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Collaborative Everyday Problem Solving among Same-gender Friends in Early and Later Adulthood

JoNell Strough, Joseph P. McFall, Jennifer A. Flinn, and Kelly L. Schuller

West Virginia University

Abstract

To investigate potential age-related differences in performance gains (compensation, optimization) and losses (failure to actualize potential) of collaboration with a familiar partner, we compared pairs of older ($N = 75$; 69% women) and younger ($N = 75$; 52% women) age homogeneous same-gender friends who interacted or worked alone to generate strategies for solving interpersonal and instrumental problems. Two indexes of strategy fluency (total and unique number of strategies) and two indexes of strategy type (content of strategy repertoires, strategy selected as most effective by older and younger adults) were examined. Strategies generated by interacting pairs were compared to nominal pair scores. Nominal pair scores indexed dyadic potential and were created by pooling the performance of two individuals who worked alone. Age differences in strategy fluency and type were largely similar to prior research based on individual problem solvers. Interacting pairs produced fewer strategies than nominal pairs but there were no differences in strategy type. For interpersonal problems, older adults were relatively more likely to actualize their dyadic potential.

Keywords

collaborative cognition; nominal pairs; everyday problem solving; friends; aging

Early research on “collaborative cognition” or “interactive minds” suggested older adults benefit more from working with a partner than do younger adults (Dixon, 1992; Staudinger & Baltes, 1996). Subsequent research addressed whether collaboration serves a compensatory function by allowing older adults to offset age-related cognitive declines (Dixon & Gould, 1998; Strough & Margrett, 2002). Some investigations of compensatory collaboration compared spouses to strangers. Older heterosexual spouses usually (but not always) outperform strangers on memory tasks (Johansson, Andersson, & Rönnerberg, 2000; cf., Gould, Osborn, Krein, & Mortenson, 2002). Other investigations of compensatory collaboration compared memory performance in younger spouses to older spouses (e.g., Dixon & Gould, 1998). The focus on spouses and memory performance limits the generalizability of research on collaborative cognition. A spouse may not be available due to divorce, death, marital discord or because the person never married. Research with young adults indicates collaboration between friends on memory tasks can be beneficial (Andersson & Rönnerberg, 1996, 1997).

Correspondence concerning this article should be sent to JoNell Strough, Department of Psychology, West Virginia University, Morgantown, WV 26506–6040. Email may be sent to JoNell.Strough@mail.wvu.edu..

Jennifer Flinn is now at Frostburg State University, Department of Psychology. Kelly Schuller is now at the College of Charleston, Department of Psychology.

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Most people have friends regardless of marital status and same-gender friendships are important across the lifespan (Maccoby, 1998; Rawlins, 2004). We compared age homogeneous same-gender friend pairs of older adults to younger adults. To further extend research on collaborative cognition, we used an everyday problem-solving task with multiple metrics of task performance and a nominal pairs design. We built on previous research to test hypotheses regarding compensatory and optimizing functions of collaboration and to examine whether the actualization of dyadic potential varied systematically a function of age group.

Everyday problems are dilemmas, obstacles, or challenges encountered in daily life (Berg & Klaczynski, 1996). When solving everyday problems, people seek input from others, including their friends, (Berg, Strough, Calderone, Sansone, & Weir, 1998; Strough, Patrick, Swenson, Cheng, & Barnes, 2003). In some cases, people prefer to solve problems collaboratively rather than individually (Strough, Cheng, & Swenson, 2002). Collaborating with a friend may be associated with the number (i.e., strategy fluency) and type of strategies (e.g., action v. emotion regulation) considered, as well as the strategy selected as most effective for solving a problem. These issues have not been addressed in the everyday problem-solving literature. The methods employed typically focus on the individual problem solver (cf., Margrett & Marsiske, 2002). This focus is surprising given that everyday problem solving often occurs in a social context (Strough, Berg, & Sansone, 1996), making it important to understand whether collaboration alters the problem-solving process. Below, we draw from research based on individual problem solvers to develop hypotheses regarding the compensatory and optimizing functions of collaboration for older adults.

Compensatory and Optimizing Functions of Collaboration

Evidence for the compensatory function of collaboration is derived from research indicating age similarities in older and younger collaborators' performances on memory (Dixon & Gould, 1998) and "everyday" cognitive tasks (Berg, Johnson, Meegan, & Strough, 2003; Cheng & Strough, 2004). Dixon and Gould (1998) suggest that when age homogeneous collaborating pairs of older and younger adults perform similarly on memory tasks, this may indicate compensation because older adults working alone typically perform worse than younger adults on memory tasks.

It is well documented that older adults generate fewer strategies than younger adults for solving everyday problems (Thornton & Dumke, 2005). Having a large strategy repertoire allows flexible responding in the face of obstacles, facilitating successful problem resolution (Spivack & Shure, 1982). Age differences in fluency are often interpreted as an age-related deficit in problem-solving performance (Marsiske & Margrett, 2006). If collaboration serves a compensatory function, typical age differences in strategy fluency may be less pronounced when comparing younger and older collaborators than when comparing younger and older individuals.

As a sole index of problem-solving performance, strategy fluency is insufficient. It does not capture variations in strategy effectiveness. To address this issue, some researchers restrict fluency indexes to the number of "safe and effective" strategies (Denney & Pearce, 1989). However, this index could place older adults at a disadvantage if older adults' greater problem-solving experience leads them to discount strategies they personally have found to be ineffective (Berg, Meegan, & Klaczynski, 1999). Moreover, older adults may selectively apply strategies they have found to be effective in their experience (Blanchard-Fields, 2007). For example, Blanchard-Fields suggests that older adults' greater life experience is associated with knowledge of the types of strategies that are most effective for solving interpersonal everyday problems. Accordingly, to address questions pertaining to strategy effectiveness, it is important

to examine not only strategy fluency, but also the types of strategies individuals select for solving problems occurring within specific domains.

Investigations of age differences in strategy type distinguish problem-focused strategies (e.g., independent actions, planning) from emotion-focused strategies (e.g., avoiding, denying, and depending on others; see Berg et al., 1998; Birditt, Fingerman, & Almedia, 2005; Blanchard-Fields, 2007; Blanchard-Fields, Stein, & Watson, 2004; Carver, Scheier, & Weintraub, 1989; Heckhausen & Schulz, 1995; Lazarus, 1996; Sorkin & Rook, 2006). When solving instrumental problems, both older and younger adults endorse problem-focused strategies (see Blanchard-Fields, 2007 for a review). Problem-focused strategies are judged by external evaluators to be effective for solving instrumental problems (Cornelius & Caspi, 1987).

