (Schafer & Graham, 2002).

For each analysis, age-20 and age-30 social activity predictors were combined in a path model in which age-20 interaction quantity predicted age-30-interaction quantity (top half of model), age-20 interaction quality predicted age-30 interaction quality (bottom half of model), and all four early adult social activity variables predicted the age-50 outcome (moving forward in time from left to right across the model). The *direct effect* hypothesis will receive support if age-

20 interaction quantity predicts age-50 outcomes when age-30 interaction quantity is controlled. To test the indirect effect of interaction quality, the product of coefficients test was conducted, in which the product of the two predictor paths (the age-20 quality effect X the age-30 quality effect) is compared to the empirically derived sampling distribution of products to produce the z' statistic (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). The *indirect effect* hypothesis will receive support if age-20 interaction quality predicts age-30 interaction quality, which, in-turn, predicts age-50 outcomes, and the product of the coefficients of the age-20 and age-30 quality paths is significant.

Sex was included in each model as a covariate, and was allowed to correlate with age-20 social activity (quantity and quality) and predict age-30 social activity (quantity and quality), as well as the age-50 outcome. A series of multi-group comparisons revealed that none of the paths in the three structural or measurement models differed significantly for men and women. Thus, sex did not interact significantly with any early adult social activity variable in the prediction of any age-50 outcome. Sex was retained in the models because it was significantly associated with age-20 social activity and age-50 friendship quality, but is not discussed further. [2]

Results

Descriptive statistics and concurrent associations among the three age-50 composite outcomes are reported in Table 1. As shown in the table, midlife adults who reported better social lives (more integration, higher quality friendships) also reported better psychological outcomes.

As is true in any prospective cohort study, a substantial minority (40.1%) of the baseline cohort did not participate at age-50, and 34.1% of age-50 participants did not participate at age-30. Although significance tests may be limited in their ability to fully discern sample bias, a

series of analyses were conducted to identify correlates of attrition. A set of *t*-tests indicated that participation at age-50 was unrelated to interaction quantity or quality at age-20 or age-30 (i.e., age-50 participants and non-participants did not differ significantly on any early adult social activity variables; all *t*s < 1.72). Although age-30 participants and non-participants did not differ significantly in the average length, number, or intimacy of age-20 interactions (all *t*s < 1.47), age-30 non-participants had lower age-20 interaction satisfaction scores (*M* = 3.37, *SD* = 1.17) than age-30 participants (*M* = 4.06, *SD* = 1.16); *t*(127) = -3.18*, p* < .01. However, the magnitude of the correlations between age-20 satisfaction and age-50 outcomes did not differ significantly for age-30 participants versus non-participants (all *Z*s < 1.18, *p*s > .24). These findings, together with our use of FIML, suggests that missing data is unlikely to have significantly altered the patter of findings.

Associations Between Early Adult Social Activity and Midlife Outcomes

Table 2 shows that individuals who reported a high quantity of social activity at age-20 were more socially integrated, and reported better quality friendships, and better psychological outcomes at age-50. However, social interaction quantity at age-30 was not significantly associated with age-50 social or psychological outcomes.

Table 2 also shows that people who reported high quality social interactions at age-20 reported better quality friendships and better psychological outcomes (less loneliness and depression, better well-being), but were not more socially integrated at age-50. A similar pattern was evident for age-30 interaction quality. People who reported higher quality social activity at age-30 reported better quality friendships and better psychological outcomes, but were not more socially integrated 20 years later at age-50.

Continuity in Social Activity Across Early Adulthood

Significant associations between age-20 and age-30 interaction quantity (β = .26 in model 3, β = .27 in models 1 and 2, all ps < .01), and between age-20 and age-30 interaction quality (βs range from .29 in Figure 2 to .33 in Figure 1, all ps < .01) demonstrates continuity in both features of social activity across early adulthood. However, the association between the quantity and quality of social activity was negligible at both age-20 (β = .04) and age-30 (β = .05) across all three models. Including the paths between these variables did not enhance model fit, so both paths were constrained to zero.

Direct and Indirect Effects of Early Adult Social Activity on Midlife Outcomes.

    Social integration structural model. For midlife social integration, the hypothesized model fit the data well, χ^2 (8, N = 133) = 2.19, p = .98, comparative fit index (CFI) = 1.00, Tucker Lewis index (TLI) = 1.14, root-mean-square error of approximation (RMSEA) = .00.[3] Interaction quantity at age-20 was positively associated with social integration 30 years later at age-50 (β = .23, p < .05), but age-30 social interaction quantity did not predict age-50 social integration (β = .14), providing support for the *direct effect* hypothesis for quantity.

    The quality of social activity at age-20 was not significantly associated with age-50 social integration (β = .07), nor was age-30 social activity quality a significant predictor of age-50 social integration (β = -.10). In addition, the indirect quality effect was not significant (β = -.03, z' = -0.78), thus the *indirect effect* hypothesis for quality was not supported for this outcome. See Figure 1 for a visual representation and standardized path coefficients.

