

## **ABSTRACT**

CHENG, YANHUA. Age Differences in Emotional Reactions to Social Rejection.(Under the direction of Daniel Grühn, Ph.D.)

The purpose of the study was to investigate age differences in emotional reactions to social rejection between younger and older adults. As a form of social pain, rejection prevents individuals from satisfying the need to belong, which in turn leads to negative outcomes such as emotional distress. Older adults may be particularly vulnerable to social pain. However, there is a lack of research on the development of reactions to rejection over the adult lifespan. Previous studies with young adults engendered two competing theories: The emotional distress hypothesis posits that rejection would lead to emotional distress and the emotional numbness hypothesis posits that rejection would numb the emotional system temporarily. The review of the literature generated three main hypotheses: First, rejection will elicit individuals' negative feelings whereas acceptance will make individuals feel positive. Rejection will also dampen individuals' empathy toward others' pain. Second, older adults will show different emotional reactions to rejection than younger adults in terms of intensity and patterns of discrete emotions. Third, the expected age effects will be partially mediated by individuals' appraisals of the rejection (e.g., motivation to be accepted). To test these hypotheses, 95 younger adults between the ages of 18 and 26, and 30 older adults between the ages of 60 and 86 engaged in an online interview ostensibly with another participant (who in fact was a confederate). During and after the interview, participants received from the other "participant" either higher ratings indicating acceptance or lower ratings indicating rejection. Self-report baseline and post interview mood were measured. Participants'

appraisals of the interview and empathy toward other individuals' pains were also measured. Results provided mixed support with regard to the three hypotheses. Specifically, the findings generally supported emotional numbness hypothesis over the emotional distress hypothesis with regard to positive and negative mood. Both younger and older rejected participants showed significant decreased positive mood but no change in negative mood, whereas accepted participants showed increased positive mood and decreased negative mood. However, there was a trend for an increase in negative mood in older rejected participants. In addition, rejection elicited more hurt feelings in older adults than in younger adults. When empathy toward other individuals' pain was examined, no effect of experimental condition or interaction with age revealed. Finally, there was no age difference in the goals and motivations of being accepted. These findings were discussed in the context of theories of rejection and theories of socioemotional development in adulthood. While the present study has contributions and implications for the understanding of age differences in reactions to rejection, the limitations and future direction were also discussed.

© Copyright 2012 by Yanhua Cheng

All Rights Reserved

Age Differences in Emotional Reactions to Social Rejection

by  
Yanhua Cheng

A thesis submitted to the Graduate Faculty of  
North Carolina State University  
in partial fulfillment of the  
requirements for the degree of  
Master of Science

Psychology

Raleigh, North Carolina

2012

APPROVED BY:

---

Lynne Baker-Ward, Ph.D.

---

Shevaun D. Neupert, Ph.D.

---

Daniel Grühn, Ph.D.  
Committee Chair

**DEDICATION**

To my parents, Wei Cheng and Guijun Li, for always encouraging and supporting me to pursue my dream.

## **BIOGRAPHY**

Yanhua Cheng was born and raised in Fushun, Liaoning, People's Republic of China. She is the only child of the family. After graduating Fushun No. 2 High School, Yanhua attended Jilin University in Changchun, China, where she received a B. S. in psychology in July, 2007. The following year she worked as a project assistant in an exhibition company in Shanghai, China. In Fall 2009, she entered the doctoral program in Lifespan Developmental Psychology at North Carolina State University under the direction of Dr. Daniel Grühn. Yanhua's master's research focused on age differences in emotional reactions to social rejection.

## **ACKNOWLEDGMENTS**

First and foremost, I would like to thank my advisor and committee chair, Dr. Daniel Grünh, for his mentorship and support over the past three years. I am extremely grateful for his continued guidance in my personal and professional development. I would also like to express my gratitude to my committee members, Dr. Lynne Baker-Ward and Dr. Shevaun Neupert, for their valuable support and feedback.

In addition, I would like to express appreciation to Dr. Thomas Hess, Michael Burt, Rebecca Chong, Qiao Chu, Logan Collins, Kendre Davis, Amber Deal, Eric Kuo, Christine Love, Matthew Moore, Laura Morris, Ashley Perry, Brittany Price, Holland Rausher, Allison Raspberry, Neika Sharifian, and Sydney Smith for their assistance with the data collection.

## TABLE OF CONTENTS

|   | Page |
|---|------|
| LIST OF TABLES .....                                    | vi   |
| LIST OF FIGURES .....                                   | vii  |
| THEORETICAL BACKGROUND.....                             | 1    |
| Theoretical Ideas for Age Differences in Rejection..... | 2    |
| Experimental Manipulation of Rejection.....             | 11   |
| Individual Differences in Reaction to Rejection.....    | 24   |
| THE PRESENT STUDY .....                                 | 25   |
| Hypotheses .....  | 30   |
| METHOD .....  | 36   |
| Participants.....                                       | 36   |
| Measures .....  | 39   |
| Procedure .....   | 45   |
| RESULTS.....  | 49   |
| Preliminary Analyses .....                              | 49   |
| Effects of Experimental Condition and Age .....         | 51   |
| Effects on Discrete Emotions.....                       | 60   |
| Mediating Effects of Appraisals.....                    | 63   |
| Influence of Covariates .....                           | 64   |
| DISCUSSION .....  | 64   |
| Summary of Findings.....                                | 65   |
| Limitations .....                                       | 70   |
| Conclusion and Future Directions .....                  | 71   |
| REFERENCES .....  | 73   |
| APPENDICES .....  | 87   |

## LIST OF TABLES

|   | Page |
|---|------|
| Table 1. Five Experimental Paradigms of Rejection or Social Exclusion.....  | 16   |
| Table 2. Summary of Hypotheses.....   | 31   |
| Table 3. Socio-Demographic Characteristics of the Total Sample and for Subsamples of<br>Young and Older Adults..... | 38   |
| Table 4. Sample Distribution for the Four Conditions by Age Group and Gender.....                                   | 39   |
| Table 5. Items of Emotion Subscales.....  | 40   |
| Table 6. Items Assessing Participants' Appraisals.....  | 42   |
| Table 7. Sample Characteristics for Young and Older Adults.....   | 50   |
| Table 8. Means and SDs of Positive Mood as a Function of Age and Condition.....                                     | 53   |
| Table 9. Means and SDs of Negative Mood as a Function of Age and Condition.....                                     | 55   |
| Table 10. Means and SDs of Empathy as a Function of Age and Condition.....  | 58   |
| Table 11. Means and SDs of Discrete Emotions as a Function of Age and Condition.....                                | 62   |
| <br>  |      |
| Table I1. Analyses of Variance for Sample Characteristics.....  | 100  |
| Table I2. Analyses of Variance for Positive Mood and Negative Mood.....   | 101  |
| Table I3. Analyses of Variance for Positive Mood and Negative Mood (Change of Rejection)<br>.....                   | 101  |
| Table I4. Analyses of Variance for Anger, Sadness, and Hurt Feelings.....   | 102  |
| Table I5. Means (SDs) and Analyses of Variance for Appraisals.....  | 102  |

**LIST OF FIGURES**

|  | Page |
|--|------|
| Figure 1a. Means for Baseline and Post-test Positive Mood as a Function of Age and Condition ..... | 54   |
| Figure 1b. Means for Baseline and Post-test Negative Mood as a Function of Age and Condition ..... | 56   |
| Figure 2. Means of Empathy Ratings as a Function of Age and Condition .....                        | 58   |
| Figure 3. Means of Hurt Feelings as a Function of Time, Age, and Condition.....                    | 63   |

## **Theoretical Background**

Social bonds are an essential part of individuals' daily life; they provide meaning, support, and a feeling of belonging. Social bonds are especially important for older adults' health and subjective well-being (Baldassare, Rosenfield, & Rook, 1984; Uchino, Cacioppo, & Kiecolt-Glaser, 1996). Older adults are more prone to experience social exclusion than younger adults (Hawkley, Williams, & Cacioppo, 2011). Retiring from work, the death of a spouse, and greater disability or physical obstacles may lead to reduced social integrity (Pitkala, Routasalo, Kautiainen, & Tilvis, 2009; Rook, 1984; Scharf, Phillipson, & Smith, 2005). Older adults also encounter rejection more frequently than younger adults due to prevalent age-stereotypes (Boduroglu, Yoon, Luo & Park, 2006; Levy & Banaji, 2002; Levy & Langer, 1994; Palmore, 1988), such as age-related negative attributes in the workplace (Posthuma & Campion, 2009). These negative stereotypes label older adults as being less productive and less flexible than younger adults as well as being slower in learning new work-related procedures. These perceptions could lower older adults' chance of being hired as well as increase their chance of being rejected from other social activities such as conversations within family gatherings (Kang & Chasteen, 2009). One of social exclusion's long-term effects, loneliness, has been widely investigated in the aging field. Loneliness is a common and distressing feeling among older adults (Pitkala, et al., 2009). Loneliness is associated with impaired quality of life, cognitive decline, and poor subjective health, increased blood pressure, increased depressive symptoms, increased use of health and social services, and increased mortality (Cacioppo, Hawkley, & Thisted, 2010; Hawkley, Thisted,

Masi, & Cacioppo, 2010; Pitkala, et al., 2009; Russell, Cutrona, Mora, & Wallace, 1997). A better understanding of social exclusion and its immediate and long-term effects on older adults could help to prevent negative consequences.

The term social rejection, although often used interchangeably with social exclusion, refers to one form of social exclusion. It involves the refusal of a social connection that someone is intentionally attempting to form (Blackhart, Nelson, Knowles, & Baumeister, 2009). The social connection can be either temporary or long-term, but being rejected is usually an acute experience. Thus, being rejected and being long-term socially excluded are two related yet different experiences. Repeated rejection from significant others, meaningful relationships, and other social bonds can lead to long-term social exclusion and isolation. However, older adults who are not suffering from social exclusion may also experience some degree of rejection quite frequently. The rejection can be as significant as being laid-off from work but also can be as trivial as having the desire to play chess with grandchildren and being turned down. Although older adults experience negative interpersonal exchanges less frequently than younger adults (Birditt, Fingerman, & Almeida, 2005), interpersonal tensions are nonetheless a source of psychological distress among older adults (Sorkin, & Rook, 2004). For instance, day-to-day interpersonal stressors are associated with increased memory failures (Neupert, Almeida, Mroczek, & Spiro, 2006).

### **Theoretical Ideas for Potential Age Differences in Experiencing Rejection**

In spite of the significance of rejection on older adults' well-being, no studies have investigated age differences in responses to social rejection. However, there are theoretical

ideas suggestive of age differences in reactions to rejection. These theories are (a) lifespan developmental psychology, (b) socioemotional selectivity theory, and (c) theories of appraisals. These theories provide seemingly conflicting predictions regarding the direction of age differences. However, close examination reveals that these predictions are not incompatible; rather, the applicability of a theory and its prediction depends largely on the context.

First, in the theoretical framework of lifespan developmental psychology (Baltes, Staudinger, & Lindenberger, 2006), there are three theoretical accounts that could be used to argue for potential age differences: (a) the model of selection, optimization and compensation, (b) the gain-loss dynamic, and (c) the multidimensionality and multidirectionality of development. Lifespan developmental psychologists argue that development involves three processes: selection, optimization, and compensation (SOC, Baltes & Baltes, 1990; Baltes, 1997; Baltes, Staudinger, & Lindenberger, 1999). Selection involves identification of goal domains and directionality of ontogenetic process. Optimization focuses on the acquisition, refinement and maintenance of means or resources that are effective in achieving desirable outcomes. Compensation involves a functional response to the loss of an outcome-relevant means. These three processes exist throughout the whole lifespan. As people age, they narrow their goals by selecting personally valued activities, using strategies to optimize their performance in certain areas, and trying to compensate for losses. Therefore, older adults' goals, motivations and strategies might be different from younger adults'. Insofar as people's reaction to rejection is affected by their

goals, needs, and motivations, older adults might also show different reactions to rejection than younger adults. For instance, older adults tend to have a stronger process focus whereas younger adults have a stronger outcome focus when pursuing goals (Freund, Hennecke, & Riediger, 2010). A process focus refers to the cognitive representation of a goal primarily in terms of the means of and one's investment in goal attainment; an outcome focus refers to the cognitive representation of a goal primarily in terms of the short-term or long-term consequences of goal pursuit (Freund et al., 2010). By definition, rejection is a negative outcome of the pursuit of social connection. Older adults may feel content with the process of social interaction regardless of the outcome whereas younger adults may focus primarily on the outcome (i. e., rejection). Examples may be found in the context of competition: older adults may be more likely to feel happy that they are able to participate in the contest and enjoy it no matter what the outcomes are (process-focus) as opposed to younger adults, who may primarily aim at winning the contest and feel upset if the outcomes are not desirable (outcome-focus). Similarly, when people are seeking social connections and the outcomes are negative (i.e., rejection), older adults may be less affected (e.g., less disappointed, upset, sad, or frustrated) by the rejection than younger adults.

The hypothesis that the effect of rejection is associated with the individual's goal orientation is supported in the child literature as well. For example, Asher, Rose, and Gabriel (2001) argued that when children with performance goals encounter rejection, they might reduce their efforts and withdraw in response to failure. In contrast, children with learning goals may be more likely to think about what they could do differently to affect a better

result. Thus, it seems plausible that children with learning goals may be less devastated by rejection. In sum, to the extent that reaction to rejection is influenced by one's goals and to the extent that individuals of different age differ in their goal orientation, the SOC model suggests that older adults may be less impacted by rejection when compared to younger adults.

Another vein of lifespan developmental theory is the proposition of gains and losses. It posits that gains and losses exist throughout the lifespan, but during the second half of life, due to an overall age-related decline in biological and cognitive resources, the proportion of losses is greater than the proportion of gains (Baltes, 1997; Grühn, Gilet, Studer, & Labouvie-Vief, 2011). Striving for resources drives developmental changes for the first two-thirds of the lifespan. In later adulthood, when losses threaten the maintenance of functioning, the motivation to prevent and counteract losses becomes increasingly important (Freund & Riediger, 2001). Rejection, as an indicator of resource losses (e.g., loss of income, opportunities and social support), might draw more attention to older adults than to younger adults and thus affect older adults more. In particular, sadness will be more salient for older adults (Kunzmann & Grühn, 2005) since it has often been described as an emotional response to loss (Leary et al., 2001). From this perspective, rejection may have a greater impact on older adults relative to younger adults when the rejection is associated with certain forms of loss such as financial or social support.