When solving interpersonal problems, older adults are more likely than younger adults to endorse emotion-focused strategies, either alone or in combination with problem-focused strategies (Birditt, et al., 2005; Blanchard-Fields, Jahnke, & Camp, 1995; Blanchard-Fields, Chen, & Norris, 1997; Blanchard-Fields, Mienaltowski & Seay, 2007; Watson & Blanchard-Fields, 1998). Compared to younger adults, older adults' selection of strategies for solving interpersonal problems better approximates external judges' evaluations of strategy effectiveness (Blanchard-Fields et al., 2007). Thus, in contrast to the age-related deficits suggested by strategy fluency, age-related maintenance (instrumental problems) or improvement (interpersonal problems) is suggested when strategy type is the performance metric (Blanchard-Fields, 2007).

Collaboration serves an optimizing function when it improves performance instead of remediating a deficit (Staudinger & Baltes, 1996). Staudinger and Baltes found that collaboration optimized performance (wise responses) on an interpersonal advice-giving task (e.g., giving advice to a friend considering suicide), especially for older adults. When taken together with prior research on interpersonal everyday problem solving (e.g., Blanchard-Fields, 2007), Staudinger and Baltes' study suggests that interpersonal everyday problem solving may be a fruitful domain within which to investigate whether collaboration serves an optimizing function for older adults.

As an initial step toward investigating the optimizing function of collaboration in later adulthood, we examined whether interacting pairs generated different types of strategies for solving interpersonal problems than individuals working alone. Optimization could occur if interacting pairs generate different types of strategies. The existence of different types of strategies is necessary, but not sufficient, to produce variability in effectiveness. Different types of strategies could be equally effective. This is particularly the case when everyday problems are ill-defined such that there is no single "best" solution (Sinnott, 1989).

When individuals solve problems, they must ultimately select a strategy to enact from the alternatives available in their larger repertoires. Accordingly, we distinguished strategy generation from strategy selection. Strategy selection is constrained not only by available alternatives, but also individual characteristics, demands of specific problems, and contextual resources (Crick & Dodge, 1994; Sansone & Berg, 1993). Our interest was whether the social context of interacting with a partner might alter the types of strategies older and younger adults generated and selected as most effective. Compared to individuals working alone, interacting partners could ultimately select different strategies either because they generate different types of strategies or because they choose different strategies from similar alternatives (cf., Rietzchel, Nijstad, & Stroebe, 2006).

Unit of Analysis

When considering whether collaboration serves a compensatory or optimizing function, the unit of analysis must be carefully considered. Comparisons of collaborating pairs' performances on memory tasks to individuals' performances (Dixon & Gould, 1998; Gould, Trevithick, & Dixon, 1991) often are cited as evidence of compensatory collaboration. However, comparing a pair's score to an individual's score does not provide a rigorous test of the effect of socially interactive collaboration because social interaction and pair performance are confounded. The difference between a pair's score and an individual's score may not be due to social interaction. Instead, the difference may reflect that a score based on two persons is compared to a score based on one person. Thus, much of the extant evidence for compensatory collaboration is based on an experimental design in which pair performance and social interaction are confounded.

To disentangle the confound between pair performance and social interaction it is necessary to control the number of persons whose efforts are compared. Nominal pair designs provide such control (see Hill, 1982; Steiner, 1972). Nominal pair scores are the sum of the non-overlapping scores of two persons working alone. On a recall memory task, if person 1 recalls 5 items (a, b, c, d, e) and their nominal partner (person 2) recalls 6 items (d, e, f, g, h, i) then the nominal pair score equals 9 (a, b, c, d, e, f, g, h, i). Items recalled by both persons (d, e) are counted once. Comparing nominal pairs' scores to interacting pairs' scores isolates the effect of *social interaction* on performance because the number of persons is controlled.

Dyadic Potential

Nominal pair scores index dyadic potential, or what two persons are capable of achieving. When the performance of interacting pairs is compared to that of nominal pairs, interacting pairs often perform worse. On memory and brainstorming tasks, interacting pairs fail to meet their dyadic potential (Andersson, 2001; Mullen, Johnson, & Salas, 1991; Weldon & Bellinger, 1997; cf., Basden, Basden, & Henry, 2000). This is counterintuitive; individuals expect to perform better in groups than alone (Paulus, Larey, & Ortega, 1995). A host of explanations have been offered to account for interacting pairs' poorer performance (see Diehl & Strobe, 1991; Kerr & Bruun, 1983; Paulus & Dzindolet, 1993; Price, Harrison, & Gavin, 2006; Stasser & Titus, 1985). These explanations converge in emphasizing interpersonal processes. Indeed, interacting pairs face challenges not faced by individuals working alone: solving interpersonal problems that may emerge while working together. Among adolescents, failure to resolve such problems is associated with poorer collaborative task performance (Strough, Berg, & Meegan, 2001).

Familiar partners are better able than strangers to offset performance losses associated with social interaction. For older adults, collaborating with a spouse on memory tasks offsets some of the performance deficits (Johansson, et al., 2000; Johansson, Andersson, & Rönnerberg, 2005). Similar benefits are found for adolescents and young adults collaborating on memory tasks with friends (Andersson & Rönnerberg, 1995, 1996, 1997). To date, researchers have not investigated age differences in the performance of nominal versus interacting pairs of familiar partners. We investigated whether performance losses within interacting pairs (as indexed by failure to achieve dyadic potential) generalized to everyday problem solving tasks and differed as a function of age group.

Older adults may be better able than younger adults to navigate the interpersonal aspects of collaboration with a familiar partner. Everyday problem solving research suggests older adults are more skilled than younger adults at solving interpersonal problems (see Blanchard Fields, 2007). To the extent that older adults prevent or overcome the interpersonal challenges presented by collaborating with a partner, they may be relatively more likely than young adults

to actualize their dyadic potential such that performance losses are less apparent among older adults. Further, collaboration could serve a compensatory function on performance metrics associated with age-related deficits (strategy fluency) and an optimizing function on metrics associated with age-related maintenance or improvement (strategy type). To investigate these issues, we compared age homogeneous younger and older interacting and nominal pairs of friends.

Research Questions and Hypotheses

Our first research question was: Are there age differences in strategy fluency when the strategies nominal and interacting pairs generate to solve everyday problems are compared? In accord with previous research comparing nominal to interacting pairs, we expected that nominal pairs would generate more strategies. Drawing from prior research on compensatory collaboration, we expected younger adults would generate more strategies than would older adults in the individual (nominal pairs) condition and that this age difference would be attenuated in the collaborative (interacting pairs) condition. Our second research question was: Are there age differences in the types of strategies generated by nominal and interacting pairs? Drawing from research on the optimizing function of collaboration, we explored whether differences between interacting and nominal pairs were more pronounced for older adults than for younger adults when the types of strategies generated and selected as most effective for solving interpersonal problems were examined.