    Friendship quality structural model. The hypothesized friendship quality model also fit the data well, χ^2 (8, N = 133) = 4.36, p = .82, CFI = 1.00, TLI = 1.11, RMSEA = .00. As hypothesized, interaction quantity at age-20 was positively associated with friendship quality at age-50 (β = .26, p < .01) while controlling age-30 social interaction quantity. Moreover, age-30

interaction quantity was not significantly related to age-50 friendship quality (β = -.12). The

direct effect hypothesis for quantity was again supported.

High quality social activity at age-20 predicted high quality social activity at age-30 (β =

.29, p < .01), which, in turn, was associated with better friendship quality at age-50 (β = .38, p <

.01). Moreover, the indirect quality effect was significant (β = .11, z' = 2.30, p < .05), and age-20

interaction quality was not significantly related to age-50 friendship quality (β = .10) when

controlling age-30 social activity quality. The *indirect effect* hypothesis for quality was thus

supported. Figure 2 contains standardized path coefficients for all estimated effects.

Psychological outcomes structural model. We first wanted to confirm that the four

psychological outcome scales fit together, so that they could be examined in a single structural

model. A confirmatory factor analysis revealed that the CES-D, HSCL, PWB, and UCLA scales

formed a well-fitting latent variable, χ^2 (1, N = 133) = .15, p = .70, CFI = 1.00, TLI = 1.03,

RMSEA= .00.

The hypothesized psychological outcomes model fit the data reasonably well, χ^2 (20, N =

133) = 33.14, p = .03, CFI = .96, TLI = .93, RMSEA = .07. Enhanced age-50 psychological

outcomes were significantly predicted by higher age-20 interaction quantity (β = .34, p < .01)

while controlling age-30 interaction quantity, supporting the *direct effect* hypothesis for quantity.

Age-20 social interaction quality predicted age-30 interaction quality (β = .31, p < .01),

and age-30 interaction quality was positively associated with psychological outcomes at age-50

(β = .23, p < .05). Social interaction quality at age-20, however, was no longer associated with

age-50 psychological outcomes (β = .08) when age-30 interaction quality was controlled.

Furthermore, the indirect effect was significant (β = .07, z' = 1.70, p < .05). The *indirect effect*

hypothesis for quality was thus supported. See Figure 3 for all estimated standardized path coefficients.

Discussion

This research had two main goals. First, we aimed to discover whether social experience during early adulthood was predictive of social connection and psychological outcomes in midlife. We found that both the quantity and quality of social activity at age-20 and age-30 had significant prognostic value for social integration, friendship quality, and a composite indicator of psychological outcomes including loneliness, depression, and psychological well-being up to 30 years later at age-50. Secondly, we sought to determine whether particular attributes of social activity might be especially influential at specific stages of early adulthood based on their relevance to developmentally significant social goals. Consistent with SOC (Baltes, 1997) and SST (Carstensen, 1995), the long-term predictive value of the quantity and quality of early-adult social behavior depended on the developmental context.

We found that, at age 20, when social information seeking is presumed to be a chief goal, social interaction quantity, but not quality, predicted midlife outcomes. However, by age-30, interaction quantity was no longer predictive of midlife psychosocial adjustment. When knowledge acquisition goals take a back seat to emotional closeness goals, having a large quantity of social contact appears to become less useful. Frequent social contact at age-30 could even interfere with the fulfillment of now-pivotal emotional closeness goals. Socializing widely may constrain possibilities for high quality experiences with closest others, and potentially obstruct intimacy development. Our findings hint at this possibility. In the psychological outcomes structural model, more frequent social activity at age-30 was associated with marginally *worse* psychological outcomes at age 50. We do not suggest that frequent or varied

social experiences necessarily become detrimental as early adults progress to age-30, and our data do not indicate why some 30 year olds have a higher quantity of social activity. Perhaps this pattern reflects disruption or loss of intimate relationships. Compensating for loss or disruption, and the process of rebuilding could engender more frequent social activity. However, our data do suggest that at this particular life stage, a balance must be struck between optimizing opportunities for enhancing and maintaining emotional closeness with select few close others, while maintaining some diversity in a decidedly smaller social network. Whether or not frequent social interaction becomes beneficial again at future stages of development remains to be seen. Perhaps transitions in later adulthood such as empty nest (which frees up time, social responsibilities, and mental energy) would produce a renewed beneficial effect of interaction quantity. If individuals find themselves experiencing relatively infrequent social interaction, any social activity may be better than none at all.