The final argument derived from the theoretical perspective of lifespan developmental psychology is that development is characterized by multidimensionality and

multidirectionality (Baltes, Lindenberger, & Staudinger, 2006). Multidimensionality means that individuals' psychological aspects have multiple domains (e.g., cognition, emotion, personality etc.) and each domain has multiple dimensions (e.g., cognition consists of attention, memory, reasoning etc.); multidirectionality means that the development of different dimensions over the whole life span may have different trajectories with no pre-determined slopes. Grühn, Kotter-Grühn, and Röcke (2010) applied the concept of multidimensionality and multidirectionality to the affect domain. That is, affect consists of different dimensions such as sadness, happiness or anger (multidimensionality), and the various dimensions may show different developmental trajectories across the lifespan (multidirectionality). Indeed, Grühn and colleagues (2010) found that discrete emotions showed different age patterns over the lifespan; that is, the size and presence of age differences differ by emotion. Specifically, positive affect and surprise showed a U-shaped function whereas negative affect and sadness showed a reversed U-shaped function over the lifespan. For the present study, this means that age differences in emotional reactions to rejection might differ by emotion. For example, older adults might react more often with sadness, which is in line with aforementioned salience of sadness to older adults. In contrast, younger adults might react more often with anger as increasing anger and aggression is often found in younger adult samples (e.g., Leary, Twenge, & Quinlivan, 2006). Compared with the previous two perspectives which are suggestive of age differences in terms of degree, the notion of multidimensional and multidirectional development suggests two qualitative different reaction patterns between younger and older adults.

Socioemotional Selectivity Theory (SST, Carstensen, Isaacowitz, & Charles, 1999) provides a second theoretical framework for potential age differences in emotional reactions following rejection. According to this theory, people pursue two general types of goals—those related to the acquisition of knowledge and those related to the regulation of emotion. Individuals' perception of time plays a fundamental role in determining which goals to pursue. When time is perceived as open-ended, individuals prioritize knowledge-related goals. In contrast, when time is perceived as limited, individuals focus more on emotional-gratifying goals. As individuals grow older, there is an increasing awareness of the ephemeral nature of existence; time is perceived as limited, and thus the salience of emotional goals increase relative to knowledge-related goals (Charles & Carstensen, 2007). As a result, older adults are motivated to allocate more resources to emotion regulation rather than information-seeking activities in comparison to younger adults. For example, older adults tend to prefer social partners that can provide more positive emotion experiences (Carstensen, Fung, & Charles, 2003) such as close relationships, which can offer less new information but more immediate affirmation and emotional connection (Charles & Carstensen, 2007). This emotion-regulation strategy is hypothesized to play a central role when one is navigating social interactions (Carstensen et al., 2003) and is believed to be more frequently used by older adults. For instance, older adults report better control over emotions compared to younger adults (Gross, Carsentsen, Tsai, Skorpen, & Hsu, 1997). In dealing with interpersonal conflict, older adults reported less negative reactivity compared to younger adults (Lefkowitz & Fingerman, 2003) as well as less anger and more sympathy in

response to the transgressions of others (Charles & Carstensen, 2008). In a study of behavioral reactions to interpersonal tensions (Birditt & Fingerman, 2005), older adults more often report emotion-focused, passive constructive strategies (e.g., doing nothing or waiting to see if things improve) whereas younger adults more often report active destructive behaviors (e.g., yelling or calling names).

The findings above suggest that in the context of rejection, older adults may utilize strategies to regulate the negative emotions elicited by rejection and maintain positive emotional experience while younger adults may express more negative emotions toward other individuals. Moreover, from the perspective of SST, the source of rejection (in terms of the nature and closeness of the relationship between the rejector and rejectee) may play an important part in how the rejection affects older adults. Close relationships are so important to older adults that rejection from meaningful relationships will have a stronger negative impact on older adults than on younger adults. In contrast, since older adults do not focus on forming new relationships as much as younger adults do, rejection from strangers or individuals with whom they do not have close relationships may have less impact on older adults than on younger adults.

Finally, theories of appraisals may also provide insights about age differences in emotional reactions to rejection. The basic premise of appraisal theories is that the individuals' evaluation of the circumstances plays a crucial role in the elicitation and differentiation of their emotions (Ellsworth & Scherer, 2003; Lazarus, 1984; Roseman, Antoniou, & Jose, 1996). Especially when the valence of the current event is negative,

further appraisals ensue and the emotional experience changes from a general feeling good or bad to some more differentiated state (Ellsworth & Scherer, 2003). Some studies have examined age differences in immediate cognitive appraisals when individuals are confronted with information that arouses negative emotions. In one study (Charles, Carstensen, & McFall, 2001), both older and younger adults viewed videotaped scenarios depicting a woman's experience of negative social interchanges. Participants were asked to report how they thought the protagonist felt. Younger adults were more likely to report the woman as feeling angry whereas older adults were more likely to report that she was feeling sad. Moreover, older adults were more likely to suggest passive strategies for the woman, such as ignoring the problem, compared to younger adults. In another study (Charles & Carstensen, 2008), both older and younger adults engaged in a talk-aloud procedure to rate their level of anger and sadness while they were listening to audiotaped conversations in which people were ostensibly making disparaging remarks about them. The results showed that older adults reported less anger but equal levels of sadness compared to younger adults. Older adults also made fewer appraisals and their comments were judged as less negative than younger adults. In addition, cognitive evaluation has been argued to affect the impact of peer rejection in childhood as well. For instance, children who consistently attribute peers' rejection to internal causes (e.g., it is because of something the rejected children did wrong) would suffer more compared to children who attribute peers' rejection to external causes (e.g., it is because the rejecter is a bully) (Asher et al., 2001). Findings from this vein of research seem to be in line with both the idea that loss-associated sadness is salient to older

adults and the notion of differential discrete emotion trajectories over the lifespan (Grühn et al., 2010). The converging evidence from the three areas of research further supports the prediction that younger adults and older adults may react to a social situation with different patterns of discrete emotions. Further, if differential emotional reaction patterns are associated with different patterns of appraisals, age differences in appraisals may partly explain potential age differences in emotional reactions to rejection.

In sum, it seems likely that older adults and younger adults may be impacted by interpersonal rejection to a different degree and may display different patterns of discrete emotions and coping strategies following rejection. In the context of rejection, older adults may have different goals and motivations for the interaction; notably, because they may not be trying hard to gain approval or further connections from others in the first place, they may not focus on the outcome of the interaction. In addition, older adults may have appraisals favoring emotion-regulation strategies, such as believing the reason is not personal to avoid feeling bad. Further, they may experience more sadness and less anger from interpersonal rejection compared to younger adults. Finally, in addition to these theoretical ideas suggestive of age differences in emotional reactions to social rejection, one study about the age differences in responses to ostracism provides an indirect empirical support to the idea that older adults may react to social rejection differently from younger adults (Hawkley et al., 2011). Ostracism is a form of social exclusion where an individual is ignored by others. It is similar to rejection in that they both diminish individuals' need to belong but ostracism usually happens in salience (Williams, Cheung, & Choi, 2000). The finding that older adults

were less affected by ostracism suggests that older adults may be less affected by rejection as well. The present study sought to investigate age differences between younger adults and older adults in immediate emotional responses to experimental manipulation of social rejection.

### **Experimental Manipulation of Rejection**

**Rejection Paradigms.** There are a growing number of studies on the experimental manipulation of rejection in laboratory settings. Many of these studies are based on the idea that individuals' subjective feelings of being accepted or rejected can arise from events that involve their perceived relational evaluation—their perception of the degree to which others value having relationships with them (Leary, 2001). Individuals feel accepted when they perceive that others regard a real or potential relationship with them as valuable or important. Otherwise, they feel rejected (Buckley, Winkel, & Leary, 2004). There are five most commonly used experimental paradigms for leading participants to experience rejection or social exclusion: (a) cyber-ball ostracism; (b) group-work rejection; (c) life-alone paradigm; (d) evaluator paradigm and (e) and non-current rejection experience. The terms social exclusion and rejection are often used interchangeably. These five paradigms all have their strength and limitations in studying rejection (or social exclusion) as summarized in Table 1.

First, in the cyber-ball ostracism paradigm (e.g., Chow, Tiedens, & Govan, 2008; Williams et al., 2000; Zadro, Williams, & Richardson, 2004), participants play a computerized ball-tossing game ostensibly with other participants over the Internet. In fact, the other “players” (usually there are two or three players besides the participant) are

controlled by a computer program. In the ostracism condition, the other “players” stop throwing the ball to the actual participant after a few rounds and only throw the ball among the other “players”. This silent and complete neglect without a reason elicits participants’ feeling of being ostracized. The cyber-ball ostracism paradigm is very powerful in eliciting participants’ emotional and behavioral reactions (Zadro et al., 2004). However, some researchers argue that ostracism may lead to multiple effects that cannot be attributed to social exclusion, such as learned helplessness or losing sense of control (Blackhart et al., 2009). The previously mentioned study by Hawkey and colleagues (2011) used this paradigm to manipulate ostracism with groups of younger, middle age, and older adults. However, it is unclear whether older adults were less affected due to actual age differences or due to the effectiveness of the paradigm (e.g., imagine the ball-tossing game may be more cognitively demanding for older adults than younger adults). The manipulation method in the present study was designed to minimize participants’ cognitive effort.

Second, in a typical group-work rejection paradigm (e.g., Leary, Cottrell, & Phillips, 2001; Maner, DeWall, Schaller, & Baumeister, 2007; Twenge, Catanese, & Baumeister, 2003), participants have to choose a partner from among other participants after a group interaction session to complete another task together. In the rejection condition, participants are told that no participant has voted for having them as a partner whereas participants in the acceptance condition are told that everyone has voted for having them as a partner. This paradigm seems more realistic than the other paradigms as the manipulation is usually an explicit face-to-face experience. However, it is more demanding in environmental support

(e.g., multiple rooms to separate each participant) and harder to control because multiple participants are tested at the same time (e.g., aspects of the interaction among participants cannot be manipulated). Thus, in the present study, participants talked to a confederate via an instant messenger to minimize the influences of characteristics of the rejector.

Third, in the life-alone paradigm (e.g., DeWall & Baumeister, 2006; Twenge, Baumeister, DeWall, Ciarocco, & Bartels, 2007; Twenge, Baumeister, Tice, & Stucke, 2001), all participants first complete a personality test. Then the participants in the future-alone condition are told that based on their personality scores, they will probably end up alone later in their life. In contrast, the participants in the future-belonging condition are told that they will have stable relationships throughout their life. In some studies (e.g., DeWall & Baumeister, 2006), a misfortune control condition was included to ensure the effects were due to social exclusion instead of general negative feedback. In this condition, participants receive a forecast that they would become increasingly accident-prone in future years. The first strength of this paradigm is that it simulates long-term social exclusion experience especially in terms of relationship. Furthermore, it is easy to have not only a neutral control group (no personality feedback) but also a negative control group (misfortune feedback) to reduce confounding factors. However, the paradigm is also limited in some regards. For example, the exclusion experience is not an acute rejection but a possibility that may happen in the future. Most importantly, the bogus forecasting of loneliness in late life may not work on older adults and may cause ethical concerns with older population. The manipulation method in the present study attempted to reduce potential ethical concerns.

Fourth, the evaluator paradigm (e.g., Buckley et al., 2004; Snapp & Leary, 2001) usually uses an “evaluator-speaker” cover story. Seemingly, half of the participants are assigned to “evaluator” and half are assigned to “speaker” at random. Each pair engages in Internet-based communication (usually the speaker answers questions via a microphone and the evaluator listens in another room). Based on the speaker’s answers, the evaluator will give feedback on the computer screen to indicate how much he or she (gender unknown to the speaker) is willing to meet or work with the speaker. Actually, all the participants are assigned to be the speakers and all the evaluators are computer programs. Somewhat similar to group-work rejection, this paradigm also creates an explicit, direct and current rejection experience. Since there is no face-to-face interaction, it eliminates many of the irrelevant factors that group-work rejection may invite such as the gender and attractiveness of the rejector. In addition, one can manipulate the change of rejection over time; that is, whether the participant receives rejection from the beginning of the interaction until the end, or if the participant receives acceptance at first but gradually receives feedback indicating increasing rejection. However, the lack of actual interaction makes the situation appear unnatural. Participants may not feel comfortable in speaking alone to a microphone without someone speaking back which may elicit negative feelings or even distract their attention from the rejection experience. Therefore, a manipulation method was modified based on the evaluator paradigm to address these limitations. In the present study, participants talked to a confederate rather than computer programs.

Finally, there are some other studies using non-current rejection experiences including past experience, imagined scenarios, or priming (e.g., DeWall & Baumeister, 2006; Sommer & Baumeister, 2002; Vandavelde & Miyahara, 2005), to examine emotional reactions to rejection. For example, in an experiment conducted by DeWall and Baumeister (2006), participants were randomly assigned to one of three autobiographical narrative conditions: social rejection, social acceptance, and control. Respectively, participants were instructed to write a detailed essay about an experience of social rejection, social acceptance, or a neutral experience (e.g., what happened yesterday). Next, measures of mood and empathy were administered. The limitation is that the participants are not experiencing rejection at the moment and people tend to exaggerate or falsely report their memory or imagined emotions (Gerber & Wheeler, 2009).

Table 1

*Five Experimental Paradigms of Rejection or Social Exclusion*

| Paradigm  | Strength   | Limitation  |
|---|--|---|
| <b>Cyber-ball<br/>Ostracism</b>                 | Experience is current but implicit<br>Effective especially for eliciting ostracism                                       | Ostracism may involve other psychological processes besides social exclusion  |
| <b>Group-work<br/>Rejection</b>                 | Rejection experience is current, explicit and direct (face-to-face)<br>Participants actually see the rejectors           | It is hard to control with group of participants<br>Invites irrelevant factors such as the gender and attractiveness of the rejector<br>Requires multiple testing rooms |
| <b>Life-alone<br/>Paradigm</b>                  | Effective especially for eliciting effects of long-term social exclusion<br>Allows neutral and negative control groups   | The rejection experience is not current but a forecasting<br>Not applicable to older adults   |
| <b>Evaluator<br/>Paradigm</b>                   | Rejection experience is current, explicit and direct<br>Allows to assess the change of the degree of rejection over time | The interaction is not face-to-face but via computer<br>The communication seems unnatural   |
| <b>Non-current<br/>rejection<br/>experience</b> | It is easy to conduct<br>One can obtain qualitative data from the essay-writing paradigm                                 | Rejection experience is not current<br>There tend to be biases in people's recollection and imagination   |

*Note.* The terms rejection and social exclusion are used interchangeably in some studies.

**The Change of Rejection.** Real world rejection is not always constant over time. For instance, a person may pass the first round of a job interview but be rejected in the second round. Alternatively, a person may finally win over another person's heart after a long, drawn out, attempt to establish a romantic relationship. The changing nature of rejection experiences is also relevant for older adults, as social interaction with older adults can reduce younger adults' age-stereotyping (Hernandez & Gonzalez, 2008). It could be the case that an older adult, for example, was rejected from serving on the board of a community association at first, but gained other people's trust later by showing his or her ability to help improve the community. However, most previous research has only included a rejection condition, an acceptance condition and a neutral control condition. Little is known about how changes in rejection over time influence emotions and behaviors (Buckley et al., 2004; Leary, Haupt, Strausser, & Chokel, 1998). Buckley and colleagues (2004) examined the significance of changes of rejection over time using the evaluator paradigm as their manipulation method. They found that increasing rejection evoked more negative reactions than constant rejection. Moreover, increasing rejection produced greater sadness and hurt feelings than constant rejection but did not differ with regard to evoking anger, happiness, and anxiety. In sum, the change of rejection over time is an important factor that should be taken into account in the investigation of the effects of rejection.