Method

Participants

Pairs of same-sex younger ($N = 75$, 52% women; M age = 19.69 yrs., $SD = 1.92$ yrs.) and older friends ($N = 75$, 69% women; M age = 72.72 yrs., $SD = 8.12$ yrs.) were recruited. The older adults were mostly white (92%), had on average, 13.46 years of education ($SD = 2.82$ yrs.) with 61.33% reporting that their annual household income was less than \$50,000 (18.66% reported incomes greater than \$50,000 with the remainder indicating that they did not know/did not want to answer). Most of the older adults were currently married (48.3%) or widowed (33.5%), followed by divorced (14.6%), or never married/other (3.3%). The young adults were mostly white (87.33%), had on average, 13.63 years of education ($SD = 1.28$ yrs.) with 52.01% reporting that the annual household income of their parents was less than \$70,000 (29.33% reported \$70,000 or greater with the remainder indicating that they did not know/did not want to answer). Most of the young adults were never married (93.3%) with the remainder reporting other (6.3%) or cohabitation (1.8%).

To be eligible for participation, pairs had to have been friends for at least six months. This criterion was based on research indicating that partners whose relationships were at least 3-months long outperformed unfamiliar partners on a collaborative task (Southerly, Strough, & Snyder, 2005). Friendship length was significantly longer among older adults ($M = 22.01$ yrs., $SD = 20.79$ yrs.) than younger adults ($M = 4.87$ yrs., $SD = 4.26$ yrs.), $F(1,148) = 51.39$, $p < .001$.

Pairs were randomly assigned to either the interacting ($N = 76$) or nominal ($N = 74$) pairs condition. Of the nominal pairs, 37 pairs were younger adults (19 female, 18 male), and 37 were older adults (26 female, 11 male). Of the interacting pairs, 38 pairs were younger adults (20 female, 18 male) and 38 were older adults (26 female, 12 male).

Procedure

A community sample of older friend pairs was recruited from West Virginia and Pennsylvania. Each older adult participant received \$20.00. Younger friend pairs were college students

recruited through flyers on the West Virginia University campus or through psychology classes. Each younger adult was given a choice of \$20.00 or extra credit in a psychology class. Measures and procedures relevant to the current report are detailed below.

Pairs participated at a time and location convenient to them and arrived together to complete the study. Younger pairs completed the study in meeting rooms on campus; most older pairs completed the study in meeting rooms in community centers. After providing informed consent, each participant completed a demographic questionnaire. Next, the experimenter gave pairs verbal instructions for completing the everyday problem-solving tasks. These instructions emphasized the importance of generating as many ways (strategies) as possible to solve each problem. Participants were then given the “Everyday Problems” Questionnaire. Problem vignettes appeared in four different orders; order was counterbalanced across age group and condition (nominal, interacting). At the top of each page, participants were instructed to list “as many different strategies as you can think of” and to indicate by placing an “X” next to the strategy, the strategy they believed would most effectively solve the problem.

Next, participants assigned to the nominal pair condition were separated and each completed the Everyday Problems Questionnaire privately in a location separate from their partner. Participants in the collaborative (interacting pairs) condition remained together. Interacting pairs received a single copy of the questionnaire to read and record their strategies and were instructed to come to a consensus about the most effective strategy for solving each problem. In both the interacting and nominal pairs conditions, participants were allowed unlimited time to complete the tasks. Participants were given the opportunity to take a break, and then individually completed a battery of cognitive tests, following which they were thanked for their participation.¹

Measures

Everyday Problems Questionnaire—The Everyday Problems Questionnaire consisted of a subset of problem vignettes from Cornelius and Caspi's (1987) Everyday Problem Solving Inventory. We modified the inventory by asking participants to generate their own strategies rather than presenting a list of strategies to rate. Written (14-point font) descriptions of interpersonal and instrumental problems were presented (one problem per page) followed by an 8.5 X 7.75 inch space for participants to write problem-solving strategies. Four vignettes (two interpersonal, two instrumental) that met the following criteria were used: a) the problem must be relevant to younger and older adults, b) the problem must be either an interpersonal or an instrumental problem (not a mix), c) within each problem domain (interpersonal or instrumental), the two vignettes should be relatively similar because previous research (Berg, 1989; Swenson, 2003) indicates strategies vary according to the specific problem within a domain.

Two *interpersonal vignettes* described problems with an intrusive friend. One vignette described a friend who criticized the person for an important decision that he/she had made. The other vignette described a friend who offered unwanted and unneeded advice. Responses to the two interpersonal problems were combined in the primary analyses. The majority of both younger (94%) and older (76%) adults reported experience with these problems.

Two *instrumental vignettes* described problems with household responsibilities that were under the direct control of the person. One vignette described how household chores had begun to

¹Wechsler's (1997) Digit-Symbol Substitution Task was used to assess processing speed, the combined Backward and Forward Digit Span Tests from the WAIS-R-III (Wechsler, 1997) was used to assess working memory, and the Kauffman Brief Intelligence Test (K-BIT) was used to assess fluid and verbal ability (Kauffmann & Kauffman, 1990). Inclusion of these variables as covariates in the analyses did not change the results.

pile up due to a lack of time. The other described how a person's home had become too cluttered with infrequently used sentimental items. In the primary analyses, responses to the two instrumental problems were combined. The majority of both younger (86.6%) and older (94%) individuals reported experience with these instrumental problems.

Demographic information—Each participant's age, race, gender, income, education, and relationship length (number of years and months) was assessed via self-report on a written questionnaire.

Strategy Coding

We categorized strategies at a very fine-grained level to ensure that we could detect differences in the types of strategies mentioned by nominal and interacting pairs if differences did indeed exist. We were concerned that a broader categorization might obscure differences because distinctions exist within problem-focused and emotion-focused strategies. Problem-focused strategies for dealing with interpersonal problems can be constructive or destructive (Birditt et al., 2005). Emotion-focused strategies can be proactive or passive (Blanchard-Fields et al., 2004). To develop our coding scheme, we began with categories from prior research (Berg et al., 1998; Blanchard-Fields, et al., 2004; Carver et al., 1989; Patrick & Strough, 2004; Strough, Patrick, & Swenson, 2003; Watson & Blanchard-Fields, 1998). During training, coders used inductive and deductive techniques to further develop and refine the categories (King, 2004). The category labels and thematic coherence of the strategies in each category were then verified via a qualitative analysis completed by a researcher (C. Mehta) with extensive training in qualitative methodology who was unfamiliar with the coding categories. The dimensions underlying the strategy categories (e.g., problem-focused, emotion-focused) and many of the categories were the same as in other research (see Birditt et al., 2005; Blanchard-Fields et al., 2004; Sorkin & Rook, 2006). Some of the labels used by others were modified to better represent our data.