As hypothesized, the findings for interaction quality followed a different pattern. Our results showed that high quality social activity at both age-20 and age-30 had bivariate associations with age-50 friendship quality and emotional adjustment. The structural models generally supported our hypothesis that long-term benefits of high quality social experiences at age-20 are mediated through high quality social experiences at age-30. The indirect effect of early-adult interaction quality was significant for age-50 friendship quality and psychological outcomes. In both cases age-20 interaction quality predicted age-30 interaction quality, and no longer predicted the age-50 outcome when age-30 interaction quality was included in the model. This pattern dovetails with numerous developmental theories (Arnett, 2000; Baltes & Carstensen, 2003; Carstensen, 1995; Caspi & Roberts, 2001; Erikson, 1959; Levinson, 1978; Neugarten, Moore, & Lowe, 1965; White, 1966), as well as theories of attachment (Mikulincer

& Shaver, 2007). There is robust evidence of continuity in relationship quality variables across stages of development in the lifespan (Glick & Rose, 2011; Reis et al., 1993; Sneed et al., 2012; Whitbourne, Sneed, & Sayer, 2009). Even in old age, shrinking social networks and decreased social engagement are not necessarily accompanied by decrements in perceived emotional support (Huxhold, Fiori, & Windsor, 2013; Lang & Carstensen, 1994). Having high quality experiences at the beginning of early adulthood likely cultivates the ability to engage in intimate, high quality social exchanges throughout the remainder of early adulthood. This, in turn, enhances 30 year olds' ability to fulfill emotional closeness needs by the time those needs become prevalent (Carstensen, 1992), and can promote ongoing adjustment throughout adult life.

These findings add to existing research on Erikson's (1959) theory of lifespan development, specifically on the impact of the "intimacy crisis" during early adulthood. Our results suggest that engagement in meaningful, intimate social interaction at age-30 is associated with better social and emotional adjustment in the decades to follow (e.g., Erikson, 1959; Levinson, 1978; Neugarten, Moore, & Lowe, 1965; White, 1966). Although a few studies have provided evidence of intimacy's importance during early adulthood (Sneed et al., 2012; Whitbourne, Sneed, & Sayer, 2009), to our knowledge ours is the first study to prospectively capture early adult social behavior with experience sampling procedures. This relatively more precise and contextually grounded tool simultaneously examined distinct structural (quantity) and functional (quality/intimacy) aspects of early adult social activity to longitudinally predict midlife intra- and interpersonal adjustment across 30 years of adulthood. Recent advances in digital technology (e.g., smartphones, location sensing, the ubiquity of the Internet) provide tools that make it feasible to assess social experience in a more detailed and naturalistically embedded manner (Reis et al., 2014). These tools might be particularly useful in studying developmental

processes throughout the lifespan, and could, for example, reveal how quantitative and qualitative aspects of social activity continue to change and contribute to well-being throughout adulthood.

This research also contributes to the literature on the differentiation of structural integration and functional support. Both types of connection have been shown to be beneficial, and some existing work distinguishes the conditions under which we might expect to see stronger effects for one component relative to the other (Lakey & Cohen, 2000). Our findings identify developmental context as an additional conditional feature capable of explaining the relative importance of each type of social connection. Two unexpected findings pertaining to midlife structural integration warrant further exploration. First, one might expect age-30 quantity to predict age-50 integration because both are quantitative measures, but this was not the case in our data. Second, age-20 interaction quality indirectly influenced midlife friendship quality and psychological outcomes but it did not influence midlife social integration. Perhaps these unexpected findings reflect the assessment of social integration in the present study, which emphasizes structural rather than functional support. It is possible that structural support in midlife is more closely related to family (e.g. number of offspring, siblings) or environmental (e.g., the nature of one's work, neighborhood, or community setting) circumstances than to psychological processes, such as the capacity to maintain intimacy, which are cultivated by more frequent social interactions in early adulthood.

Our application of the SOC model in early adulthood represents another novel feature of this research. Although SOC describes development as a life-long process, the model is typically applied in older age -- for example, examining how older adults adjust to cognitive decline and diminished social life (e.g., Baltes, Staudinger, & Lindenberger, 1999; Freund & Baltes, 2002).

Our pattern of findings is consistent with the idea that young adults may be selecting social situations and types of activity as a means of optimizing developmentally relevant social goals and needs. However, we did not assess the motives underlying participants' social interaction. Research is needed to provide a direct test of the influence not only of selection and optimization but also compensation (e.g., for relationship loss or disruption).

Frequent social activity at age-20 did not predict higher quality social activity at age-30. In other words, fulfilling a foremost social goal at age-20 may not promote one's ability to fulfill a primary social goal at age-30. In all likelihood this is because social information gathering that takes place at age-20 can occur in settings that both do and do not enhance the ability to experience intimacy. For example, forced social encounters with classmates, teammates, hall-mates, and friends-of-friends can provide a variety of novel learning opportunities, ranging from shallow conversations with casual acquaintances to raucous good times with virtual strangers or to altercations with prickly co-workers. These high and low quality social experiences alike can help early adults develop social proficiency that will be useful in navigating future social situations. Experiences such as these contribute to a knowledge base about how to behave in a variety of situations, how to choose social situations, and how to motivate, manipulate, and negotiate with others. These tools may be useful to long term well-being, despite the fact that such skills (and the social experiences that gave rise to them) may be unrelated to forming meaningful emotional connections to close others.