**Rejection and Emotional Reactions.** The prediction that rejection will cause emotional distress seems compelling both intuitively and theoretically. Rejection is a negative social experience that is inherently distressing (Leary et al., 2001). Emotional

reactions are widely assumed to reflect motivationally relevant outcomes (Blackhart et al., 2009). Most models of motivation and behavior stress the importance of emotion in behavior (e.g., Carver & Scheier, 1990). In these models, emotion changes provide signal that something needs to be attended to and that action may be required (Gerber & Wheeler, 2009). Further studies have shown that rejection is associated with increasing aggressive response in young adult samples (e.g., Chow et al., 2007; DeWall, Twenge, Gitter, & Baumeister, 2009; Leary et al., 2006). Negative emotional reactions such as anger have been hypothesized as a mediator of this association. Another account that supports the link between rejection and emotional distress is the theory of needs. Baumeister and Leary (1995) posit that the need to belong is a powerful, fundamental, and extremely pervasive motivation and it appears to have multiple and strong effects on emotional patterns. Since rejection prevents individuals from satisfying their need to belong, one would reasonably expect that rejection results in negative emotional reactions (DeWall & Baumeister, 2006).

Indeed, many studies have found emotional distress following rejection in laboratory experiments. Williams and colleagues (e.g., Wesselmann, Bagg, & Williams, 2009; Williams, Forgas, & von Hippel, 2005; Williams et al., 2000; Zadro et al., 2004) found that when compared to accepted groups, individuals in the ostracized groups in a computer-simulation ball tossing game reported worsen mood and/or increased negative affect across varying conditions (e.g., when participants played the game either online or in the laboratory; even when participants observed other individuals being ostracized). Similarly, rejection increases specific negative emotions including anger (Chow et al., 2007), sadness and hurt

feeling (Buckley et al., 2004). In addition, Gerber and Wheeler (2009) concluded from a meta-analysis of 88 experimental studies with younger adult participants that rejection did appear to make people feel worse. In sum, there is both theoretical and empirical evidence suggesting that rejection will lead to emotional distress.

However, some other studies failed to find this predicted pattern of emotional distress following rejection (e.g., DeWall & Baumeister, 2006; Twenge et al., 2001; Twenge et al., 2003). For instance, in a study using the group-work paradigm (Twenge et al., 2003), being rejected unanimously by a group of peers did not elicit significant negative affect or significant differences in sadness, fear, embarrassment, or anger. In fact, results of studies using the life-alone paradigm imply that the differences in mood measures between the rejected group and accepted group are generated by the boosted positive mood from the accepted group. Specifically, Twenge and colleagues (2002) found that future belonging participants (accepted control group) reported significantly more positive mood but the future alone (rejected group) and misfortune group (negative feedback control group) did not differ significantly in mood ratings. Moreover, when differences in mood or emotion have been found, emotional reactions did not mediate rejection's behavioral effects (e.g., Buckley et al., 2004; DeWall & Baumeister, 2006; Twenge, et al., 2001). Finally, a meta-analytic review of 192 studies of social exclusion on younger adults concluded that rejected individuals feel worse than neutral controls whereas accepted persons feel slightly better. However, examination of compiled data about the absolute levels of affect and emotion revealed that

rejected participants did not, on average, report affective states that could be described as negative, distress, or upset (Blackhart et al., 2009).

In order to explain the lack of observed emotional distress following rejection, Twenge, Baumeister, and colleagues (DeWall & Baumeister, 2006; Twenge et al., 2001; Twenge et al., 2003) proposed the emotional numbness theory. It posits that the immediate reaction to social rejection involves processes similar to the shock reaction to physical pain. According to this theory, rejection is a form of social pain and social pain is hypothesized to share some physiological mechanisms with physical pain. From the perspective of evolutionary theories, social pain serves as a signal of threat to survival (e.g., loss of social support) just as physical pain serves as a signal of danger in the environment. This hypothesis is supported by evidence from neuroscience studies (DeWall, 2009; DeWall & Baumeister, 2006; Eisenberger, Lieberman & Williams, 2003; MacDonald & Leary, 2005). As physical pain increases individuals' pain threshold rises, making them feel less pain; similarly, social pain, that is rejection, makes them become emotionally numb producing neutral emotional states (Blackhart et al., 2009). In fact, rejection not only produced neutral mood but also increased participants' pain threshold and pain tolerance and dampened participants' empathy toward other individuals' pain (DeWall & Baumeister, 2006). This pattern of results suggests that rejection as a form of social pain temporarily causes the emotion system to cease normal functioning; that is, rejected individuals feel no emotions and lower their emotional reactions to other stimuli too.

**Measurement Issues.** It seems that both theories, the Emotional Distress theory and the Emotional Numbness theory, have empirical evidence supporting their hypotheses. However, these hypotheses appear to be contradictory. Close examination of the literature revealed three measurement issues in disentangling the two theories: (a) lack of measuring intraindividual change in mood, (b) different choice of measures and manipulation paradigms, and (c) relying on self-report measures of emotion. These measurement issues also need to be addressed to detect age differences in reactions to rejection. First, most of the studies measured current mood only after the experimental manipulation comparing the mood of the rejected group with the mood of accepted group or neutral control group. Mood or emotion was seldom assessed before and after the rejection intervention. Even in studies where the change of rejection over time was manipulated, the emotions were only assessed after rejection and compared between conditions (Buckley et al., 2004). Thus, there are little data about intraindividual change in mood or emotion caused by rejection (see the meta-analysis, Blackhart et al., 2009; Gerber & Wheeler, 2009). Researchers who support the numbness hypothesis argue that even when rejected participants did feel worse than individuals of a neutral control group, they still reported almost precisely neutral emotional states (Blackhart et al., 2009). However, without measures of intraindividual change before and after rejection, the lack of observed group differences on emotion measures after the manipulation alone is not sufficient to support or reject the numbness hypothesis. It could be the case that rejected individuals did feel worse, not in comparison to accepted individuals but in comparison of themselves before the rejection experience. It is possible that the

emotional states of rejected participants did shift toward the negative states significantly and just enough to offset the initial positive mood. If rejected individuals' mood shifted from positive to neutral, then it is actually an indicator of emotional distress. In contrast, there would be a compelling evidence for the emotional numbness hypothesis if there are rejected individuals who report increased mood from slightly negative at baseline to neutral after the rejection manipulation. This pattern of results would indicate that rejection does make people feel an absence of emotion or numbness with regard to emotions. It is also important to assess intraindividual change in mood for examining age differences because older adults tend to report more positive mood than younger adults in general (Kessler & Staudinger, 2009). It is possible that older adults do not differ from younger adults in terms of mood after the rejection because older adults have a higher level of positive mood at baseline. In sum, without a pre-post-test design for measures of mood, any conclusions involving intraindividual change by the rejection manipulation should be treated with caution. The present study addressed this issue by including both baseline and post-rejection mood measures.

Second, the discrepancy of the results might be confounded with the different choice of measures and manipulation paradigms (Gerber & Wheeler, 2009). Studies that did not find significant emotional effects of emotion usually used scales measuring participants' general mood states such as the Brief Mood Introspection Scale (BMIS; Mayer & Gaschke, 1988), the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988), or items asking how participants feel overall. For many of the studies, researchers focused on

the valence of the mood and analyzed the scores on positive affect and negative affect subscales but did not investigate any specific emotion (e.g., DeWall et al., 2009; Maner et al., 2007). For instance, only mood valence and arousal subscale scores were included in the data analysis in DeWall and Baumeister (2006), even though the BMIS has items measuring specific type of emotion such as happiness and sadness. When discrete emotional states were investigated, researchers did find that rejection leads to negative emotional reactions (Leary et al., 2006). For instance, in a study using the evaluator paradigm (Buckley et al., 2004), individuals who received either extremely rejecting feedback or moderately rejecting feedback reported stronger negative emotions including anger, hurt feeling, sadness, and lower happiness than individuals who received neutral or accepting feedback. Similar results were obtained in a study using the cyberball paradigm (Zadro et al., 2004). With regard to investigating age differences, if the pattern of older adults' emotional reactions to rejection differs from the pattern of younger adults as suggested by the aforementioned perspective of multidimensional development and theories of appraisals (i.e., age differences may emerge in anger and sadness), reliance on general mood valence measures may cover this interesting age effect. In addition to anger and sadness, hurt feeling is another important discrete emotion to examine. Hurt feeling is often described as a distinct negative emotion that is often directly associated with social pain (Smart Richman & Leary, 2009). The present study addressed this issue by assessing both mood valence and discrete emotions (i. e., anger, sadness, and hurt feeling).

Finally, most of the studies utilized direct self-report measures of emotion (see Blackhart et al., 2009; Gerber & Wheeler, 2009). It is possible that social desirability biases could influence self-report data (DeWall & Baumeister, 2006). Rejected participants may intentionally avoid showing negative emotions and thus rate their feelings close to the neutral point on the mood continuum. Particularly, self-report of current mood may not effectively test the numbness hypothesis—not feeling very bad or very good does not necessarily imply being emotionally numb. One experiment by DeWall and Baumeister (2006) did try to use alternative measures to tap on the emotional reactions following rejection. In line with their numbness hypothesis, they found that rejection not only caused participants physical numbness (indicated by increased pain threshold and higher levels of pain tolerance) but also lowered participants' empathy toward other individuals' physical and social pain. The present study also included empathy towards others' pain as an outcome measure in addition to self-report mood measures.

### **Individual Differences in Reaction to Rejection**

People differing in personality may experience rejection differently and respond differently once rejected. For example, less agreeable people are more likely to expect rejection (Geen, 1998; Zuckerman, Kuhlman, Thornquist, & Kiers, 1991). Agreeable people may feel more hurt and saddened by rejection since they are oriented toward maintaining harmonious relationships (Graziano & Eisenberg, 1997). In contrast, low agreeable people may become more angry and aggressive following rejection. Another dispositional factor is rejection sensitivity. Downey and Feldman (1996) used the term rejection sensitive to

describe people who anxiously expect, readily perceive, and overreact to interpersonal rejection. Highly rejection sensitive (HRS) individuals appear to be vigilant for rejection cues during social interactions (Levy, Ayduk, & Downey, 2001) and are hypothesized to react more negatively to rejection. One should note that rejection sensitivity should not affect accepted situations since it is conceptualized to be relevant only in rejected situations (Buckley et al., 2004). Although many studies have not found moderation effects of either agreeableness or rejection sensitivity (e.g., DeWall & Baumeister, 2006), they did predict participants' responses (Buckley et al., 2004). Given typical age differences in agreeableness, with older adults reporting higher means than younger adults (e.g., Terracciano, McCrae, Brant, & Costa, 2005), and possible age differences in rejection sensitivity (Kang & Chasteen, 2009), these personality measures are important control variables.

### **The Present Study**

The research on rejection showed that rejection may lead to immediate effects, such as emotional distress or dampened emotional reactions, and long-term effects, such as loneliness or aggression. The negative reactions to rejection could have a major impact on older adults, who may experience rejection often due to age stereotypes and are particularly vulnerable to social pain (Hawkley et al., 2011). There is, however, a lack of research on the development of reactions to rejection over the adult lifespan. The literature review is suggestive of age differences in experiencing rejection. In particular, older adults may be less impacted by rejection due to different goal orientation as suggested by lifespan developmental theories (Baltes et al., 1999), or due to a better ability of emotion regulation as

suggested by socioemotional selectivity theory (Carstensen et al., 1999). Older adults may also appraise the rejection experience differently (Charles & Carstensen, 2008) and show a different pattern of emotional reactions in terms of discrete emotions (Grühn et al., 2010).

To initiate the first step in investigating developmental processes in reactions to rejection, the present study seeks to compare younger and older adults' emotional reactions following rejection in a laboratory setting. To do this, a cross-sectional experimental design with a new rejection manipulation paradigm, the online interview paradigm, was conducted. The rejection paradigm was modified from the evaluator paradigm (Buckley et al., 2004). In the present study, each participant engaged in an online interview with a confederate. Participants were seemingly randomly assigned to the "interviewee" role whereas another participant (who in fact is a confederate) was randomly assigned to the "interviewer" role. Participants received ratings indicating whether the interviewer would like to meet with them or not during and after the interview. Emotional reactions were assessed using multiple measures: (a) intraindividual change assessed by baseline and post-test mood measures; (b) emotional outcome measures including both mood valence and discrete emotions; and (c) empathy assessed as a measure of the consequence of rejection. Appraisals of the rejection experience were assessed to further explore the potential age differences. Finally, in order to control for potential confounding variables, personality, rejection sensitivity and trait affect were assessed.

The justification of creating a modified version of the evaluator paradigm consists of four major points. First, the manipulation method and cover story have to be applicable to

older adults since age differences in emotional reactions are the main focus of this study. Thus, the life-alone paradigm was excluded from consideration. At the same time, the type of rejection participants experience should be the same across age groups. This rules out the non-current rejection such as essay-writing; older adults may have stronger reactions simply because they remember significant rejection experiences in their lives (presumably because they have more chances of experiencing rejection in major events in their lives) whereas the rejection experiences younger adults remember may be trivial (or vice versa). Second, for the purpose of this study, one should minimize the influence of factors that are irrelevant of rejection experience such as those might exist in ostracism (e.g., learned helplessness) or in group-work rejection (e.g., attractiveness of the rejector). Third, the effects of change of rejection over time are also of interest to this study and so far the evaluator paradigm seems to be the most effective way of realizing the change of rejection. To do this, the present study included four conditions: constant rejection, increasing rejection, increasing acceptance and constant acceptance. Finally, the limitations of the evaluator paradigm could be mitigated by modifying the procedure. For example, in the present study, participants were actually talking to a person (a confederate) over the Internet to address the unnatural flow of the interaction. One limitation to the modified paradigm is that it only allows examination of individuals' reactions to stranger's rejection. As the first step in investigating developmental processes in reactions to rejection, the present study focused on the situation where rejection is initiated by an unfamiliar other.