Strategy categories—Each strategy (including the strategy identified as most effective), was coded into one of 15 mutually exclusive and exhaustive categories. Eight strategies were problem-focused. Two of the eight represented efforts to change one's own behavior: *behavioral inhibition* (inhibiting or reducing behaviors associated with the problem; e.g., “stop accumulating things”) and *self-action* (altering one's behavior; e.g., “have a garage sale”). One strategy, *deliberation* (gathering information, choosing, deciding, or planning; e.g., “decide which items to keep,” “think about my decision”) represented cognitive analysis of the problem. Three problem-focused strategies were constructive, interpersonal strategies: *discussion* (engaging others who are involved in the problem without an explicitly stated agenda; e.g., “talk to them about it”), *seeking instrumental support* (seeking assistance or advice from others; e.g., “ask a friend to help with the chores,” “give the items to a family member”) and *self-assertion* (standing up for one's own interests; e.g., “remind them it was my decision”). Two were socially inappropriate, destructive acts: *aggression* (hostile actions directed toward others; e.g., “smack them”); *verbal aggression* (abusive talk; e.g., “yell at them”).

Six strategies were emotion-focused. Two reflected proactive attempts to regulate one's subjective experience: *accepting influence* (acceding to another person's point of view or actions; e.g., “listen to them”) and *emotion regulation* (managing feelings and subjective reactions; e.g., “calm down”). Four were more passive: *doing nothing* (not doing anything at all; e.g., “do nothing about it”); *ignoring the problem* (avoidance of thinking about the problem; e.g., “ignore them”), *leaving/disengaging* (leaving the situation and/or avoiding future involvement; e.g., “avoid them”) and *passive acceptance* (accepting the situation as it is and putting it in the past; e.g., “move on with my life”).

Strategies that were too vague to classify or did not fit into another category were placed into an *other* category. This category was infrequent but was included so that the coding scheme was exhaustive.

Strategy fluency—For each problem, the *total number of strategies* listed was coded. Total number of strategies included multiple instances of the same type of strategy (e.g., two discussion strategies) and/or distinct types of strategies (e.g., one discussion strategy and one deliberation strategy). *Unique strategies* were strategies coded into different categories. For example, if a participant listed two self-assertion strategies and one discussion strategy, the total number of strategies was three but the number of unique strategies was two. To determine the number of unique strategies, coders determined whether a strategy category was present or absent and then counted the number of categories present in the response.

We used two indexes of strategy fluency to examine the generalizability of the results across measures and to address the source of age or pair differences in strategy fluency. For example, age and/or pair differences might reflect mention of different strategy types (e.g., “self-action,” versus “deliberation”) or differences in the frequency of a given type of strategy (e.g., multiple ways of taking “self-action”).

Reliability of strategy coding—Strategy fluency and strategy type data from a different study were used to train three graduate student research assistants to a criterion of 80% agreement with the criterion coder (J. Strough). These training data were from nominal and interacting pairs who generated strategies for solving the same everyday problems used in the current investigation. Coders met weekly and discussed their disagreements until consensus was reached. After achieving the 80% criterion, the three coders and the criterion coder each independently coded 20% of the data from the current investigation to establish the reliability of the coding categories for nominal and interacting pairs of younger and older adults. Coders were blind to age and condition. Interrater reliability was assessed via kappa coefficients (see Table 1). The two coders who were most reliable with the criterion coder then independently completed the coding. Periodic reliability checks between these two coders were conducted using an additional six cases. These checks indicated that reliability was maintained or improved (see Table 1).

For the total number of strategies and the number of unique types of strategies, the same coding training procedure was employed. Reliability was assessed by computing intraclass correlation coefficients on the 20% of the data that was coded independently. Interrater agreement was excellent for both measures of strategy fluency ($r = .98$ for total number of strategies; $r = .96$ for number of unique types of strategies). After reliability was established, two coders (the same coders who coded strategy type) independently completed the remainder of the coding. Periodic reliability checks indicated that interrater agreement was maintained ($r = .99$ for total number of strategies; $r = .96$ for number of unique types of strategies).

Strategy Type Scores

Proportion score—We used two measures of strategy type. The first was a proportion score. This measure indexed the relative representation of a given type of strategy in relation to the entire problem-solving repertoire. This measure captured diversity in the content of problem-solving repertoires while simultaneously categorizing the extent to which a particular type of strategy was representative of the repertoire. We have used this measure in our previous research (Patrick & Strough, 2004; Strough et al., 2003).

We computed proportion scores for each strategy category by dividing the number of strategies that fell into a given category by the total number of strategies. For example, if the total number of strategies was three, and two were “discussion” strategies, the discussion strategy score was .

66. For each strategy type category, scores from the two instrumental problems were averaged and scores from the two interpersonal problems were averaged. This resulted in two sets of strategy proportion scores, one set for instrumental problems, and another set for the interpersonal problems (see Table 2).

Most effective strategy—The strategy that participants selected as most effective for solving the problem was the second measure of strategy type. This measure is innovative. Prior research has used researchers' or experts' ratings of effectiveness (e.g., Artistic, Cervone, & Pezzuti, 2003; Blanchard-Fields et al., 2007). Analyses based on this measure were exploratory and were directed toward understanding the consequences of social interaction across various aspects of the problem-solving process. In analyses using this measure, it was necessary to examine each problem separately rather than combining across the two problems within a domain. This was necessary because as might be expected based upon prior research on the contextual specificity of strategies (Berg, 1989), the strategies selected as most effective were not always exactly the same across the two problems within a domain. Within the interpersonal domain, the same strategy was selected for the two problems 30% of the time. Within the instrumental domain, the same strategy was selected for the two problems 34% of the time. Thus, there were four sets of most effective strategy codes (one for each problem).

Strategy Fluency Scores

Total number of strategies—The total numbers of strategies listed in response to each of the two instrumental problems were averaged. Total numbers of strategies from the two interpersonal problems were averaged. This resulted in two scores: one for the interpersonal domain and one for the instrumental domain (see Table 2).

Number of unique strategies—The numbers of unique types of strategies listed in response to each of the instrumental problems were averaged. The unique numbers of strategies from the two interpersonal problems were averaged. Thus, there were two scores: one for the interpersonal domain and one for the instrumental domain (see Table 2).

Nominal Pair Scores

To compute strategy type proportion scores and fluency scores for nominal pairs, we adapted the formula used to examine collaborative memory performance (see Andersson, 2001). For nominal pairs, the proportion of strategies of a given type was based upon non-overlapping strategies generated by friends who comprised the non-interacting pairs. For instance, if person 1 listed two discussion strategies and one self-action strategy, and their nominal partner (person 2) listed three discussion strategies and one self-assertion strategy, the nominal pair's score was five for total number of strategies (three discussion, one self-action, one self-assertion); three for number of unique types of strategies (discussion, self-action, self-assertion); and .60 for the proportion of discussion strategies.

For the most effective strategy, nominal partners did not always nominate the same type of strategy (agreement between members of nominal pairs on the most effective strategy ranged from 24% to 45% across the four problems). For those who disagreed, it was not possible to compute nominal pair scores. Thus, in the exploratory analyses that used the most effective strategy as the performance metric, interacting pairs were compared to individuals, not to nominal pairs. The types of strategies selected by interacting pairs were compared to the types of strategies selected by individuals as most effective for each of the four problems (two instrumental, two interpersonal).