One possibly surprising outcome of this research was the failure to find sex differences in the associations between early adult social activity and midlife outcomes. Some prior evidence suggests that men and women may differ in terms of the benefits they garner from social support (e.g., Kiecolt-Glaser & Newton, 2001; Taylor, Klein, Lewis, Gruenwald, Gurung, & Updegraff,

2000). In these studies, women typically show stronger benefits of social involvement on well-being, which failed to emerge in the current research – both men and women experienced midlife social and psychological benefits as function of early adult social activity. However, consistent with the present findings, many other studies suggest that social involvement is beneficial for the health and well-being of both women and men. For example, Holt-Lunstad et al.'s (2012) meta-analytic review of the mortality-reducing effects of social connections did not find moderation by sex. It may be that the lack of moderation by sex in this study derives from the use of relatively objective indicators of interaction quality and quantity, in contrast to the global, more subjective measures used in most other studies that do uncover a sex difference.

Limitations and Conclusion

We note five limitations that apply to this research. First, our participants were relatively well-functioning, well-educated, mostly white midlife adults who attended a private university during a key period of early adulthood. Their early-adult social environment consisted of residential dormitories that maximized opportunities for social contact. Our findings may not generalize to persons from different social backgrounds (e.g. live-at-home college commuters or those who do not attend college). The relative socioeconomic advantages enjoyed by this sample may have protected them from some of the health and well-being problems common to lower SES individuals. It would be ideal to replicate these findings with a more diverse sample to determine whether individuals who are more susceptible to environmental disadvantages will experience equivalent gains from frequent and supportive social contact.

Second, the transitions made by this sample may not have the same meaning in other historical periods. The first wave of research with this sample was conducted in the late 1970s, a time when the transition from college to work was commonly associated with marriage and

starting a family. In 1980 (when the last of this cohort graduated), 41.4% of women and 27.9% of men in the U.S. aged 20-24 were married (United Nations, 2009). By 2010 the marriage rate was more than halved for this age group according to U.S. census data (19.2% for women, and 10.8% for men). Young adults more frequently put off marriage and family in favor of developing a career. Our reference to age-20 as early adulthood may, nowadays, be more aptly described as very early adulthood, whereas by age-30, people often feel they have fully entered adulthood. The developmental changes that we ascribe to 30-year olds may have taken place by age-30 for many in this late baby-boom cohort, but may unfold at a later stage of adulthood (e.g. closer to age-40) for other generations. Thus, it is possible that the shift in early adult social activity we attribute to a developmental change could also be due to secular changes in early adult social life. It remains to be shown whether the influence of contextualized social activity varies according to ongoing cultural shifts in the meaning of emerging adulthood (Arnett, 2000).

Third, as is true in any prospective cohort study, some participants were lost to follow-up at both age-30 and age-50. We compared retained and lost participants, and saw little evidence of differences between the two groups on early adult social activity. However, it is impossible to know whether and how people for whom follow-up data were unavailable may have differed in terms of life events (e.g., moves, marriages, divorces, employment, physical health), and how those potential differences may have affected midlife outcomes.

Fourth, the measures of midlife social and psychological outcomes were self-reports, and were narrow in scope. Given potential biases in self-report measures (described above), it would be useful to collect objective behavioral measures of midlife psychosocial adjustment. Finally, it should not be presumed that identical patterns of findings would have been observed for other outcomes, such as physical health, or at other life stages, such as older adulthood. It would be

valuable to extend the study of this and other midlife samples into later life in order to determine whether early adult social activity, as measured with context-sensitive tools, is associated with physical or cognitive health and longevity during time periods when disease becomes more prevalent and physical and cognitive functioning typically decline. Such samples offer the potential to discover whether and which features of early adult social activity may protectively buffer persons against susceptibility to illness and deterioration, and thereby promote longevity.

In conclusion, this research contributes to our understanding of the associations between social activity and psychosocial adjustment across 30 years of adult life. Prior research on selection, optimization, and compensation processes has focused nearly exclusively on later adulthood (Baltes, 1997; Baltes & Baltes, 1990; Baltes & Carstensen, 2003). Our findings support the idea that selection and optimization serve important functions in early adulthood, and may have significant implications for psychosocial functioning in midlife.

References

Argyle, M. (2002). *The psychology of happiness*. New York: Routledge.

Arnett, J.J. (2000). Emerging adulthood: A theory of development from the late teens through the

twenties. *American Psychologist, 55*, 469-480.

Aron, A., Aron, E.N., and Smollan, D. (1992). Inclusion of other in self scale and the structure of

interpersonal closeness. *Journal of Personality and Social Psychology, 63,* 596-612.

Baltes, P.B. (1997). On the incomplete architecture of human ontogeny: Selection, optimization,

and compensation as foundation of developmental theory. *American Psychologist, 52*,

366-380.

Baltes, P.B., & Baltes, M.M. (1990). Psychological perspective on successful aging: The model

of selective optimization with compensation. In P.B. Baltes & M.M. Baltes (Eds.),

Successful aging: Perspectives from the behavioral sciences (pp. 1-34). New York:

Cambridge University Press.

Baltes, M.M., & Carstensen. L.L. (2003). The process of successful aging: Selection,

optimization, and compensation. In U.M. Staudinger & U.E.M. Lindenberger (Eds.),

Understanding human development: Dialogues with lifespan psychology (pp. 81-104).

Norwell, MA: Kluwer Academic Publishers.