As previously discussed, there are three measurement issues in disentangling the emotional distress hypothesis and emotional numbness hypothesis: (a) lack of measuring intraindividual change in mood, (b) different choice of measures, and (c) relying on self-report measures of emotion. In the present study, I addressed these three measurement issues. First, both baseline mood and post-test mood were assessed. Second, multiple measures of emotions were used to tap on multiple facets of emotional reactions for two reasons: On the one hand, as argued before, affect shows multidimensional and multidirectional age pattern over the lifespan (Grühn et al., 2010), that is, the size and presence of age differences differ by emotion. For the present study, this means that age differences in emotional reactions to rejection might differ by emotion. For example, older adults might react more often with sadness and younger adults might react more often with anger. Such age differences would not necessarily be visible in a uni-dimensional assessment of affect. On the other hand, a multi-dimensional assessment of affect might provide hints for disentangling the inconsistent results in the literature. Changes in discrete emotions could be covered up if one only examines the composite score of the valence of emotions. For example, rejected people may experience strong anger but no sadness, anxiety or other negative emotions. If one only examines a total score of all the negative emotions, the total score may be so close to the neutral mid-point of the mood scale leading to support the numbness hypothesis. However, the undetected strong increase of anger is nevertheless a negative reaction. Finally, to reduce the self-report bias, the proposed study will also use an implicit indicator of emotional reactions—empathy. As argued by DeWall and Baumeister (2006), if the emotional systems

have really ceased to function normally as the numbness hypothesis posits, rejected individuals should be insensitive to other emotional stimuli too. In addition, it has been demonstrated that empathy is affected by individuals' current mood. Thus, rejected individuals reluctant to admit their distress out of self-presentational concerns would still show lower empathy toward other individuals' pain. There is another reason why empathy deserves extra attention. Previous research has shown that rejected individuals tend to behave less prosocially than nonrejected individuals (Twenge et al., 2006). Empathy is believed to play a prominent role in shaping prosocial behavior (Batson, Klein, Highberger, & Shaw, 1995) and an important motivational component of prosocial behavior (Hoffman, 1977). Therefore, examining the effects of rejection on empathy might help explain the link between experiencing rejection and demonstrating less prosocial behavior.

The present study also included a questionnaire to assess participants' appraisals toward the rejection experience. Despite disagreement on specific dimensions, many theories of appraisal and emotion (e.g., Lazarus, 1991; Oatley & Johnson-Laird, 1987; Scherer, 1997) commonly agree on two dimensions: *goal achievement expectancy*, and *motive congruence* (Tong, Ellsworth, & Bishop, 2009). Goal achievement expectancy indicates how attainable one expects a goal to be. Motive congruence concerns the appraisal of how closely an outcome matches one's goal. As aforementioned, older adults may have a different goal orientation in social interactions (Freund et al., 2010) and may not be motivated to gain connections with unfamiliar others (Carstensen et al., 1999). A short questionnaire was

specifically designed to assess participants' appraisals about the interview experience along the goal and motivation dimension.

### **Hypotheses**

The goal of the present study was to investigate the effects of rejection in younger and older adults. Specifically, the question is whether younger and older adults differ in their emotional reactions to rejection. In terms of the effects of rejection, the present study investigates persons' emotional reactions to rejection as well as consequences for persons' social behaviors (e.g., empathy) after rejection. The review of the literature generated three main hypotheses regarding the effects of rejection, age differences in reactions to rejection, and potential explanatory effect of appraisals. Table 2 provides a summary of the hypotheses.

Table 2

*Summary of Hypotheses.*


---

**Hypothesis 1 - Effects of Rejection: The experimental manipulation of rejection and acceptance will affect participants' mood, emotions, and empathy.**

- H1a** From baseline to post-test, rejected participants will show a significant decrease in positive mood and significant increase in negative mood.
- H1b** In the post-test assessment, rejected participants will show lower levels of empathy toward others than accepted participants.
- H1c** Different conditions of rejection and acceptance will have different effects. In particular, increasing rejection will evoke more negative reactions than constant rejection whereas increasing acceptance will not elicit different reactions than constant acceptance.

---

**Hypothesis 2 - Effects of Age: Older adults will show different emotional reactions to rejection than younger adults.**

- H2a** Compared with older rejected participants, younger rejected participants will show a larger decrease in positive mood and a larger increase in negative mood.
- H2b** Compared with older rejected participants, younger rejected participants will show lower levels of empathy toward other people's pain.
- H2c** Older rejected participants will show different emotional reactions with respect to discrete emotions than younger rejected adults. In particular, older rejected adults will react more with sadness whereas younger adults will react more with anger.

---

**Hypothesis 3 – Mediating Effects of Appraisals: The expected age effects will be partially mediated by individuals' appraisals of the rejection.**

Age differences in appraisals can partially explain age differences in emotional reactions to rejection. In particular, age differences in goal and motivation may mediate the age differences in emotional reactions to rejection.

---

**Hypothesis 1. Effects of Rejection.** The experimental manipulation of rejection and acceptance will affect participants' mood, emotions, and empathy. The overall prediction regarding impact of rejection is that rejection will elicit people's negative feelings whereas acceptance will make people feel positive. Rejection, in comparison to acceptance, will also elicit more anger, sadness, and hurt feelings regardless of the general mood index and age, and lower people's empathy toward other people. In addition, among the four conditions, increasing rejection will elicit the strongest effects.

*Hypothesis 1a. From baseline to post-test, rejected participants will show a significant decrease in positive mood and significant increase in negative mood.*

Based on the previous findings, I hypothesize that rejected participants will show a mood shift toward the negative direction whereas accepted participants will show a mood shift toward the positive direction. In another word, rejected participants will show a significant decrease in positive mood and significant increase in negative mood from baseline to post-test. In contrast, accepted participants' mood will be elevated such that there will be a significant increase on the positive mood scale and significant decrease on the negative mood scale.

*Hypothesis 1b. In the post-test assessment, rejected participants will show lower levels of empathy toward others than accepted participants.*

As predicted by the numbness theory, if rejection makes the emotion system cease to function normally, rejection will lower people's emotional reaction toward other emotional stimuli (DeWall & Baumeister, 2006). The prediction is that because people's empathy is

related to their current emotional state, if rejection makes them feel emotionally numb, they should be numb to other people's unfortunate experiences.

***Hypothesis 1c.** The different conditions of rejection and acceptance will have different effects. In particular, increasing rejection will evoke more negative reactions than constant rejection whereas increasing acceptance will not elicit different reactions than constant acceptance.*

The change of rejection over time will influence the effects of the rejection as demonstrated by Buckley and colleagues (2004) such that increasing rejection will elicit more negative reactions than constant rejection, increasing acceptance and constant acceptance. In the increasing rejection condition, the interviewer gives feedback indicating acceptance to the participants at first, but as the interview carries on and presumably as the interviewer knows more about the participants, the interviewer gives feedback indicating increasing rejection. Participants may feel more offended and perceive the rejection more personal. Thus, one can expect increasing rejection will elicit more negative emotional reactions than constant rejection. In the increasing acceptance condition, the initial rejection may make participants feel uncomfortable; however, by further interacting with the interviewer, they gradually gained interest or trust from the interviewer. Participants in this condition should feel at least as positive as participants in the constant acceptance condition.

**Hypothesis 2. Effects of age.** Older adults will show different emotional reactions to rejection than younger adults. In general, older adults will be less affected by rejection from a stranger than younger adults as evidenced by a smaller negative shift of mood and higher

level of empathy. However, older adults are not immune to rejection either, that is, they will show a higher level of sadness than younger adults.

***Hypothesis 2a.** Compared with older rejected participants, younger rejected participants will show a larger decrease in positive mood and a larger increase in negative mood.*

As discussed previously, older adults are not as outcome-focused as younger adults (Freund et al., 2010) and reported to be better at emotion regulation than younger adults. Therefore, younger rejected participants may feel worse because the result of the event is unpleasant. In addition, rejection from a stranger may not have an impact on older adults because they do not focus on seeking new connections (Charles & Carstensen, 2007). In contrast, younger adults tend to focus on information-seeking goals (particularly in this experiment indicated by future interaction with the interviewer), thus they may feel worse because their goals are blocked.

***Hypothesis 2b.** Compared with older rejected participants, younger rejected participants will show lower levels of empathy toward other people's pain.*

In line with the emotional numbness hypothesis, the lower level of empathy is an indicator that rejection makes people's emotion system cease to function temporarily (DeWall & Baumeister, 2006). If older participants are less affected by the rejection compared to younger adults, younger rejected participants in both rejection conditions will show lower levels of empathy than older rejected participants.

*Hypothesis 2c. Older rejected participants will show different emotional reactions with respect to discrete emotions than younger rejected participants. In particular, older rejected participants will react more with sadness whereas younger participants will react more with anger.*

As previously discussed, effects of rejection may emerge when specific negative discrete emotions are examined. Further, studies have shown that older adults tend to show higher level of sadness but lower level of anger in comparison to younger adults when they experience interpersonal tensions (Charles et al., 2001; Charles & Carstensen, 2008). The present study predicts the same pattern in rejection experience, that is, older rejected participants will show an increase in sadness and younger rejected participants will show an increase in anger from baseline to post-test.

**Hypothesis 3. Mediating Effects of Appraisals.** *The expected age effects will be partially mediated by individuals' appraisals of the rejection.*

Age differences in appraisals can partially explain age differences in emotional reactions to rejection. In particular, older adults and younger adults may differ in their chronic goals as predicted by the lifespan developmental perspective and STT. In the social situation created by the present study, older adults may not expect to be liked (goal achievement expectancy) by an unknown person (i.e., the interviewer) and may not be motivated to gain connection (motive congruency) with that person as much as younger adults would do. As a result of low motivation, older participants may be less affected by the rejection experience compared to younger participants. Thus, age differences in goal and

motivation of the interaction with the interviewer (e.g., wanting to be liked by the interviewer or not) may mediate the age differences in emotional reactions to rejection.

## Method

### Participants

The sample comprised 95 younger adults (aged 18 to 26 years) and 30 older adults (aged 60 to 86 years). Younger adults were recruited from Introductory Psychology classes at North Carolina State University and received partial course credits for participation. Older adults were recruited through (a) advertisements in local newspapers, senior centers, public libraries in the local area of Raleigh, North Carolina, and (b) information from a database of individuals who had previously participated in studies in the Adult Development Laboratory (North Carolina State University). Older participants received \$15 for compensation. Participants were informed that the purpose of the study was to investigate online communication and decision making. Due to computer malfunction, three younger participants were excluded.

The final sample comprised 92 younger adults between the ages of 18 and 26 ( $M = 19.28$ ,  $SD = 1.60$ , 53% female) and 30 older adults between the ages of 60 and 86 ( $M = 69.93$ ,  $SD = 6.57$ , 58% female). Table 3 shows a summary of socio-demographic characteristics of the total sample and subsamples of young and older adults. The distribution of sex did not differ across the two subsamples,  $\chi^2_{(1)} = 0.72$ ,  $p = .40$ . Compared to the subsample of older adults, the subsample of younger adults is more racially diverse,  $\chi^2_{(5)} = 11.74$ ,  $p < .05$ . Expected differences between the two age groups were found in years of

education ( $t = -5.23, p < .01$ ), and subjective socioeconomic status ( $t = -2.9, p < .01$ ). Older adults were more educated and higher in socioeconomic status than younger adults.

Table 3.

*Socio-Demographic Characteristics of the Total Sample (N=122) and for Subsamples of Young( n=92) and Older Adults (n=30)*

|                                | Total        | Young Adults | Older Adults |
|--------------------------------|--------------|--------------|--------------|
| <i>Ethnicity</i>               |              |              |              |
| Hispanic                       | 8 7%         | 8 9%         | 0 0%         |
| Non-Hispanic                   | 115 93%      | 84 91%       | 30 100%      |
| <i>Racial Group</i>            |              |              |              |
| European American              | 79 64%       | 51 57%       | 27 90%       |
| African American               | 21 17%       | 19 21%       | 2 7%         |
| Asian                          | 6 5%         | 6 7%         | 0 0%         |
| Mixed race                     | 4 3%         | 4 4%         | 0 0%         |
| Other                          | 12 10%       | 10 10%       | 1 3%         |
| <i>Marital Status</i>          |              |              |              |
| Single                         | 94 78%       | 90 98%       | 4 14%        |
| Married/partnership            | 15 12%       | 2 2%         | 13 45%       |
| Divorced                       | 7 6%         | 0 0%         | 7 24%        |
| Widowed                        | 4 3%         | 0 0%         | 4 14%        |
| <i>Years of Education</i>      |              |              |              |
| Mean (SD)                      | 13.79 (2.21) | 13.08 (1.16) | 15.97 (3.08) |
| Range                          | 7 - 23       | 12 - 17      | 7 - 23       |
| <i>Subjective SES (0 - 10)</i> |              |              |              |
| Mean (SD)                      | 5.75 (1.54)  | 5.53 (1.42)  | 6.50 (1.73)  |
| Range                          | 2 - 9        | 2 - 9        | 3 - 9        |

*Note.* Income is annual household income. Subjective SES was measured using the MacArthur Scale of Subjective Social Status (Adler, Epel, Castellazzo, & Ickovics, 2000).

The study was aiming to obtain a balanced sample in terms of sex and age groups across conditions. However, the numbers of male and female older participants were not evenly distributed across the four experimental conditions (Table 4).

Table 4.

*Sample Distribution for the Four Conditions by Age Group and Gender*

|                       | Young Adults |      | Older Adults |      |
|-----------------------|--------------|------|--------------|------|
|                       | Female       | Male | Female       | Male |
| Increasing Rejection  | 11           | 12   | 2            | 3    |
| Constant Rejection    | 11           | 12   | 4            | 2    |
| Increasing Acceptance | 12           | 10   | 5            | 4    |
| Constant Acceptance   | 13           | 11   | 7            | 3    |

## Measures

### **Measures of the Effects of the Experimental Manipulation.**

*Measures of emotion.* Baseline and post-test self-reported emotions were assessed by six subscales: (a) happiness, (b) satisfaction, (c) anger, (d) sadness, (e) hurt feeling, (f) anxiety. Scales are composed of 21 items: six items were taken from the Brief Mood Introspection Scale (BMIS; Mayer & Gaschke, 1988), 15 items from a mood scale used in a previous rejection experiment (Buckley et al., 2004) (see Appendix B for sources of specific items and the order of presentation). The subscales and the corresponding items are listed in

Table 5. Participants rated to what extent each word is describing their current feelings on a 7-point scale ranging from *not at all* (1) to *very much* (7). As previously argued, a multi-facet approach can capture different aspects of mood. In order to weight each subscale, a composite score indicating positive mood was created based on the average of the happiness and satisfaction subscales. A composite score indicating negative mood was created based on average of the anger, sadness, hurt feelings, and anxiety subscales. Internal consistencies were adequate ranging from  $\alpha = .70$  to  $\alpha = .91$  (see Table 5).

Table 5.