Results

Preliminary Analyses

Data screening was conducted to examine potential outliers, determine whether variables were normally distributed, and identify missing data. There were no missing strategy data. For most variables, there were several univariate outliers. Cook's Distance and Leverage statistics indicated no multivariate outliers. Skewness and kurtosis values for strategy fluency and strategy type indicated positive skew. When outliers were removed, these variables were normally distributed. Analyses that addressed the research questions were performed both with and without outliers; the results were the same. Therefore, all data were included.

Prior to conducting the analyses that addressed the primary research questions, analyses were conducted to: a) address potential vignette order effects; b) explore potential unexpected gender differences in strategy fluency and strategy type; and c) to address the role of friendship length in understanding potential age differences.² There were no significant order effects. Gender was nonsignificant both as a main effect and as an interaction effect with age and condition. Analyses with and without gender, and with and without friendship length as a covariate, yielded the same results.³ Therefore, gender and friendship length were excluded from further analyses.

Strategy Fluency: Total Number and Number of Unique Strategies

To determine whether there were age differences in strategy fluency when nominal and interacting pairs were compared, we conducted a 2 (condition: nominal, interacting pair) X 2 (age group: younger, older) MANOVA. The four measures of strategy fluency (i.e., total number of strategies for interpersonal and instrumental problems; number of unique strategies for interpersonal and instrumental problems) were dependent variables. We used univariate ANOVAs to follow up significant multivariate tests and set alpha at .05 for all significance tests.

Condition by age—In accord with our hypothesis, the multivariate condition by age interaction was significant, Wilks' $\Lambda = .91$, $F(4, 143) = 3.59$, $p < .01$. The interaction was localized to the two indexes of strategy fluency associated with interpersonal problems: total number of strategies, $F(1, 146) = 11.31$, $p < .01$, $\eta_p^2 = .07$ and unique number of strategies, $F(1, 146) = 5.64$, $p < .05$, $\eta_p^2 = .04$. For instrumental problems, the condition by age interaction was not significant for either index of strategy fluency ($ps > .05$, $\eta_p^2 < .01$.)

For the interpersonal problems, younger adults listed a greater total number of strategies and a greater number of unique strategies than did older adults. However, the difference between younger and older adults was smaller in the interacting pair condition than in the nominal pair condition (see Figures 1 and 2).

Pair condition—The multivariate main effect of condition on the measures of strategy fluency indicated nominal pairs outperformed interacting pairs, Wilks' $\Lambda = .66$, $F(4, 143) = 18.42$, $p < .001$. For instrumental problems, nominal pairs listed a greater total number of strategies ($M = 7.33$, $SD = 2.39$) than interacting pairs ($M = 5.01$, $SD = 1.62$), $F(1, 146) = 49.59$, $p < .001$, $\eta_p^2 = .25$. Nominal pairs also listed a greater number of unique strategies ($M = 3.51$, $SD = .94$) than interacting pairs ($M = 2.77$, $SD = .69$), $F(1, 146) = 31.85$, $p < .001$, $\eta_p^2 = .18$.

²All analyses are available upon request.

³The single exception was that for instrumental problems, the age difference in seeking instrumental support was nonsignificant when friendship length was included as a covariate.

For interpersonal problems, this main effect of condition was qualified by the above-described condition by age interaction.

Age. The multivariate main effect of age was significant, Wilks' $\Lambda = .69$, $F(4,143) = 16.13$, $p < .001$. For instrumental problems, compared to older adults, younger adults listed a greater total number of strategies and a greater number of unique strategies (see Table 4). For interpersonal problems, the effect of age was qualified by the above-described condition by age interaction.

Strategy Type: Proportional Representation of Strategies

Our second research question was whether nominal and interacting pairs of older and younger adults generated different types of strategies for solving interpersonal and instrumental problems. Prior to conducting analyses that addressed this question, we examined the prevalence of each strategy type category within each of the four cells of the design. Some strategy types comprised a very small proportion of responses. Proportion scores that comprised less than 5% of responses by age group and condition (for interpersonal and instrumental problems, respectively) were excluded from analyses (see Table 2). Excluding these strategies reduced the number of comparisons and prevented statistical issues associated with singular data matrices.

A 2 (condition: nominal, interacting pair) X 2 (age group: younger, older) MANOVA with twelve strategy type proportion scores as dependent variables was conducted. Eight of the twelve proportion scores corresponded to interpersonal problems (i.e., deliberation, discussion, seeking instrumental support, self-assertion, verbal aggression, accepting influence, emotion regulation, ignoring the problem). Four of the twelve proportion scores corresponded to instrumental problems (self-action, deliberation, seeking instrumental support, doing nothing).

In contrast to our hypothesis, the condition by age interaction was nonsignificant (Wilks' $\Lambda = .92$, $F(12,135) = 0.96$, $p = .49$). The main effect of condition also was nonsignificant, Wilks' $\Lambda = .90$, $F(12, 135) = 1.24$, $p = .26$. The main effect of age group was, however, significant, Wilks' $\Lambda = .47$, $F(12, 135) = 12.56$, $p < .001$.

Interpersonal problems—For interpersonal problems, compared to younger adults, a significantly greater proportion of older adults' strategies involved deliberation and seeking instrumental support (see Table 3). Compared to younger adults, a lesser proportion of older adults' strategies involved verbal aggression and ignoring the problem (see Table 3).

Instrumental problems—For the instrumental problems, compared to younger adults, a significantly greater proportion of older adults' strategies involved deliberation and seeking instrumental support (see Table 4). Compared to younger adults, a lesser proportion of older adults' strategies involved self-action and doing nothing (see Table 4).

Strategy Type: Most Effective Strategy

To explore whether the results for strategy type were consistent across measures, we used logit modeling and examined the type of strategy selected by participants as most effective (categorical criterion variable) as a function of two categorical predictor variables: age group (young, old) and condition (interacting, alone). We conducted four analyses (one for each problem: two interpersonal, two instrumental) that compared interacting pairs' responses to individuals' responses (not to nominal pairs). This approach was necessary because the same strategy was not always selected as the most effective strategy either across the two problems within a domain or by the two members of the nominal pair. To ensure that analyses had adequate power, low frequency strategies were combined to form an "other effective strategy"

category and the strategies that were nominated most frequently were retained as separate categories (see Tables 5 and 6). This resulted in an adequate ratio of cases to cells and sufficient expected cell values.⁴

K-way tests from hierarchical log-linear analyses conducted to identify partial associations to use in logit models indicated that age, but not condition, was significantly associated with the type of strategy selected as most effective. Logit models confirmed that strategies were associated with age but not condition. For all four problems, the model that included the first-order effect of Strategy and the Strategy X Age association had adequate expected fit: “critical friend” problem, $G^2(10) = 2.45$, $p = .99$; “advice-giving friend” problem, $G^2(8) = 4.73$, $p = .79$; “chores” problem, $G^2(6) = 5.70$, $p = .45$; “clutter” problem, $G^2(6) = 12.78$, $p = .05$.⁵ To localize the effects, we used standardized parameter estimates.⁶ Below, we describe the results for strategies that varied significantly ($p < .05$) as a function of age.