Baltes, P.B., Staudinger, U.M., Lindenberger, U. (1999). Lifespan psychology: Theory and

application to intellectual functioning. *Annual Review of Psychology, 50,* 471-507.

Baraldi, A.N., & Enders, C.K. (2010). An introduction to modern missing data analysis. *Journal

of School Psychology, 48,* 5-37.

Berkman, L.F., Glass, T., Brissette, I., & Seeman, T.E. (2000). From social integration to health:

Durkheim in the new millennium. *Social Science and Medicine, 51*, 843-57.

Blanchard-Fields, F. (2007). Everyday problem solving and emotion: An adult developmental

        perspective. *Current Directions in Psychological Science, 16,* 26-31.

Bolger, N. Davis, A., & Rafaeli, E. (2003). Diary methods: Capturing life as it is lived. *Annual*

        Review of Psychology, 54, 579-616.

Cacioppo, J.T., & Patrick, W. (2008). *Loneliness: Human nature and the need for social*

        connection. New York: W.W. Norton & Company.

Carstensen, L.L. (1992). Social and emotional patterns in adulthood: Support for socioemotional

        selectivity theory. *Psychology and Aging, 7,* 331-338.

Carstensen, L.L. (1995). Evidence for a life-span theory of socioemotional selectivity. *Current*

        directions in psychological science, 4, 151-156.

Carstensen, L.L., Isaacowitz, D.M., & Charles, S.T. (1999). Taking time seriously: A theory of

        socioemotional selectivity. *American Psychologist, 54*, 165-181.

Caspi, A., & Roberts B.W. (2001). Personality development across the life course: The argument

        for change and continuity. *Psychological Inquiry, 12,* 49-66.

Charles, S.T., & Carstensen. L.L. (2009). Social and emotional aging. *Annual Review of*

        Psychology, 61, 383-409.

Cohen, S., Doyle, W.J., Skoner, D.P., Rabin, B.S., & Gwaltney, J.M. (1997). Social ties and

        susceptibility to the common cold. *Journal of the American Medical Association, 277,*

        1940-1944.

Collins, L.M., Schafer, J.L., & Kam, C.M. (2001). A comparison of inclusive and restrictive

        strategies in modern missing data procedures. *Psychological Methods, 6,* 330-351.

Derogatis, L.S. (1977). The SCL-90 Manual I: Scoring, administration and procedures for the

        SCL-90. *Clinical Psychometric Research.* Baltimore

Enders, C.K. (2010). *Applied missing data analysis.* New York: Guilford Press.

Enders, C.K., & Bandalos, D.L. (2001). The relative performance of full information maximum likelihood estimation for missing data in structural equation models. *Structural Equation Modeling, 8,* 430-457.

Erikson, E.H. (1959). *Identity and the life cycle.* New York: W.W. Norton.

Fredrickson, B.L, & Carstensen, L.L. (1990). Choosing social partners: How old age and anticipated endings make people more selective. *Psychology and Aging, 5,* 335-347.

Freund, A.M., & Baltes, P.B. (2002). Life-management strategies of selection, optimization, and compensation: Measurement by self-report and construct validity. *Journal of Personality and Social Psychology, 82,* 642-662.

Glick, G.C., & Rose, A.J. (2011). Prospective associations between friendship adjustment and social strategies: Friendship as a context for building social skills. *Developmental Psychology, 47*, 1117-1132.

Hartup, W.W., & Stevens, N. (1997). Friendships and adaptation in the life course. *Psychological Bulletin, 121,* 355-370.

Holt-Lunstad, J., Smith, T.B., & Layton, J.B. (2010). Social relationships and mortality risk: A meta-analytic review. *PLoS Med, 7,* e1000316.

Huxhold, O., Fiori, K.L., & Windsor, T.D. (2013). The dynamic interplay of social network characteristics, subject well-being, and health: The costs and benefits of socio-emotional selectivity. *Psychology and Aging, 28,* 3-16.

Kiecolt-Glaser, J.K., & Newton, T.L. (2001). Marriage and health: His and hers. *Psychological Bulletin, 127*, 472–503.

Lang, F.R., & Carstensen, L.L. (1994). Close emotional relationships in lat life: Further support for proactive aging in the social domain. *Psychology and Aging, 9,* 315-324.

Leary, M.R., & Baumeister, R.F. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin, 117,* 497-529.

Lakey, B., & Cohen, S. (2000). Social support theory and measurement. In S. Cohen, L.G. Underwood, L.G., & B.H. Gottlieb (Eds), *Social support measurement and intervention: A guide for health and social scientists* (pp. 29-52). New York: Oxford University Press.

Levinson, D.J. (1978). *The seasons of a man's life.* New York: Knopf.

MacKinnon, D.P., Lockwood, C.M., Hoffman, J.M., West, S.G., & Sheets. V. (2002). A comparison of methods to test mediation and other intervening variable effects. *Psychological Methods, 7,* 83-104.

Mikulincer, M., & Shaver, P.R. (2007). *Attachment in adulthood: Structure, dynamics, and change.* New York: Guilford.