*Items of Emotion Subscales.*

| Scale                      | Items                               | Cronbach's alpha |           |
|----------------------------|-------------------------------------|------------------|-----------|
|                            |                                     | Baseline         | Post-test |
| <b>Positive Mood Score</b> |                                     | .76              | .84       |
| Happiness                  | happy, delighted, cheerful, pleased | .88              | .91       |
| Satisfaction               | Content                             |                  |           |
| <b>Negative Mood Score</b> |                                     | .75              | .76       |
| Anger                      | annoyed, angry, mad, grouchy        | .70              | .82       |
| Sadness                    | depressed, dejected, sad, gloomy    | .88              | .84       |
| Hurt feelings              | hurt, pained, injured, wounded      | .86              | .84       |
| Anxiety                    | anxious, nervous, tense, uneasy     | .87              | .88       |

**Measure of empathy.** To measure empathic reactions to others after being rejected/accepted, a measure of empathy adapted from DeWall and Baumeister (2006; Batson et al., 1995) was used. Participants read two handwritten essays and rated how *sympathetic, warm, compassionate, softhearted, and tender* they felt toward the authors of the essay on a 7-point scale ranging from *not at all* (1) to *very much* (7). In past research (DeWall & Baumeister, 2006), the internal consistency for the empathy related adjectives was high ( $\alpha = .92$ ). In the present study, the content of the two essays was adapted to reduce bias by either age group (see Appendix C). The two essays were handwritten by two persons and the handwriting styles were both rated as gender-neutral by seven independent raters in pilot testing. In the first essay, the author is describing his or her physical pain and inconvenience caused by an injury. In the second essay, the author is describing an argument with his or her best friend. The 5-item scale across two essays showed high internal consistency ( $\alpha = .91$ ).

**Measure of appraisals.** Measures of appraisals were created based on two dimensions (Tong et al., 2009): *goal achievement expectancy* and *motive congruence*. There were two items for each dimension for a total of 4 items. These items were designed to assess the interview experience specifically because context-specific appraisals rather than general appraisal styles were relevant to the present study. Table 6 presents the appraisal dimensions together with the corresponding items along with the internal consistency. Participants were asked to rate to what extent they agree with each statement on a 7-point scale ranging from *strongly disagree* (1) to *strongly agree* (7).

Table 6

*Items assessing participants' appraisals.*

| <b>Dimension</b>                   | <b>Item</b>  | <b>Cronbach's <math>\alpha</math></b> |
|------------------------------------|--|---------------------------------------|
| <b>Goal Achievement Expectancy</b> |  | .39                                   |
|                                    | I expected the interviewer to want to meet with me.                                    |                                       |
|                                    | <sup>a</sup> I don't really care whether the interviewer wants to meet with me or not. |                                       |
| <b>Motive Congruence</b>           |  | .67                                   |
|                                    | I was trying to make the interviewer want to meet with me.                             |                                       |
|                                    | I answered the questions in a way to impress the interviewer.                          |                                       |

*Note.* The order of items presented in the study was randomized. See Appendix D.

<sup>a</sup>Item was recoded.

**Measures of Covariates.** In order to control for person characteristics that may potentially influence the effects of the rejection manipulation, participants' cognitive functioning, personality (including rejection sensitivity), and emotional functioning were measured.

**Cognitive functioning.** In order to assess participants' fluid and crystallized intelligence, participants completed the Digit Symbol Substitution Task (DSST, Wechsler, 1981) as an indicator of fluid intelligence and the Shipley Vocabulary Test (SVT, Zachary, 1986) as an indicator of crystallized intelligence. Specific items of both measures are included in Appendix E.

**Personality.** The 44-item Big Five Inventory (BFI, John, Donahue, & Kentle, 1991; John, Naumann, & Soto, 2008) measured participants' personality of five broad dimensions: extraversion, neuroticism, agreeableness, openness and conscientiousness. It is a widely used multidimensional personality test consisting of short phrases and has demonstrated adequate validity and reliability. In the present study, internal consistencies were high (extraversion:  $\alpha = .87$ ; neuroticism:  $\alpha = .83$ ; agreeableness:  $\alpha = .75$ ; openness:  $\alpha = .80$ ; conscientiousness:  $\alpha = .77$ ). See Appendix F for items.

**Rejection Sensitivity.** A short version of Rejection Sensitivity Questionnaire (RSQ; Downey & Feldman, 1996) was used to measure participants' general sensitivity to rejection. The original scale contains 16 social situations, in which people might encounter rejection (e.g., "You ask your boyfriend/girlfriend to move in with you."). Participants were asked to indicate their degree of concern or anxiety about the outcome of each situation (e.g., "How concerned or anxious would you be over whether your boyfriend/girlfriend would want to move in with you?") on a 7-point scale from *unconcerned* (1) to *very concerned* (7). Participants are also asked to indicate the likelihood that the other person(s) would respond in an accepting fashion (e.g., "I would expect that he/she would willingly agree to move in with me.") on a 7-point scale from *unlikely* (1) to *very likely* (7). The original RSQ showed high internal reliability ( $\alpha = .83$ ) and high test-retest reliability (.78 - .83) (Downey & Feldman, 1996).

The RSQ was originally developed for college student samples. Many of the situations are only meaningful for college students (e.g., "You ask someone in class if you

can borrow his/her notes”) and not applicable to older adults. However, there are six situations applicable for older adults (Kang & Chasteen, 2009). The present study only included this 6-item short version of the RSQ (see Appendix G) to make it equivalent and comparable between the two age groups. There was no direct use of the term rejection in these 6 items to avoid raising participants’ suspicion. In addition, three distractor items were created to further decrease the awareness of the rejection manipulation. In the present study, the internal consistency is adequate ( $\alpha = .61$ ).

***Emotional functioning.*** In order to assess participants’ general emotional functioning, trait empathy as well as indicators of subjective well-being were assessed (see Appendix H). Empathy is measured by Davis’ Empathy Scale (DES, Davis, 1994). The DES has seven items and the responses were adapted to a 7-point scale ranging from *strongly disagree* (1) to *strongly agree* (7). Subjective well-being was assessed with positive affect, negative affect, life satisfaction, and depressive symptoms. For measuring trait affect, the Positive and Negative Affect Schedule (PANAS, Watson et al., 1988) was used. Participants rated on 20 items indicating how well each statement describes them generally on a 7-point scale ranging from *very rarely* (1) to *very frequently* (7). For life satisfaction, a single-item question (i.e., “Overall, how satisfied do you feel with your life?”), was assessed on a 7-point scale ranging from *very unsatisfied* (1) to *very satisfied* (7). The Center for Epidemiological Studies – Depression scale (CES-D; Radloff, 1977) was used for measuring depressive symptoms. CES-D has 20 items and participants rated how often they have felt this way during the past week on a 4-point scale ranging from *Rarely or none of the time (less than 1*

day) (1) to *Most or all of the time* (4). All measures demonstrated high internal consistency in the present study (DES:  $\alpha = .78$ ; PANAS:  $\alpha = .78$  for positive affect and  $\alpha = .81$  for negative affect; CES-D:  $\alpha = .87$ )

**Manipulation Check.** A manipulation check was included to make sure that participants understood the meaning of the positive (acceptance) and negative (rejection) feedback from the interviewer. A single-item question assessing participants' perceived rejection was administered immediately after the interview. Participants were asked to rate "How much did the other participant indicate that he or she wanted to get to know you?" on a 7-point scale ranging from *not at all* (1) to *very much* (7).

### **Procedure**

The present rejection paradigm was mainly adapted from the evaluator paradigm (Buckley et al., 2004). Participants' rejection experience was operationalized as negative feedback from another participant (who in fact is a confederate) indicating no interest in future interaction. Participants come into the laboratory for a study, ostensibly, about online communication and decision making.

**The Rejection Manipulation.** Participants were told that the present study was about online communication and decision making. Specifically, participants were told that:

*A simulated online interview has been designed to investigate when two persons meet online, what factors make them want to know each other in real life. To do this, two participants in two separate rooms will engage in an interview via an instant messenger. At random, one can be either assigned to the "interviewer" role or to the "interviewee" role.*

*The interviewer will ask questions by typing into the instant messenger whereas the interviewee will answer those questions out loud. The interviewer will make a decision whether he or she would like to meet with the interviewee based on the interviewee's responses to the questions.*

The screen on the participants' computer consists of two parts: the major part was a window that appeared to be a "feedback rating program" embedded in the instant messenger. The "program" displayed a question and a 7-point scale which indicated how much the interviewer would like to meet with the interviewee ranging from *not at all* (1) to *very much* (7). Below the feedback rating program window, there was a message box where participants received the questions from the interviewer. There were 15 questions in total. After every 3 questions, the interview would give a feedback rating on the 7-point scale and the corresponding button on participants' computer screen would turn red. After the last question, the interviewer would type in "that was the last question, and this is my final decision" and then gave a rating corresponding to participants' condition. In the constant rejection condition, the ratings were either 2 or 3 during the entire interview, whereas in the increasing rejection condition, the ratings were at first around 5 or 6, but change to 2 or 3 at the end. Likewise in the constant acceptance condition, ratings were either 5 or 6, whereas in the increasing acceptance condition, the ratings changed from 2 or 3 to 5 or 6. Participants were also told that the interviewer was only able to hear their voices and could not see their faces, and the interview would be video-recorded. In order to encourage participants to be more engaged in the interview, they were told that if the interviewer indicated that he or she

would like to meet with them, the participants and the interviewer could participate in a side project and would be enrolled in a lottery for an additional \$10 cash prize. At the end of the experiment, all participants were offered the chance to be enrolled in the lottery. Participants first answered two practice questions and received one rating for each question (4 and 5, respectively). Participants were instructed that the ratings they received for the two practice questions were the same for all participants. The actual interview only proceeded after participants were familiar and comfortable with the procedure. The experimenter stepped outside the room during the interview.

The questions participants answered during the interview were adapted from the Relationship Closeness Induction Task (Sedikides, Campbell, Reeder, & Elliot, 1999). The questions began generally (e.g., “Where are you from?”) and gradually became more personal (e.g., “What is one habit you’d like to break?”; “What is something about you that most people would consider surprising?”). These questions were previously used in studies involving social interactions as well as in rejection studies (e.g., Buckley et al., 2004; Maner et al., 2007). The interview usually lasted for approximately 15 to 20 minutes. Interviewers were trained undergraduate or graduate psychology students. Interviewers were provided with a script corresponding to each condition and were allowed to provide short written responses to participants’ answers at appropriate times during the interview. Example responses were “sounds interesting”, “okay”, and “I did not like that movie”.

**The Sequence of Events.** Two slightly different sequences of events with the same measures were used for younger and older participants to shorten the duration of session in

the laboratory for older participants. For younger participants, all the measures were completed in the laboratory in one session. After signing the informed consent form, participants first received a set of questionnaires, which included the measures of demographic information, experiences with online chatting, rejection sensitivity, trait empathy, life satisfaction, general physical health, and baseline mood (in this order). The 6-item version of RSQ with 3 additional distractor items and the trait empathy were administered along with these background measures to decrease participants' awareness of the rejection manipulation. Five items regarding online chatting experiences were also included to increase the credibility of the cover story. Then participants engaged in the online interview. Immediately after the interview, participants completed the post-test mood measures and appraisal measures, which followed by the empathy-essay task. Afterwards, participants completed the cognitive functioning tests (i.e., DSST and SVT), and personality and emotional functioning tests (i.e., BFI, PANAS, and CES-D). Finally, participants were fully debriefed.

For older participants, several measures were either mailed or emailed to older participants and were completed prior to the laboratory session. These measures included demographic information, rejection sensitivity, trait empathy, life satisfaction, general physical health, personality and emotional functioning. In the laboratory session, participants first completed a questionnaires including experiences with online chatting and baseline mood, which was followed by the online interview. Immediately after the interview, participants completed post-test mood measure and appraisal measures, then they completed

the cognitive functioning tests. Finally, participants were fully debriefed and given the opportunity to talk to interviewers via video chatting.

## **Results**

In the result section, I focus on three major topics. First, I conducted preliminary analyses on a variety of psychosocial factors including depressive symptoms, cognitive functioning, and personality to examine the sample characteristics. I also conducted an analysis to check the effectiveness of the experimental manipulation. Second, I tested the effects of experimental conditions and age on positive mood, negative mood, empathy, and three discrete emotions: anger, sadness and hurt feelings. Finally, I explored the possibility that age differences in rejected participants' goal and motivation may mediate the age differences in emotional reactions to rejection.

### **Preliminary Analyses**

**Sample Characteristics.** To examine differences in baseline characteristics across age groups and conditions, a series of  $2 \times 2$  (Age group  $\times$  Condition) analyses of variance (ANOVAs) were conducted for each dependent variable, with age group (younger adults vs. older adults) and Condition (rejection vs. acceptance) as two between-subject factors. Results revealed typical age differences reported in the adult literature. There were significant main effects of age for depressive symptoms, crystallized intelligence, fluid intelligence, and conscientiousness, as indicated in Table 7. Older adults reported less depressive symptoms, poorer fluid intelligence, and better crystallized intelligence than younger adults. There was no other significant main effect of age, all  $ps > .05$ ,  $\eta^2 < .01$ . There was no main effect of

condition, all  $ps > .05$ ,  $\eta^2 < .01$  (See Appendix I, Table I1), indicating random assignment of participants to conditions.

Table 7

*Sample Characteristics for Young and Older adults*

|                                 | Young Adults |        | Older adults |         | ANOVA    |                |            |
|---------------------------------|--------------|--------|--------------|---------|----------|----------------|------------|
|                                 |              |        |              |         | <i>F</i> | <i>p</i>       | $\eta^2$   |
| <i>Self-Reported Well-being</i> |              |        |              |         |          |                |            |
| Life Satisfaction               | 5.34         | (1.15) | 5.53         | (1.22)  | 0.16     | .67            | <.01       |
| Subjective Health               | 5.40         | (1.02) | 5.63         | (1.07)  | 1.12     | .29            | <.01       |
| Depressive symptoms             | 1.60         | (0.40) | 1.36         | (0.40)  | 6.54     | <b>.01</b>     | <b>.05</b> |
| <i>Intellectual Functioning</i> |              |        |              |         |          |                |            |
| Fluid Intelligence              | 69.83        | (9.68) | 54.24        | (11.66) | 59.86    | <b>&lt;.01</b> | <b>.34</b> |
| Crystallized Intelligence       | 29.66        | (3.78) | 35.07        | (3.78)  | 50.31    | <b>&lt;.01</b> | <b>.30</b> |
| <i>Personality</i>              |              |        |              |         |          |                |            |
| Rejection Sensitivity           | 14.42        | (4.76) | 15.24        | (4.72)  | 0.85     | .36            | <.01       |
| Trait Empathy                   | 5.26         | (0.81) | 5.62         | (0.87)  | 4.24     | <b>.04</b>     | <b>.04</b> |
| Trait Positive Affect           | 4.99         | (0.76) | 4.90         | (0.65)  | 0.97     | .33            | <.01       |
| Trait Negative Affect           | 2.61         | (0.73) | 2.70         | (0.69)  | 0.21     | .63            | <.01       |
| Extraversion                    | 4.61         | (1.14) | 4.41         | (0.97)  | 0.95     | .33            | .01        |
| Agreeableness                   | 5.35         | (0.71) | 5.54         | (0.73)  | 2.09     | .15            | .02        |
| Conscientiousness               | 4.84         | (0.73) | 5.48         | (0.89)  | 13.06    | <b>&lt;.01</b> | <b>.10</b> |
| Neuroticism                     | 3.35         | (0.99) | 3.16         | (1.08)  | 0.57     | .45            | .01        |
| Openness                        | 4.78         | (0.85) | 4.94         | (0.94)  | 0.70     | .42            | .01        |

*Note.* Standard Deviations are in parentheses.