Interpersonal problems—For the advice-giving friend problem, younger adults were more likely to select “self-assertion,” “ignoring the problem” and “deliberation” as the most effective strategy (see Table 5). Older adults were more likely to select a strategy that was in the “other effective strategy” category for the advice-giving friend problem. For the critical friend problem, younger adults were again more likely to select “self-assertion” as the most effective strategy and also were more likely to select “discussion” (see Table 5). These age differences were similar regardless of whether problem solvers worked alone or with a friend.

Instrumental Problems—For the clutter problem, younger adults were more likely to select “self-action” as the most effective strategy (see Table 6). For the chores problem, younger adults were more likely to select “deliberation” as the most effective strategy (see Table 6). These age differences were similar regardless of whether problems solvers worked alone or with a friend.

Summary—Across all four problems, age, but not condition, was important for understanding the types of strategies selected as most effective. Individuals and interacting pairs selected similar types of strategies as most effective. Thus, the results for the strategy selected as most effective were consistent with results based on proportion scores: interacting with a friend did not yield significant differences in strategy type.

Discussion

As predicted, for strategy fluency, interacting pairs failed to achieve the level of performance of two friends working alone. For interpersonal problems, this failure was less pronounced in

⁴Five times the number of cases in relation to the number of cells modeled is recommended (Demaris, 1992; Green, 1998; Kennedy, 1992). Expected cell frequencies for all two-way associations should be greater than one and no more than 20% of cells less than five (Tabachnick & Fidell, 2001). For the interpersonal problems, 12 of the strategy type categories were selected at least once as the most effective strategy. However, when the two-way associations were examined for each interpersonal problem, 63% (critical friend) and 67% (advice-giving friend) of the cells had expected frequencies less than five, reflecting that 7 of the 12 strategies were infrequent. For the instrumental problems, 10 of the strategy type categories were selected at least once as the most effective strategy. However, when the two-way associations were examined for each problem, 70% of the cells had expected frequencies less than five, reflecting that 7 of the 10 categories were infrequent.

⁵The reported logit models were the most parsimonious models that generated expected frequencies that did not differ significantly from observed frequencies. Each model term significantly reduced the residual chi-square (Kennedy, 1992) associated with the null model. For the clutter problem, the fit of the model was only marginally adequate. A variety of procedures were attempted to improve the fit of the model for the clutter problem, including increasing and further reducing the number of strategy categories, and adding and deleting model terms. A better fitting model could not be identified.

⁶Standardized parameter estimates are similar to z-scores (Green, 1988) and indicate cell frequencies significantly different than would be expected by chance (Kennedy, 1992). Although parameter estimates can be converted to odds ratios, we used standardized parameter estimates because z-scores are a familiar metric and have been employed in previous developmental research using logit models (e.g., Berg et al., 1998).

older friends than younger friends: older friends were relatively more likely to achieve their dyadic potential. Thus, for some indexes of everyday problem-solving performance, social interaction appears to be less debilitating for older friends. For performance metrics based on strategy type, however, the consequences of collaboration appear to be inconsequential for both older and younger adults. Interacting pairs and individuals working alone generated and selected as most effective similar types of strategies. Thus, there was no indication that collaboration with a familiar partner optimized this aspect of performance on the everyday problems we examined.

Compensatory and Optimizing Functions of Collaboration in Everyday Problem Solving

Our findings did not support the hypothesis that collaboration with a familiar partner serves a compensatory function for older adults' everyday problem-solving performance. Although the difference between interacting and nominal pairs in strategy fluency was less pronounced for older friends, both older and younger friends failed to achieve their dyadic potential. This failure replicates and extends prior research on memory and brainstorming tasks (Andersson, 2001; Johannson et al., 2000, 2005; Mullen et al., 1991) to everyday problem-solving tasks. Social interaction appears to have detrimental consequences across a variety of cognitive tasks when fluency metrics (number of strategies or ideas generated, number of items remembered) are used to assess performance.

By demonstrating that social interaction is associated with poorer performance, our study suggests that interventions that target pairs instead of individuals in an attempt to remediate typical age-related cognitive declines must consider how to overcome barriers to optimal performance. Investigations of older friends' collaborative interactions may shed light on this issue. Differences in performance between nominal and interacting pairs were smaller for older friends than for younger friends. Older adults' interpersonal problem-solving skills (Blanchard-Fields, 2007) may allow them to prevent or deal more effectively with the interpersonal challenges of collaboration so that impairments for task performance are less likely to occur. Investigating interpersonal processes occurring during collaboration such as partners' ability to adjust control of the task (Berg et al., 2007), affective qualities of interactions (Berg et al., 2003; Gould, Kurzman, & Dixon, 1994) and the timing and type of interactive cues partners provide (Andersson, Hitch, & Meudell, 2006) may be useful in understanding why older adults are more likely to actualize their dyadic potential.

Although interacting pairs produced fewer strategies than did nominal pairs, they did not produce different types of strategies. Thus, one prerequisite necessary for demonstrating that collaboration optimizes problem-solving performance was not met. To the extent that collaborating and nominal pairs generated similar types of strategies and viewed the same types of strategies as most effective, the consequences of collaboration may be negligible (cf., Mullen et al., 1991). Perhaps optimization and compensation are more likely to occur when problems are more difficult and performance metrics index the upper limits of accumulated knowledge and judgment (e.g., Azmitia & Montgomery, 1993; Staudinger & Baltes, 1996). Situational demands also may facilitate or impede optimization. For example, requiring collaborators to come to a consensus may limit a thorough consideration of alternatives (Tjosvold & Field, 1985).

Age Differences and Similarities in Everyday Problem-Solving Strategies

Our findings are based on pairs, yet are strikingly similar to findings from prior research based on individuals. Age differences in strategy fluency favored younger adults (cf., Thornton & Dumke, 2005). Our findings also are notable given differences in the performance metrics we employed (e.g., proportional representation of strategies) in comparison to previous research (e.g., self-reports of strategy use; strategy endorsement ratings). For both younger and older

adults, the greatest proportions of strategies for solving instrumental and interpersonal problems and the strategies nominated as most effective were problem-focused (“self-action”, and “self-assertion”, respectively; cf., Berg et al., 1998; Blanchard-Fields et al., 1997). The relatively greater representation of deliberation and seeking instrumental support in older adults' strategy repertoires aligns with research indicating that older adults are more likely to endorse and report using cognitive analysis and inclusion of others (cf., Blanchard-Fields, 2007). Together, our findings suggest that everyday problem-solving research based on individuals generalizes to situations where younger and older adults seek input from friends.