Neugarten, B.L., Moore, J.W., & Lowe, J.C. (1965). Age norms, age constraints, and adult socialization. *American Journal of Sociology, 70,* 710-717.

Radloff, L.S. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement, 1*, 385-401.

Reis, H.T., Gable, S.L. & Maniaci, M.R. (2014). Methods for studying everyday experience in its natural context. In H.T. Reis & C.M. Judd (Eds.), *Handbook of research methods in social and personality psychology* (2nd edition, pp. 373-403). New York, NY: Cambridge University Press.

Reis, H.T., Lin, Y., Bennett, E.S., & Nezlek, J. (1993). Change and consistency in social participation during early adulthood. *Developmental Psychology, 29,* 633-645.

Reis, H.T., Nezlek, J., & Wheeler, L. (1980). Physical attractiveness in social interaction. *Journal of Personality and Social Psychology, 38*, 604-617.

Reis, H.T., & Wheeler, L. (1991). Studying social interaction with the Rochester interaction record. *Advances in Experimental Social Psychology, 24,* 269-318.

Reis, H.T., Wheeler, L., Spiegel, N., Kernis, M., Nezlek, J., & Perri, M. (1982). Physical attractiveness in social interaction: II. Why does appearance affect social experience? *Journal of Personality and Social Psychology, 43,* 979-996.

Ryff, C.D., & Keyes, C.L. (1995). The structure of psychological well-being revisited. *Journal of Personality and Social Psychology, 69,* 719-727.

Russell, J. (1996). UCLA loneliness scale (version 3): Reliability, validity, and factor structure. *Journal of Personality Assessment, 66,* 20-40.

Schaefer, M.T., & Olson, D.H. (1981). Assessing intimacy: The PAIR Inventory. *Journal of Marital and Family Therapy, 7,* 47-60.

Schafer, J.L., & Graham, J.W. (2002). Missing data: Our view of state of the art. *Psychological Methods, 7*, 147-177.

Schwarz, N. (2012). Why researchers should think "real-time": A cognitive rationale. In M.R. Mehl & T.S. Conner (Eds.), *Handbook of research methods for studying daily life* (pp. 22-42). New York: Guilford.

Settersten, R.A., & Hägestad, G.O. (1996). What's the latest? Cultural age deadlines for family transitions. *The Gerontologist, 36,* 178-188.

Sneed, J.R., Whitbourne, S.K., Schwartz, S.J., & Huang, S. (2012). The relationship between identity, intimacy, and midlife well-being: Findings from the Rochester Adult Longitudinal Study. *Psychology and Aging, 27,* 318-323.

Taylor, S.E., Klein, L.C., Lewis, B.P, Gruenwald, T.L., Gurung, R.A.R., & Updegraff, J.A.

 (2000). Biobehavioral responses to stress in females: Tend-and-befriend, not fight-or-

 flight. *Psychological Review, 107*, 411-429.

Umberson, D., Chen, M.D., House, J.S., Hopkins, K., & Slaten, E. (1996). The effect of social

 relationships on psychological well-being: Are men and women really so different?

 American Sociological Review, 61, 837-857.

Wheeler, L., & Nezlek, J. (1977). Sex differences in social participation. *Journal of Personality*

 and Social Psychology, 35, 742-754.

Wheeler, L., Reis, H.T., & Nezlek, J. (1983). Loneliness, social interaction, and sex roles.

 Journal of Personality and Social Psychology, 45, 943-953.

Whitbourne, S.K., Sneed, J.R., & Sayer, A. (2009). Psychosocial development from college

 through midlife: A 34-year sequential study. *Developmental Psychology, 45,* 1328-1340.

White, R.W. (1966). *Lives in progress.* New York: Holt, Rienhart & Winston.

Wrzus, C., Hänel, M., Wagner, J., & Neyer, F.J. (2013). Social network changes and life events

 across the life span: A meta-analysis. *Psychological Bulletin, 139,* 53-80.

Footnotes

1. The original research was aimed at examining sex differences in the patterns of social

   interaction (Wheeler & Nezlek, 1977), the relationship between physical attractiveness and

   social competence (Reis, Nezlek, & Wheeler, 1980; Reis et al., 1982), and the impact of

   social activity on loneliness (Wheeler, Reis & Nezlek, 1983).

2. Women reported marginally higher quantity (βs = .16 in Figures 1 and 3, and .17 in Figure 2,

   all ps < .10), and significantly higher quality social activity (βs = .21 in Figures 1 and 3, and

   .22 in Figure 2, all ps < .05) at age-20 than men. In addition, women reported higher quality

   age-50 friendship quality than did men (β = .18, p < .05; see Figure 2.)

3. Because means and intercepts were estimated in the proposed models, the correct χ^2 and

   degrees of freedom for the independence model had to be estimated in AMOS by removing

   all associations between observed variables. All reported fit indices were calculated using the

   χ^2 and degrees of freedom of the proposed model and the corrected independence model.