**Manipulation Check.** In order to determine the effectiveness the experimental manipulation, a  $2 \times 4$  (Age group  $\times$  Condition) ANOVA on perceived rejection was conducted. The results revealed a significant main effect of Condition,  $F(3,109) = 155.27, p < .01, \eta^2 = .81$ . Follow-up post hoc tests indicated that participants in the constant rejection condition ( $M = 2.26, SD = 0.66$ ) and increasing rejection condition ( $M = 2.19, SD = 0.56$ ) perceived significantly higher rejection than participants in the constant acceptance condition ( $M = 5.75, SD = 0.44$ ) and increasing acceptance condition ( $M = 5.58, SD = 1.06$ ),  $p < .01$ . The perceived rejection did not differ between the two rejection conditions or between the two acceptance conditions. There was no main effect of age group,  $F(1,109) = 0.44, p = .51, \eta^2 < .01$ , or interaction between Age group and Condition,  $F(3,109) = 0.73, p = .54, \eta^2 = .02$ . Altogether, these results demonstrated that the rejection manipulation was successful in both younger and older adults.

### **Effects of Experimental Condition and Age**

**Mood Shift.** In Hypothesis 1a, I predicted that rejected participants would show a significant decrease in positive mood and significant increase in negative mood from baseline to post-test. In Hypothesis 2a, I predicted that compared with older rejected participants, younger rejected participants would show a larger decrease in positive mood and a larger increase in negative mood. In order to test these two hypotheses, two separate  $2 \times 2 \times 2$  (Time  $\times$  Age group  $\times$  Condition) repeated-measure ANOVAs were conducted on the two dependent variables, positive mood and negative mood. In these analyses, the within-subject factor was time (baseline vs. posttest) and the between subject factors were age group (young

vs. old) and condition (rejection vs. acceptance). A significant two-way interaction between time and condition in both positive mood and negative mood would support Hypothesis 1a. A significant three-way interaction among time, age group, and condition would support Hypothesis 2a.

For positive mood, there was a significant main effect of age group,  $F(1,118) = 5.63$ ,  $p < .05$ ,  $\eta^2 = .05$ . Older participants reported higher level of positive mood than younger participants overall. There was also a significant main effect of condition,  $F(1,118) = 7.84$ ,  $p < .01$ ,  $\eta^2 = .06$ . Overall, rejected participants reported less positive mood than accepted participants. However, this effect was qualified by a significant interaction between time and condition,  $F(1,118) = 17.30$ ,  $p < .01$ ,  $\eta^2 = .13$ . This result was consistent with the prediction of Hypothesis 1a that from baseline to post-test, rejected participants reported a significant decrease in positive mood whereas accepted participants reported a significant increase in positive mood. Figure 1a provides a visual representation of the results. No other effects reached significance, all  $ps > .05$ ,  $\eta^2 < .01$ . In particular, contrary to the prediction of Hypothesis 2a, the three-way interaction between time, age groups, and condition was not significant,  $F(1,118) = 0.40$ ,  $p = .53$ ,  $\eta^2 < .01$ . Table I2 in Appendix I provides a comprehensive summary of all effects. Table 8 shows the descriptive statistics for positive mood across the two age groups and two conditions (see combined). In sum, the results supported Hypothesis 1a but not Hypothesis 2a. Rejected participants felt less positive than accepted participants regardless of their age.

Table 8

*Means and SDs of Positive Mood as a Function of Age and Condition*

| Condition           | Total    |       | Young adults |       | Older adults |       |
|---------------------|----------|-------|--------------|-------|--------------|-------|
|                     | Baseline | Post- | Baseline     | Post- | Baseline     | Post- |
| Means               |          |       |              |       |              |       |
| <i>Rejection</i>    |          |       |              |       |              |       |
| Increasing          | 4.58     | 3.91  | 4.52         | 3.73  | 4.82         | 4.73  |
| Constant            | 4.35     | 3.73  | 4.17         | 3.66  | 5.00         | 4.01  |
| Combined            | 4.46     | 3.82  | 4.36         | 3.75  | 4.98         | 4.33  |
| <i>Acceptance</i>   |          |       |              |       |              |       |
| Increasing          | 4.98     | 5.08  | 4.77         | 5.99  | 5.51         | 5.32  |
| Constant            | 4.56     | 5.09  | 4.34         | 4.88  | 5.07         | 5.59  |
| Combined            | 4.62     | 4.49  | 4.55         | 4.93  | 5.28         | 5.08  |
| Standard Deviations |          |       |              |       |              |       |
| <i>Rejection</i>    |          |       |              |       |              |       |
| Increasing          | 1.55     | 1.61  | 1.48         | 1.68  | 2.00         | 1.01  |
| Constant            | 1.30     | 1.52  | 1.33         | 1.59  | 1.03         | 1.29  |
| Combined            | 1.42     | 1.55  | 1.42         | 1.59  | 1.53)        | 1.24  |
| <i>Acceptance</i>   |          |       |              |       |              |       |
| Increasing          | 1.03     | 1.04  | 0.10         | 1.09  | 1.05         | 0.89  |
| Constant            | 1.36     | 1.16  | 1.31         | 1.22  | 1.42         | 0.82  |
| Combined            | 1.32     | 1.47  | 1.16         | 1.15  | 1.24         | 1.09  |

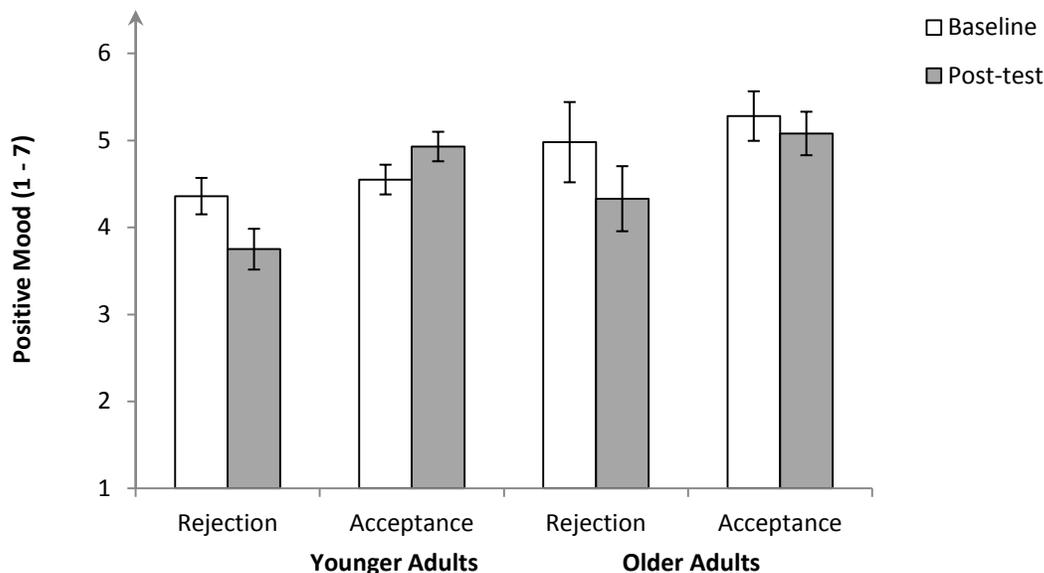


Figure 1a. Means for baseline and post-test positive mood as a function of age and condition.

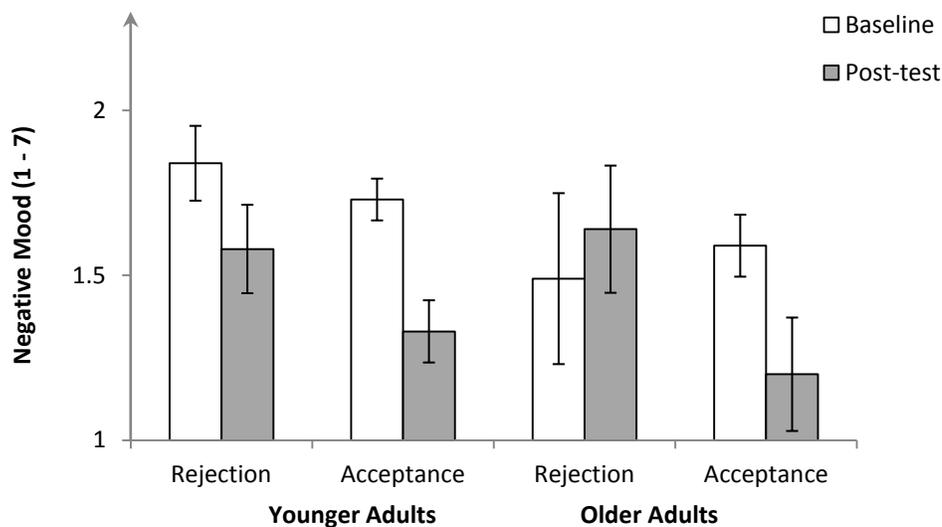
For negative mood, the results surprisingly revealed a significant main effect of time,  $F(1,118) = 15.56, p < .01, \eta^2 = .12$ . Overall, participants' negative mood decreased from baseline to post-test. The two-way interaction between time and condition was significant,  $F(1,118) = 9.04, p < .01, \eta^2 = .07$ . Regardless of age groups, accepted participants' negative mood significantly decreased from baseline to post-test whereas rejected participants did not change. No other effects reached significance, all  $ps > .05, \eta^2 < .01$ . In particular, contrary to the prediction of Hypothesis 2a, the three-way interaction was not significant,  $F(1,118) = 3.04, p = .08, \eta^2 = .03$ , but revealed a trend in the direction opposite to the prediction of Hypothesis 2a. As Figure 1b shows, rejection appeared to elicit negative mood in older adults but not in younger adults. Table I2 in the appendix provides a comprehensive summary of all

effects. Table 9 shows the descriptive statistics for negative mood across the two age groups and two conditions (see combined). In sum, the results did not support Hypothesis 1a or Hypothesis 2a. Rejection did not elicit participants' negative mood in either age group.

Table 9

*Means and SDs of Negative Mood as a Function of Age and Condition*

| Condition           | Total    |       | Young adults |       | Older adults |       |
|---------------------|----------|-------|--------------|-------|--------------|-------|
|                     | Baseline | Post- | Baseline     | Post- | Baseline     | Post- |
| Means               |          |       |              |       |              |       |
| <i>Rejection</i>    |          |       |              |       |              |       |
| Increasing          | 1.57     | 1.53  | 1.58         | 1.49  | 1.55         | 1.71  |
| Constant            | 1.96     | 1.66  | 2.10         | 1.67  | 1.45         | 1.58  |
| Combined            | 1.77     | 1.59  | 1.84         | 1.58  | 1.49         | 1.64  |
| <i>Acceptance</i>   |          |       |              |       |              |       |
| Increasing          | 1.53     | 1.24  | 1.66         | 1.30  | 1.22         | 1.09  |
| Constant            | 1.83     | 1.34  | 1.79         | 1.36  | 1.93         | 1.29  |
| Combined            | 1.73     | 1.43  | 1.73         | 1.33  | 1.59         | 1.20  |
| Standard Deviations |          |       |              |       |              |       |
| <i>Rejection</i>    |          |       |              |       |              |       |
| Increasing          | 0.75     | 0.73  | 0.75         | 0.67  | 0.87         | 1.06  |
| Constant            | 0.95     | 0.83  | 0.99         | 0.86  | 0.59         | 0.76  |
| Combined            | 0.87     | 0.78  | 0.91         | 0.77  | 0.69         | 0.86  |
| <i>Acceptance</i>   |          |       |              |       |              |       |
| Increasing          | 0.49     | 0.32  | 0.51         | 0.35  | 0.24         | 0.15  |
| Constant            | 0.79     | 0.48  | 0.76         | 0.50  | 0.90         | 0.44  |
| Combined            | 0.77     | 0.63  | 0.64         | 0.43  | 0.75         | 0.41  |



*Figure 1b.* Means for baseline and post-test negative mood as a function of age and condition.

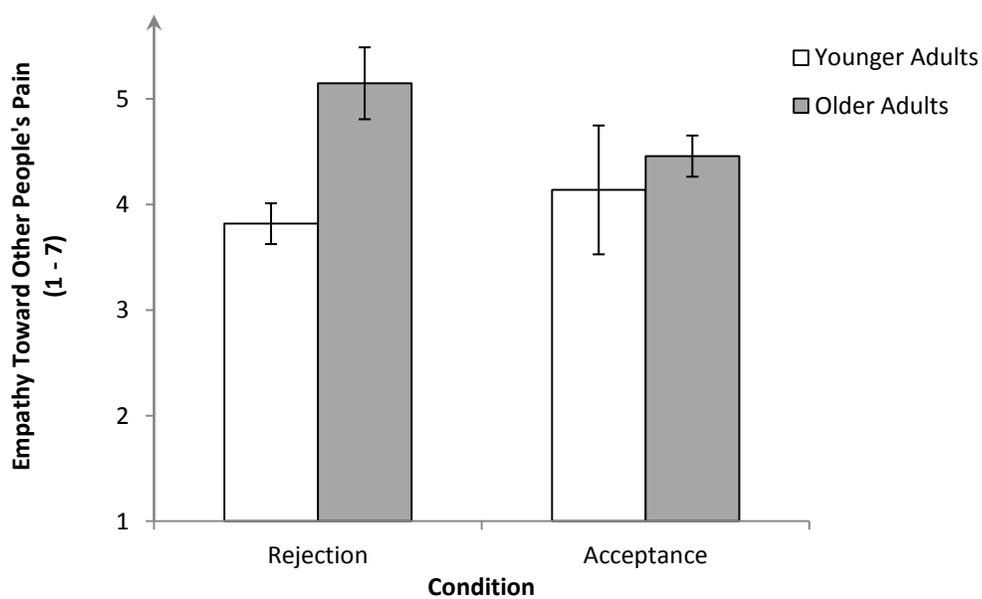
**Empathy.** In Hypothesis 1b, I predicted that rejected participants will show lower levels of empathy toward others than accepted participants. In Hypothesis 2b, I predicted that compared with older rejected participants, younger rejected participants will show lower levels of empathy toward other people's pain. To test these two hypotheses, a  $2 \times 2$  (Age group  $\times$  Condition) analyses of covariance (ANCOVA) was conducted with participants' empathy rating as the dependent variable and trait empathy as a covariate. A significant main effect of condition would support Hypothesis 1b. A significant interaction between age group and condition would support Hypothesis 2b.