By examining two indexes of strategy type (relative representation of strategies in relation to the larger repertoire, most effective strategy), our results point to the cognitive and motivational processes that underlie age similarities versus differences in strategy type. When solving interpersonal problems, self-assertion and accepting influence comprised the greatest proportion of both younger and older adults' strategy repertoires (cf., Sorkin & Rook, 2006). However, younger adults were more likely to select self-assertion as the most effective strategy. Age differences in strategies may reflect different goals (Berg et al., 1998). Sorkin and Rook found that self-assertion strategies were most frequent when the goal was to change the interaction partner. Asserting one's identity and ideas are relatively more important to younger adults than to older adults whose concerns center on generativity and maintaining important relationships (Lang & Carstensen, 2002; Zirkel & Cantor, 1990). Our findings extend previous research by suggesting that younger and older adults have similar types of strategies available to them in their repertoires, but vary in the relative representation of such strategies and the extent to which strategies are viewed as effective for solving specific types of everyday problems. Furthermore, our findings suggest that age similarities and differences in strategies are consistent across situations where individuals solve problems alone versus with a same-gender friend. That is, social interaction with a friend does not appear to modify the types of strategies younger and older adults consider or view as most effective for solving everyday interpersonal and instrumental problems.

Limitations and Future Directions

Our study has a number of limitations to be addressed in future research. Generating strategies to solve hypothetical problems may not fully capture the contextual richness and affective complexity of problem solving in daily life. For example, verbal aggression was present in strategy repertoires (relatively more so for younger adults) but was seldom selected as the most effective strategy. Yet, this type of destructive interpersonal strategy is used by individual problem solvers to deal with interpersonal tensions (Birditt et al., 2005). Research examining collaborative interpersonal problem solving as it unfolds in everyday contexts is needed to address the role that social partners play in strategy selection.

We focused on outcomes of collaboration at one moment in time and used a small number of everyday problems. Benefits of collaboration may develop over more extended time frames (Azmitia, 1996; Margrett & Willis, 2006; McGlynn, McGurk, Effland, Johll, & Harding, 2004). The small number of problems may have restricted the range of responses. Investigating other types of problems and other outcomes, such as performance on tasks with well-defined solutions (e.g., Margrett & Willis, 2006) and the consequences of collaboration for partners' interpersonal relationships (Meegan & Berg, 2002), is needed to further understand the functions of collaborative cognition in everyday contexts.

We have suggested that it is important to understand whether social interaction alters the problem-solving process because everyday problem solving often occurs in a social context. Increasingly, everyday problem solving occurs in a technological context. Future research should be directed toward understanding whether technology alters the everyday problem-solving process (e.g., availability of information on the world wide web; computer-based

cognitive interventions). These investigations could compare problem solving supported by technology to problem solving supported by social interaction to better understand the functions of each.

Together with research comparing pairs to single individuals, our results underline the importance of investigating mechanisms that facilitate or impede collaborative performance. We have suggested that older friends' greater tendency to actualize their dyadic potential reflects age-related differences in interpersonal problem-solving skills. Research on interpersonal processes occurring during collaboration is needed to test this explanation. Additional research also is needed to examine alternative explanations. For example, college students' experiences with classroom collaborations may have led them to be more or less reactive to the experimental situation. College students' experiences of their friendships also may be qualitatively different. In early adulthood, friends serve supportive functions that often are served by spouses later in adulthood. Dimensions of interpersonal relationships including whether they are voluntary (e.g., friends) or obligatory (e.g., family), defined by equal status (e.g., friends) or hierarchical roles (e.g., parent-child), or are comprised of same- or other-sex individuals may be important for understanding the conditions under which collaboration is associated with performance gains versus losses. Comparing different types of relationships (e.g., spouses, siblings) will be useful in this regard. Within-subjects designs such as those employed in the child development literature (see Rogoff, 1998) could be used to understand how collaboration supports individual performance. Such designs may be useful when developing interventions to remediate age-related cognitive decline.

Conclusion

Our findings suggest that age-related differences in the consequences of collaboration for everyday problem solving may be specific to interpersonal problem solving and limited to measures of amount (fluency) rather than quality (type). Further investigation of older friends' collaborative interactions is necessary to understand why older friends were more likely than younger friends to actualize their dyadic potential. Continued attention to the unit of analysis and type of task will facilitate the development of a more complete understanding of the conditions under which collaboration is associated with gains versus losses.

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Figure 1.
Total number of strategies by age group and pair condition for interpersonal problems.

Figure 2.
Number of unique strategies by age group and pair condition for interpersonal problems.

Table 1**Kappa Coefficients for Strategy Categories**

Strategy category	Reliability ¹		Reliability Check ²
	Agreement with criterion Coder 1	Agreement between coders Coder 2 Coder 1-Coder 2	Agreement Between coders Coder 1-Coder 2
Action and cognition (PF)			
Behavioral Inhibition	0.84	0.78	0.76
Deliberation	0.72	0.74	0.72
Self-action	0.79	0.78	0.77
Interpersonal constructive (PF)			
Discussion	0.79	0.78	0.80
Seek instrumental support	0.88	0.89	0.88
Self-assertion	0.84	0.87	0.83
Interpersonal destructive (PF)			
Aggression	0.80	0.83	0.77
Verbal aggression	0.74	0.71	0.70
Proactive (EF)			
Accepting influence	0.84	0.85	0.85
Emotion regulation	0.73	0.81	0.77
Passive (EF)			
Doing nothing	0.84	0.78	0.76
Ignoring the problem	0.83	0.86	0.87
Leaving the situation	0.77	0.87	0.82
Passive acceptance	0.78	0.80	0.76
Other			
Other *	0.33	0.29	0.50

Note. PF = problem-focused strategy; EF = emotion-focused strategy.

* Strategies included in this category were not included in analyses of strategy type.

¹ Based on 20% of the data.

² Based on an additional 6 cases.