Table 1. Concurrent correlations among age-50 composite variables.

|	*n*	*M*	*SD*	*Age-50 Social Integration*	*Age-50 Friendship Quality*
Age-50 Social Integration	132	.000	.919	-	
Age-50 Friendship Quality	129	-.002	.907	.31**	-
Age-50 Psychological Outcomes	130	.009	.848	.35**	.57**

**p ≤ .01, *p ≤ .05

Table 2. Correlations between early-adult social activity and age-50 outcomes.

	Age-50 Social Integration	*Age-50 Friendship Quality*	*Age-50 Psychological Outcomes*
Interaction Quantity			
Age-20	.24** (128)	.23** (125)	.26** (126)
Age-30	.16 (84)	.03 (82)	-.04 (82)
Interaction Quality			
Age-20	.05 (128)	.27** (125)	.18* (126)
Age-30	-.04 (84)	.41** (82)	.22* (82)

**p ≤ .01, *p ≤ .05

Note: *n* for analysis included in parentheses

Figure 1. Direct effect of age-20 interaction quantity on age-50 social integration.
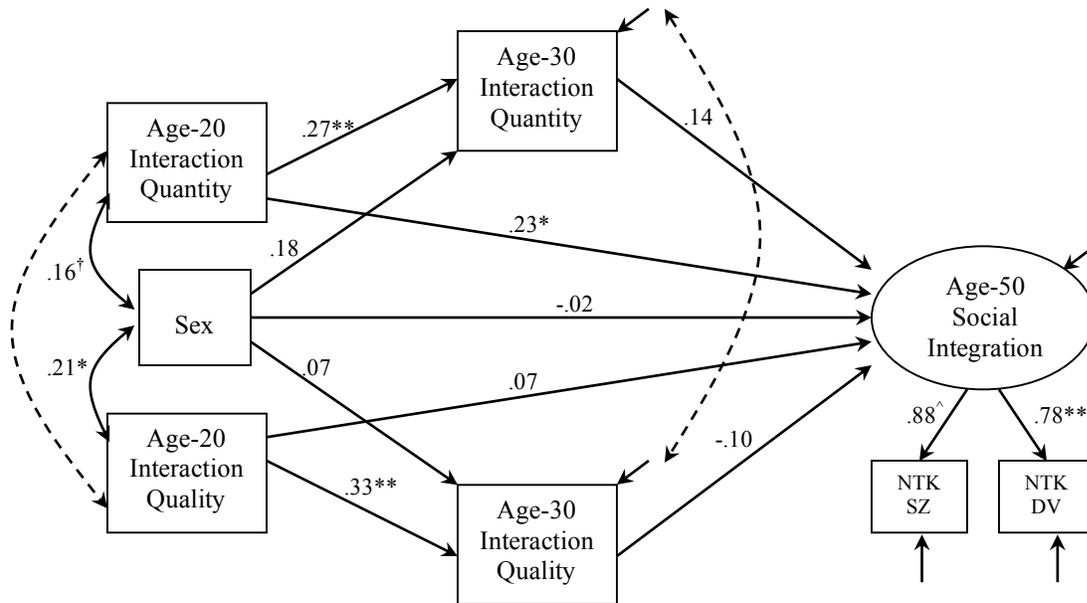
χ^2 (8, N = 133) = 2.19, p = .98, CFI = 1.00, TLI = 1.14, RMSEA = .00
*p < .05, **p < .01, ^ = path set to 1 to scale latent variable
Note: Dotted lines represent paths constrained to zero because the association was non-significant and including the path did not improve model fit.
NTK SZ = social network size; NTK DV = social network diversity

Figure 2. Direct effect of age-20 interaction quantity and indirect effect of early-adult interaction quality on age-50 friendship quality.