There was a significant main effect of age group,  $F(1,117) = 7.55, p < .01, \eta^2 = .06$ . Older participants reported higher empathy toward other people's pain than younger participants across conditions. This main effect was further qualified by a significant age group  $\times$  condition interaction,  $F(1,117) = 3.91, p = .05, \eta^2 = .03$ . Older rejected participants reported significantly higher level of empathy than younger rejected participants. The results also indicated that participants who were higher on trait empathy also showed higher empathy toward other people's pain,  $F(1,117) = 32.58, p < .01, \eta^2 = .20$ . Contrary to the prediction, there was no significant main effect of condition,  $F(1,117) = 1.23, p = .27, \eta^2 = .01$ . Table 10 presents the descriptive statistics of empathy ratings across the two age groups and the two conditions (see combined). In sum, these results were not consistent with the predictions with regard to the effect of rejection on empathy. Figure 2 provides a visual representation of the results.

Table 10

*Means and SDs of Empathy as a Function of Age and Condition*

| Condition         | Means |         |       | Standard Deviations |         |       |
|-------------------|-------|---------|-------|---------------------|---------|-------|
|                   | Total | Younger | Older | Total               | Younger | Older |
| <i>Rejection</i>  |       |         |       |                     |         |       |
| Increasing        | 3.94  | 3.71    | 5.01  | 1.45                | 1.71    | 0.85  |
| Constant          | 4.20  | 3.93    | 5.27  | 1.32                | 1.58    | 1.39  |
| Combined          | 4.08  | 3.82    | 5.15  | 1.38                | 1.64    | 1.13  |
| <i>Acceptance</i> |       |         |       |                     |         |       |
| Increasing        | 4.35  | 4.33    | 4.39  | 0.89                | 1.09    | 1.00  |
| Constant          | 4.14  | 3.98    | 4.52  | 0.89                | 1.29    | 0.72  |
| Combined          | 4.24  | 4.14    | 4.46  | 0.94                | 1.20    | 0.84  |



*Figure 2.* Means of empathy ratings as a function of age and condition.

**Change of Rejection.** Hypothesis 1c specifically compares the differential effects of the two variations of rejection and acceptance conditions, that is, increasing rejection will evoke more negative reactions than constant rejection whereas increasing acceptance will not elicit different reactions than constant acceptance. Therefore, separate analyses on the two dependent variables, positive mood and negative mood, were performed with only rejected participants and only accepted participants, resulting a total of four separate  $2 \times 2$  (Time  $\times$  Condition) repeated-measure ANOVAs.

Consistent with previous findings, when only rejected participants were examined, there was a significant main effect of time on positive mood,  $F(1,55) = 19.19, p < .01, \eta^2 = .26$ , and negative mood,  $F(1,55) = 6.04, p < .05, \eta^2 = .10$ . No other effects were found to be significant, all  $ps > .05, \eta^2 < .01$ . Regardless of the change of rejection, all rejected participants showed a significant decrease in positive mood and in negative mood from baseline to post-test. When only accepted participants were examined, there was a significant main effect of time on positive mood,  $F(1,63) = 8.24, p < .01, \eta^2 = .12$ , and negative mood,  $F(1,63) = 37.50, p < .01, \eta^2 = .37$ . No other effects were found to be significant, all  $ps > .05, \eta^2 < .01$ . Regardless of the change of acceptance, all accepted participants showed a significant increase in positive mood and significant decrease in negative mood from baseline to post-test.

Table 8 and Table 9 present the descriptive statistics of positive mood and negative mood across the four conditions. Table I3 in Appendix I shows a comprehensive summary of all effects.

### Effects on Discrete Emotions

In Hypothesis 2c, I predicted that rejection would elicit specific negative discrete emotions. Three  $2 \times 2 \times 2$  (Time  $\times$  Age group  $\times$  Condition) repeated-measure ANOVAs were conducted on three discrete negative emotions: anger, sadness, and hurt feelings. These three discrete emotions were chosen because they were typically associated with rejection (e.g., Buckley et al., 2004).

There was a significant interaction between time and condition in anger,  $F(1,118) = 8.20, p < .01, \eta^2 = .07$ , and sadness,  $F(1,118) = 5.64, p < .05, \eta^2 = .05$ . Accepted participants' level of anger and sadness significantly decreased from baseline to post-test whereas rejected participants' level of anger and sadness did not change. For hurt feelings, there was a significant time  $\times$  condition interaction,  $F(1,118) = 12.68, p < .01, \eta^2 = .10$ , and a significant time  $\times$  age group interaction,  $F(1,118) = 6.40, p < .05, \eta^2 = .05$ . These two-way interactions were further qualified by a three-way interaction between time, age group, and condition,  $F(1,118) = 10.79, p < .01, \eta^2 = .08$ . Bonferroni adjusted post-hoc tests revealed that only older rejected participants, but not younger rejected participants, showed significantly higher level of hurt feelings from baseline to post-test ( $p < .01$ ). Both younger and older accepted participants showed significant decrease in level of hurt feelings from baseline to post-test ( $ps < .05$ ). Table I4 in Appendix I shows a comprehensive summary of all effects. Table 11 presents the descriptive statistics of the three discrete emotions across the two age groups and two conditions.

In sum, interesting differential results emerged in hurt feelings such that rejection elicited more hurt feelings in older adults compared to younger adults. Figure 3 provides a visual representation of the effects of rejection and acceptance on hurt feelings. Contrary to the predictions, older adults and younger adults did not react to rejection differently in terms of anger and sadness.

Table 11

*Means and SDs of Discrete Emotions as a Function of Age and Condition*

| Condition            | Total    |       | Young adults |       | Older adults |       |
|----------------------|----------|-------|--------------|-------|--------------|-------|
|                      | Baseline | Post- | Baseline     | Post- | Baseline     | Post- |
| Means                |          |       |              |       |              |       |
| <i>Anger</i>         |          |       |              |       |              |       |
| Rejection            | 1.41     | 1.47  | 1.45         | 1.49  | 1.23         | 1.39  |
| Acceptance           | 1.43     | 1.16  | 1.46         | 1.20  | 1.35         | 1.07  |
| Combined             | 1.42     | 1.31  | 1.45         | 1.35  | 1.30         | 1.18  |
| <i>Sadness</i>       |          |       |              |       |              |       |
| Rejection            | 1.58     | 1.60  | 1.59         | 1.60  | 1.55         | 1.66  |
| Acceptance           | 1.45     | 1.19  | 1.47         | 1.19  | 1.39         | 1.12  |
| Combined             | 1.51     | 1.38  | 1.53         | 1.40  | 1.45         | 1.32  |
| <i>Hurt feelings</i> |          |       |              |       |              |       |
| Rejection            | 1.46     | 1.45  | 1.51         | 1.37  | 1.23         | 1.77  |
| Acceptance           | 1.30     | 1.10  | 1.27         | 1.10  | 1.37         | 1.11  |
| Combined             | 1.37     | 1.26  | 1.39         | 1.23  | 1.32         | 1.35  |
| Standard Deviations  |          |       |              |       |              |       |
| <i>Anger</i>         |          |       |              |       |              |       |
| Rejection            | 0.66     | 0.84  | 0.70         | 0.87  | 0.43         | 0.69  |
| Acceptance           | 0.72     | 0.44  | 0.73         | 0.50  | 0.70         | 0.23  |
| Combined             | 0.69     | 0.67  | 0.71         | 0.72  | 0.61         | 0.47  |
| <i>Sadness</i>       |          |       |              |       |              |       |
| Rejection            | 1.14     | 0.99  | 1.16         | 1.00  | 1.11         | 1.02  |
| Acceptance           | 0.78     | 0.43  | 0.77         | 0.46  | 0.81         | 0.36  |
| Combined             | 0.97     | 0.78  | 0.98         | 0.80  | 0.92         | 0.71  |
| <i>Hurt feelings</i> |          |       |              |       |              |       |
| Rejection            | 0.98     | .093  | 1.05         | 0.89  | 0.51         | 1.08  |

Table 11 Continued

|            |      |      |      |      |      |      |
|------------|------|------|------|------|------|------|
| Acceptance | 0.70 | 0.31 | 0.64 | 0.89 | 0.82 | 0.33 |
| Combined   | 0.84 | 0.70 | 0.88 | 0.68 | 0.71 | 0.76 |

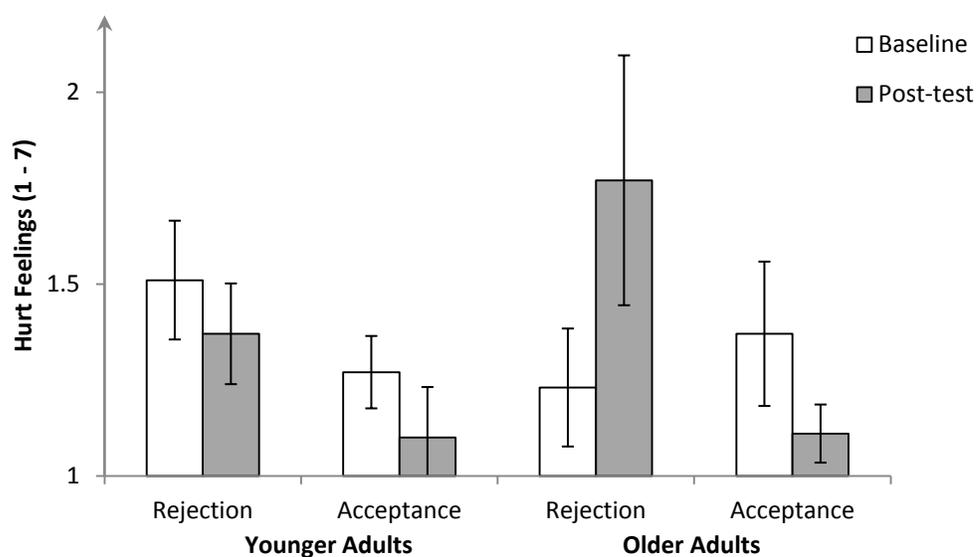


Figure 3. Means of hurt feelings as a function of time, age, and condition.

### Mediating Effects of Appraisals

Hypothesis 3 suggested that goal and motivation of wanting to be liked by the interviewer would mediate the age differences in emotional reactions to rejection. To test this hypothesis, only rejected participants were included to examine the age differences on goal and motivation of wanting to be liked by the interviewer. A one-way multivariate ANOVA

was conducted on goal achievement expectancy and motive congruence, with age group as a between subject factor. No significant main effect of age was found in either goal achievement expectancy,  $F(1,53) = 1.61, p = .21, \eta^2 = .03$ , or motive congruence,  $F(1,53) = 0.42, p = .52, \eta^2 < .01$ . Table I5 in Appendix I provides the descriptive statistics of appraisals and a summary of effects across the two age groups and the two conditions. No further analysis was performed with regard to appraisals.

### **Influence of Covariates**

All the primary analyses reported above were run with and without rejection sensitivity and agreeableness entered as covariates. In general, the patterns of results did not differ by including covariates.

### **Discussion**

The goal of this study was to investigate age differences between younger and older adults' emotional reactions following rejection in a laboratory setting. As a form of social pain, rejection prevents individuals from satisfying the need to belong, which in turn leads to negative outcomes such as emotional distress, increased aggression and decreased meaningful existence (e.g., DeWall et al., 2009; Twenge et al., 2003). The negative reactions to rejection could have a major impact on older adults, who may be particularly vulnerable to social pain (Hawkley et al., 2011). However, there is a lack of research on the development of reactions to rejection over the adult lifespan. The literature review is suggestive of age differences in experiencing rejection. In particular, older adults may be less impacted by rejection due to different goal orientation as suggested by lifespan developmental theories

(Baltes et al., 1999), or due to a better ability of emotion regulation as suggested by socioemotional selectivity theory (Carstensen et al., 1999). Older adults may also appraise the rejection experience differently (Charles & Carstensen, 2008) and show a different pattern of emotional reactions in terms of discrete emotions (Grühn et al., 2010).

Past research conducted with younger adults has shown that rejection may lead to immediate emotional reactions such as emotional distress (Gerber & Wheeler, 2009) or emotional numbness (Blackhart et al., 2009). Only one study using the cyberball ostracism paradigm was conducted with older adults (Hawley et al., 2011). The study found that older adults showed less negative affect than younger adults after being ostracized. However, it is unclear whether the results were due to age differences or due to the effectiveness of the manipulation method (i.e., computerized ball-tossing game).

The present study is the first step in investigating developmental processes in reactions to rejection. The rejection-acceptance was manipulated through an interview where an interviewer indicated whether he or she would like to meet with the participant or not. Rejection was hypothesized to negatively affect both younger and older adults' mood, emotions, and empathy toward other individuals' pain. Older adults were hypothesized to be less negatively affected by rejection and to show differential emotional reactions in terms of discrete emotions.

### **Summary of Findings**

**Effects of Experimental Condition and Age.** The results provided mixed support for Hypothesis 1a and no support of Hypothesis 2a. When baseline and post-test positive

mood were examined, both younger and older rejected participants showed a significant decrease whereas both younger and older accepted participants showed a significant increase. When baseline and post-test negative mood were examined, both younger and older rejected participants showed no significant change whereas accepted participants showed a significant decrease. This pattern of results seems to support the emotional numbness hypothesis. The hypothesis posits that social rejection would cause temporary emotional numbness and predicts that rejection would lead to a reduction in positive affect but no elicitation of negative affect in absolute terms (Blackhart et al., 2009; Twenge et al., 2003). The findings of the present study are consistent with this prediction in both young and older adults. There was, however, a noteworthy trend in older adults. As Figure 1b shows, the direction of the effect of rejection on older participants' negative mood is different from younger participants. The three-way interaction between time, age, and condition seems likely to reach significance if the number of older participants is larger than in the current sample. This finding, though opposite to my prediction, is suggestive of the notion that negative social interactions have a major impact on older adults.

With regard to empathy, Hypothesis 1b was not supported by the results. After controlling for trait empathy, rejection did not dampen participants' empathy toward other individuals' pain compared to accepted participants. This result is inconsistent with the finding in DeWall and Baumeister (2006), in which rejection decreased participants' empathy toward others, and inconsistent with the emotional numbness hypothesis. One possible explanation is that the severity of the social rejection elicited in the present paradigm

is different from the severity of social exclusion experience manipulated by the life alone paradigm in the study by DeWall and Baumeister (2006). Berstein and Claypool (2012) manipulated the severity of the life alone paradigm and found that the typical (i.e., high-severity) condition ( participants were told that they would virtually lose all social connections) resulted in numbness to physical pain but the low-severity condition (participants were told that they would lose much of the social connections but maintain some) resulted in hypersensitivity to physical pain. It is plausible that the social rejection in the present study is less severe than the exclusion life alone paradigm. Thus, the present study found mixed support to the numbness hypothesis.

Consistent with Hypothesis 2b, older rejected participants showed higher empathy than younger rejected participants. Thus, older adults were less influenced by rejection in their empathy towards others than younger adults.