Table 2
Strategy Measures by Interpersonal and Instrumental Problem Domain: Mean, SD, Range

Measure	Interpersonal Problems		Instrumental Problems	
	M	Range	M	Range
Total number of strategies	6.20	2.00 – 14.50	6.16	1.00 – 14.50
Unique number of strategies	4.16	1.00 – 7.50	3.14	1.00 – 6.00
		Strategy Fluency Scores		
Action and cognition (PF)				
Behavioral Inhibition	0.02*	(0.04) 0.00 – 0.17	0.03*	(0.07) 0.00 – 0.38
Deliberation	0.06	(0.08) 0.00 – 0.50	0.15	(0.12) 0.00 – 0.60
Self-action	0.03*	(0.05) 0.00 – 0.25	0.42	(0.15) 0.00 – 0.92
Interpersonal constructive (PF)				
Discussion	0.06	(0.08) 0.00 – 0.33	0.00*	(0.01) 0.00 – 0.13
Seeking instrumental support	0.04 ¹	(0.07) 0.00 – 0.38	0.28	(0.14) 0.00 – 0.78
Self-assertion	0.29	(0.17) 0.00 – 1.00	0.00*	(0.01) 0.00 – 0.08
Interpersonal destructive (PF)				
Aggression	0.02*	(0.04) 0.00 – 0.25	0.00*	(0.00) 0.00 – 0.00
Verbal aggression	0.04 ²	(0.06) 0.00 – 0.27	0.00*	(0.00) 0.00 – 0.00
Proactive (EF)				
Accepting influence	0.23	(0.14) 0.00 – 0.75	0.00*	(0.01) 0.00 – 0.07
Emotion regulation	0.05	(0.07) 0.00 – 0.38	0.02*	(0.04) 0.00 – 0.19
Passive (EF)				
Doing nothing	0.02*	(0.06) 0.00 – 0.25	0.06	(0.07) 0.00 – 0.31
Ignoring the problem	0.08	(0.08) 0.00 – 0.33	0.01*	(0.04) 0.00 – 0.21
Leaving/disengaging	0.03*	(0.06) 0.00 – 0.38	0.01*	(0.03) 0.00 – 0.33
Passive acceptance	0.01*	(0.03) 0.00 – 0.14	0.01*	(0.03) 0.00 – 0.17
		Strategy Type Proportion Scores		
Other				
Other	0.01*	(0.03) 0.00 – 0.20	0.01*	(0.04) 0.00 – 0.20

Note. PF= problem-focused strategy; EF = emotion-focused strategy.

* Indicates strategy type excluded in analyses.

¹The mean proportion score for this strategy was .07 for older interacting pairs thus, it was included in the analysis of strategy type.

²The mean proportion scores for younger nominal pairs was .07 and for interacting pairs was .09, thus, this strategy was included in the analysis of strategy type.

Table 3
Age Differences in Strategy Measures for Interpersonal Problems: Mean, SD, and F Statistics

Strategy Measures	Younger Adults <i>M</i>	(<i>SD</i>)	Older Adults <i>M</i>	(<i>SD</i>)	<i>F</i> -Test <i>F</i>	η_p^2
Total strategies	7.23	Strategy Fluency Scores (2.68)	5.16	(2.31)	39.69***	.21
Unique strategies	4.85	(1.39)	3.47	(1.26)	56.37***	.28
Action and cognition (PF) Deliberation	0.05	Strategy Type Proportion Scores (0.06)	0.08	(0.10)	7.28**	.05
Interpersonal constructive (PF) Discussion	0.05	(0.06)	0.07	(0.09)	1.16	.01
Seeking instrumental support	0.03	(0.05)	0.05	(0.08)	4.80*	.03
Self-assertion	0.27	(0.14)	0.31	(0.20)	1.91	.01
Interpersonal destructive (PF) Verbal aggression	0.08	(0.07)	0.01	(0.02)	75.32***	.34
Proactive (EF) Accepting influence	0.21	(0.10)	0.25	(0.16)	3.78	.03
Emotion regulation	0.05	(0.07)	0.05	(0.08)	0.30	.00
Passive (EF) Ignoring the problem	0.11	(0.07)	0.06	(0.08)	21.80***	.13

Note. PF= problem-focused strategy; EF = emotion-focused strategy.

*
 $p < .05$

**
 $p < .01$

 $p < .001$.

Table 4
Age Differences in Strategy Measures for Instrumental Problems: Mean, SD, and F Statistics

Strategy Measures	M	Younger Adults (SD)	M	Older Adults (SD)	F	F-Test η_p^2
Total strategies	6.48	Strategy Fluency Scores (2.12) (0.87)	5.83	(2.51)	4.07*	.03
Unique strategies	3.29		2.97	(0.91)	6.29*	.04
Action and cognition (PF)		Strategy Type Proportion Scores				
Deliberation	0.13		0.17	(0.15)	5.00*	.03
Self-action	0.46		0.39	(0.14)	11.33**	.07
Interpersonal constructive (PF)						
Seeking instrumental support	0.24		0.32	(0.17)	12.68***	.08
Passive (EF)						
Doing nothing	0.09	(0.08)	0.04	(0.06)	19.54***	.12

Note. PF=problem-focused strategy; EF=emotion-focused strategy.

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

Table 5
Percent Selecting Strategy as Most Effective by Age Group: Interpersonal Problems

Most Effective Strategy	% of Younger Adults	% of Older Adults	% of Total
Problem: Advice-giving friend			
Action and cognition (PF)			
Deliberation	6.3 [*]	1.8 [*]	4.0 [*]
Interpersonal constructive (PF)			
Self-assertion	56.3 [*]	50.0 [*]	53.1
Proactive (EF)			
Accepting influence	21.4	23.2	22.3
Passive (EF)			
Ignoring the problem	8.9 [*]	5.4 [*]	7.1 [*]
Other			
Other effective strategies	7.1 [*]	19.6 [*]	13.4
Problem: Critical friend			
Action and cognition (PF)			
Deliberation	8.9	15.2	12.1
Interpersonal constructive (PF)			
Discussion	26.8 [*]	16.1 [*]	21.4
Self-assertion	37.5 [*]	28.6 [*]	33.0
Proactive (EF)			
Accepting influence	14.3	14.3	14.3
Passive (EF)			
Ignoring the problem	3.6	5.4	4.5 [*]
Other			
Other effective strategies	8.9	20.5	14.7

Note. PF=problem-focused strategy; EF=emotion-focused strategy. Number of cases = 224 (38 interacting pairs each age group; 74 individuals each age group).

^{*} indicates $z \geq 1.96$, $p \leq .05$

Table 6
Percent Selecting Strategy as Most Effective by Age Group: Instrumental Problems

Most effective strategy	% of Younger Adults	% of Older Adults	% of Total
Problem: Clutter			
Action and cognition (PF)			
Deliberation	9.8	8.0	8.9
Self-action	71.4 *	33.0 *	52.2
Interpersonal constructive (PF)			
Seeking instrumental support	16.1	49.1	32.6
Other			
Other effective strategies	2.7	9.8	6.3
Problem: Chores			
Action and cognition (PF)			
Deliberation	42.0 *	24.1 *	33.0
Self-action	40.2	41.1	40.6 *
Interpersonal constructive (PF)			
Seeking instrumental support	14.3	18.8	16.5
Other			
Other effective strategies	3.6	16.1	9.8

Note. PF= problem-focused strategy; EF = emotion-focused strategy. Number of cases = 224 (38 interacting pairs each age group; 74 individuals each age group).

* indicates $z \geq 1.96$, $p \leq .05$