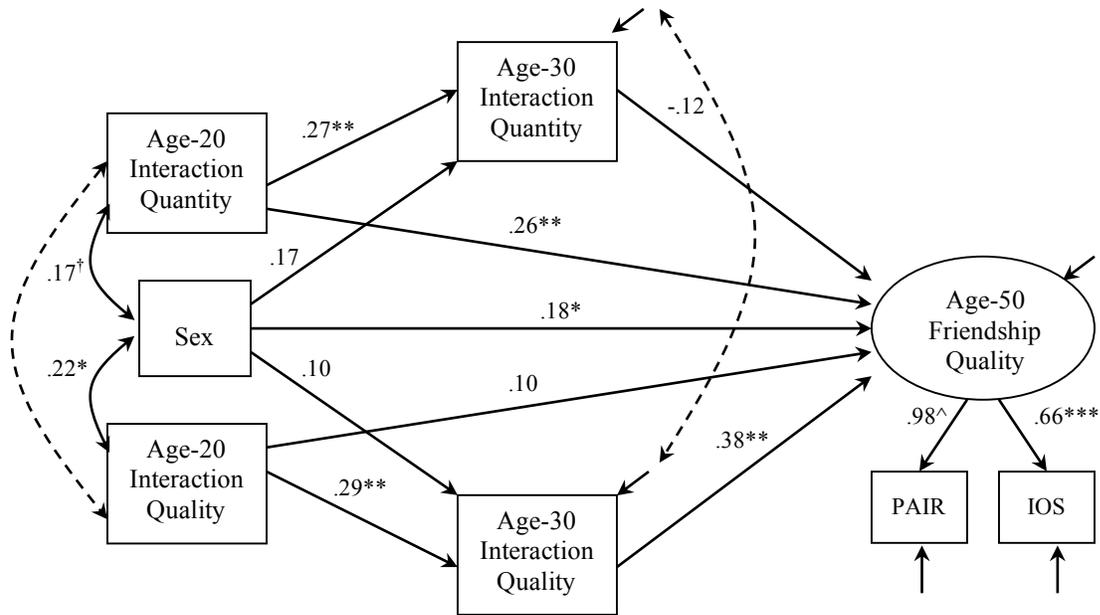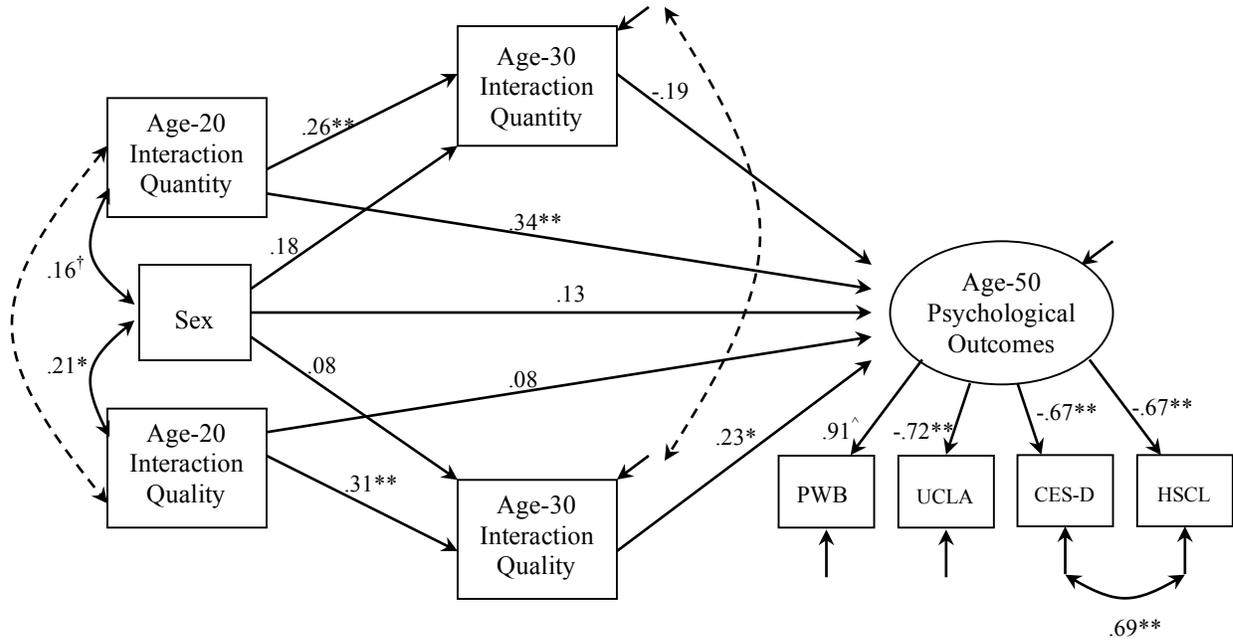

χ^2 (8, N = 133) = 4.36, p = .82, CFI = 1.00, TLI = 1.11, RMSEA = .00
*p < .05, **p < .01, ^ = path set to 1 to scale latent variable
Note: Dotted lines represent paths constrained to zero because the association was non-significant and including the path did not improve model fit.
PAIR = Intimacy; IOS = Closeness

Figure 3. Direct effect of age-20 interaction quantity and indirect effect of early-adult interaction quality on age-50 psychological outcomes.

χ^2 (20, N = 133) = 33.14, p = .03, CFI = .96, TLI = .93, RMSEA = .07
*p < .05, **p < .01, ^ = path set to 1 to scale latent variable
Note: Dotted lines represent paths constrained to zero because the association was non-significant and including the path did not improve model fit.
PWB = Psychological well-being; UCLA = Loneliness; CES-D = Depression; HSCL = Depression

Appendix A

Date_____ Time_____ am___ p.m.___ Length _____

Initials____ ____ ____ Male Group   Female Group
                       Mixed Group

Sex. ____ ____ ____ No _____

Initiator   Self   Other   Mutual   Unclear

Intimacy of Interaction   Intimate 7 6 5 4 3 2 1 Not Intimate

Satisfaction   Unpleasant 7 6 5 4 3 2 1 Pleasant

Location   Mine Theirs Ours Dining On Campus Off Campus

Nature Task Past-time Conversation Share Date Party Date/Party Other

The Rochester Interaction Record. Copyright © 1980 by the American Psychological Association. Reproduced with permission. The official citation that should be used in referencing this material is Reis, H. T., Nezlek, J., & Wheeler, L. (1980). Physical attractiveness in social interaction. *Journal of Personality and Social Psychology*, *38*(4), 604-617. doi:10.1037/0022-3514.38.4.604. The use of APA information does not imply endorsement by APA.