The results of the change of rejection did not support Hypothesis 1c. When the two variations of rejection condition were compared, no differential effects were found. Similarly, the change of acceptance did not produce different effects on participants' affect. It is possible that the outcome is more important than the process when it comes to social rejection.

**Effects on Discrete Emotions.** The results provided mixed support for Hypothesis 1c and Hypothesis 2c. An age difference was found in hurt feelings. Rejection elicited more hurt feelings in older adults compared to younger adults. Rejection did not elicit anger and sadness in either age group. The decrease in anger and sadness from baseline to post-test was

primarily driven by the decrease in accepted participants. Hurt feeling is described as a distinct negative emotion that is often directly associated with feeling devalued, unwanted, and rejected (Smart Richman & Leary, 2009). Hurt feeling appears to be a direct result of social pain. In contrast, sadness and anger may be associated with aspects of the social situation that are not present in the current study. For example, sadness is often associated with loss (Leary et al., 2001) and anger is often associated with frustration and hostile intent (Kalat & Shiota, 2007). It is possible that the predicted age differences in sadness and anger were not found because the rejection in the study was not particularly associated with losses, frustration or hostility. Therefore, age difference emerged only in hurt feelings. Another possible explanation stems from the numbness hypothesis. One of the core assumptions of the numbness hypothesis is that individuals' physiological system responding to social pain shares some physiological mechanisms with the physiological system responding to physical pain. It is possible that this system is subject to age-related changes so that older adults are particularly sensitive to both social pain and physical pain. Hawkley and colleagues (2011) suggested that older adults may be more likely to experience physical pain and the signals from physical may compete with the signals from social pain. However, it is also possible that the signals from physical pain may amplify the signals from social pain, which is reflected current study's finding on hurt feelings. This may render older adults to be more vulnerable to social rejection.

**Appraisals.** Hypothesis 3 regarding the potential mediating effect of individuals' goals and motivations on age differences in emotional reactions to rejection was not

supported by the results. There were no age differences in participants' goals or motivations in terms of wanting to be liked by the interviewer. Although older adults do not seek out new connections in general, they could show the same level of interest and motivation in social interactions with a stranger in certain social context such as in a research project they volunteered to participate.

Taking the results from negative mood, hurt feelings, and appraisals together, it is possible that older adults can be motivated to establish social connections with strangers as much as younger adults do. When older adults try to gain connections or form relationships with another person (even when it is a stranger), the rejection from that person could particularly elicit emotional distress and hurtful feelings in older adults. These findings have three major implications for the theories of socioemotional development in old age: First, social interactions with unfamiliar others are an important social context to examine the development of socioemotions. Second, it is important to examine older adults' goals and motives in social situations when investigate their reactions and behaviors in those social situations. Third, if the hypothesis that the signals from physical pain may amplify the signals from social pain is correct, and if social rejection from a stranger could increase older adults' hurt feelings, rejection from family members and friends may potentially cause major risk to older adults' health and well-being. The results also have implication for the two theories of rejection such that which theory is applicable depends on which population and which outcomes are being examined. In the present study, the emotional distress theory largely

predicted older adults' reactions where the emotional numbness theory largely predicted younger adults' reactions.

### **Limitations**

While the results of the study contribute to our understanding of how individuals of different ages react to social rejection, there are a number of limitations. First, the number of older adults in the sample is small which could limit the power to detect age differences. The sample could be relatively selected because individuals who are not comfortable talking to a stranger may not be willing to participate in a study involving verbal communication with another participant. It is plausible that the current sample consists of individuals who are better at handling rejection from strangers compared to individuals who are not willing to talk to a stranger in a laboratory setting.

Second, the manipulation method does not allow examination of other forms of social rejection such as unanimous rejection from a group, or rejection from a close friend or family member. Thus, the results may not be generalized to all social situations involving rejection. Another limitation of the manipulation method is that interviewers may introduce noise to the meaning of the feedback rating. Although interviewers were provided with a script, interviewers may provide written responses to participants' answers depending on the specific situation to increase the credibility of the interview. It is possible that participants interpret the written feedback in an unexpected way due to the limitation of written language. For example, an interviewer may type in "I have never seen that movie" to indicate little interest but the participant may think that the interviewer wants to know more about the

movie. Third, the social interaction in the present manipulation paradigm is primarily unidirectional. However, this limitation is common most existing paradigms. Finally, the two hand-written essays assessing participants' empathy toward other individuals' painful experiences may not produce enough variance. In particular, the mean score of empathy index for the second essay was below 4 on a 7-point scale. It is possible that most individuals do not feel empathic toward the author due to the content.

Finally, the measure of appraisals may not adequately assess the desirable construct. The items showed poor to moderate internal consistency ( $\alpha < .70$ ). In particular, social desirability may cause rejected participants to provide untruthful answer in the item "I answered the questions in a way to impress the interviewer". It is also possible that individuals' general goals and motivations in social interaction are a better predictor of their reactions to rejection compared to context-specific appraisals.

### **Conclusion and Future Directions**

This study contributes to both the social rejection and aging literature because it is the first study examining age differences in emotional reactions to interpersonal rejection in a relatively realistic social interaction. Despite the inconsistent findings with regard to empathy, the results generally support the numbness hypothesis over the emotional distress hypothesis. However, there was a trend that older rejected participants showed increased negative mood. For both younger and older adults, rejection decreased positive mood but did not elicit anger or sadness. Interestingly, rejection elicited hurt feelings in older adults but not in younger adults. Future research may investigate the mechanism underlying this age

difference. As aforementioned, rejection is considered as a form of social pain, and it is associated with the physiological system responding to physical pain. It may be fruitful to investigate whether rejection would lead to numbness in physical pain in older adults as it did in younger adults (DeWall & Baumeister, 2006). Perhaps the underlying mechanisms for explaining the “numbness” caused by rejection are different for younger adults and older adults.

Future research should also examine the effects of rejection on emotion indicators other than self-report mood such as physiological markers, facial expressions, and behavioral responses. These outcome measures are presumably less controlled by participants and less affected by social desirability than self-reported mood. Future research should also investigate the role of emotion regulation in the process of coping with rejection. According to the numbness hypothesis, immediate reactions to rejection are similar to shock reactions. Is emotion regulation part of this shock reaction at all? Does emotion regulation come to play in the recovery process from the numbness? Finally, future research should investigate different contexts of rejection. For instance, according to the SST, older adults may be particularly negatively impacted by rejection coming from a close relationship. It is possible that age differences will emerge in a different social context.

## REFERENCES

- Asher, S. R., Rose, A. J., & Gabriel, S. W. (2001). Peer rejection in everyday life. In M. Leary (Ed.), *Interpersonal rejection*. (pp. 105-142). New York, NY US: Oxford University Press.
- Adler, N. E., Epel, E. S., Castellazzo, G., & Ickovics, J. R. (2000). Relationship of subjective and objective social status with psychological and physiological functioning: Preliminary data in healthy, White women. *Health Psychology, 19*, 586-592.  
doi:10.1037/0278-6133.19.6.586
- Baldassare, M., Rosenfield, S., & Rook, K. (1984). The types of social relations predicting elderly well-being. *Research on Aging, 6*, 549-559. doi:  
10.1177/0164027584006004006
- Baltes, P. B. (1997). On the incomplete architecture of human ontogeny: Selection, optimization, and compensation as foundation. *American Psychologist, 52*, 366-380.
- Baltes, P. B., & Baltes, M. M. (1990). Psychological perspectives on successful aging: The model of selective optimization with compensation. In P. B. Baltes & M. M. (Eds.), *Successful aging: Perspectives from the behavioral sciences* (pp. 1-34). New York, NY: Cambridge University Press.
- Baltes, P. B., Lindenberger, U., & Staudinger, U. M. (2006). Life Span Theory in Developmental Psychology. In Richard M. Lerner & William Damon (Eds.), *Handbook of child psychology (6th ed.): Vol 1, Theoretical models of human development*. (pp. 569-664). Hoboken, NJ US: John Wiley & Sons Inc.

- Baltes, P. B., Staudinger, U. M., & Lindenberger, U. (1999). Lifespan psychology: Theory and application to intellectual functioning. *Annual Review of Psychology, 50*, 471-507. doi: 10.1146/annurev.psych.50.1.471
- Batson, C. D., Klein, T. R., Highberger, L., & Shaw, L. L. (1995). Immorality from empathy-induced altruism: When compassion and justice conflict. *Journal of Personality and Social Psychology, 68*, 1042-1054. doi: 10.1037/0022-3514.68.6.1042
- Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin, 117*, 497-529. doi: 10.1037/0033-2909.117.3.497
- Bernstein, M. J., & Claypool, H. M. (2012). Social exclusion and pain sensitivity: Why exclusion sometimes hurts and sometimes numbs. *Personality and Social Psychology Bulletin, 38*, 185-196. doi: 10.1177/0146167211422449
- Blackhart, G. C., Nelson, B. C., Knowles, M. L., & Baumeister, R. F. (2009). Rejection elicits emotional reactions but neither causes immediate distress nor lowers self-esteem: A meta-analytic review of 192 studies on social exclusion. *Personality and Social Psychology Review, 13*, 269-309. doi: 10.1177/1088868309346065
- Birditt, K. S., & Fingerman, K. L. (2005). Do we get better at picking our battles? Age group differences in descriptions of behavioral reactions to interpersonal tensions. *Journal of Gerontology: Psychological Sciences, 60B(3)*, P121–P128.

- Birditt, K. S., Fingerman, K. L., & Almeida, D. M. (2005). Age differences in exposure and reactions to interpersonal tensions: A daily diary study. *Psychology and Aging, 20*, 330–340. doi: 10.1037/0882-7974.20.2.330
- Boduroglu, A., Yoon, C., Luo, T., & Park, D. C. (2006). Age-related stereotypes: A comparison of American and Chinese cultures. *Gerontology, 52*, 324-333. doi: 10.1159/000094614
- Buckley, K. E., Winkel, R. E., & Leary, M. R. (2004). Reactions to acceptance and rejection: Effects of level and sequence of relational evaluation. *Journal of Experimental Social Psychology, 40*, 14-28. doi: 10.1016/s0022-1031(03)00064-7
- Cacioppo, J. T., Hawkey, L. C., & Thisted, R. A. (2010). Perceived social isolation makes me sad: 5-year cross-lagged analyses of loneliness and depressive symptomatology in the Chicago Health, Aging, and Social Relations Study. *Psychology And Aging, 25*, 453-463. doi:10.1037/a0017216
- Carstensen, L. L. (2006, June 30). The influence of a sense of time on human development. *Science, 312*, 1913–1915.
- Carstensen, L. L., Fung, H. H., & Charles, S. T. (2003). Socioemotional selectivity theory and the regulation of emotion in the second half of life. *Motivation and Emotion, 27*, 103–123.
- Carstensen, L. L., Isaacowitz, D. M., & Charles, S. T. (1999). Taking time seriously: A theory of socioemotional selectivity. *American Psychologist, 54*, 165-181. doi: 10.1037/0003-066x.54.3.165

- Carver, C. S., & Scheier, M. (1990). Principles of self-regulation: Action and emotion. In E. Tory Higgins & Richard M. Sorrentino (Eds.), *Handbook of motivation and cognition: Foundations of social behavior, Vol. 2.* (pp. 3-52). New York, NY US: Guilford Press.
- Charles, S. T., & Carstensen, L. L. (2007). Emotion regulation and aging. In J. J. Gross (Ed.), *Handbook of emotion regulation* (pp. 307–327). New York, NY: Guilford Press.
- Charles, S. T., & Carstensen, L. L. (2008). Unpleasant situations elicit different emotional responses in younger and older adults. *Psychology and Aging, 23*, 495-504. doi: 10.1037/a0013284
- Charles, S. T., Carstensen, L. L., & McFall, R. M. (2001). Problem-solving in the nursing home environment: Age and experience differences in emotional reactions and responses. *Journal of Clinical Geropsychology, 7*, 319–330. doi: 10.1023/a:1011352326374
- Chow, R. M., Tiedens, L. Z., & Govan, C. L. (2008). Excluded emotions: The role of anger in antisocial responses to ostracism. *Journal of Experimental Social Psychology, 44*, 896-903. doi: 10.1016/j.jesp.2007.09.004
- Davis, M. H. (1994). *Empathy: A social psychological approach.* Boulder, CO US: Westview Press.
- DeWall, C. N. (2009). The pain of exclusion: Using insights from neuroscience to understand emotional and behavioral responses to social exclusion. H. J. Monica (Ed.), *Bullying,*

- rejection, and peer victimization: A social cognitive neuroscience perspective (pp. 201-224). New York, NY: Springer Publishing Co.
- DeWall, C. N., & Baumeister, R. F. (2006). Alone but feeling no pain: Effects of social exclusion on physical pain tolerance and pain threshold, affective forecasting, and interpersonal empathy. *Journal of Personality and Social Psychology, 91*, 1-15. doi: 10.1037/0022-3514.91.1.1
- DeWall, C. N., Twenge, J. M., Gitter, S. A., & Baumeister, R. F. (2009). It's the thought that counts: The role of hostile cognition in shaping aggressive responses to social exclusion. *Journal of Personality and Social Psychology, 96*, 45-59. doi: 10.1037/a0013196
- Downey, G., & Feldman, S. I. (1996). Implications of rejection sensitivity for intimate relationships. *Journal of Personality and Social Psychology, 70*, 1327-1343. doi: 10.1037/0022-3514.70.6.1327
- Ellsworth, P. C., & Scherer, K. R. (2003). Appraisal processes in emotion. In Richard J. Davidson, Klaus R. Scherer & H. Hill Goldsmith (Eds.), *Handbook of affective sciences*. (pp. 572-595). New York, NY US: Oxford University Press.
- Eisenberger, N. I., Lieberman, M. D., & Williams, K. D. (2003). Does Rejection Hurt? An fMRI Study of Social Exclusion. *Science, 302*, 290-292. doi: 10.1126/science.1089134

- Freund, A. M., Hennecke, M., & Riediger, M. (2010). Age-related differences in outcome and process goal focus. *European Journal of Developmental Psychology, 7*, 198-222. doi: 10.1080/17405620801969585
- Freund, A.M., & Riediger, M. (2001). What I have and what I do—The role of resource loss and gain throughout life. *Applied Psychology: An International Review, 50*, 370-380. doi: 10.1111/1464-0597.00063
- Gerber, J., & Wheeler, L. (2009). On being rejected: A meta-analysis of experimental research on rejection. *Perspectives on Psychological Science, 4*, 468-488. doi: 10.1111/j.1745-6924.2009.01158.x.
- Graziano, William G., & Eisenberg, Nancy. (1997). Agreeableness: A dimension of personality. In Robert Hogan, John A. Johnson & Stephen R. Briggs (Eds.), *Handbook of personality psychology*. (pp. 795-824). San Diego, CA US: Academic Press.
- Gross, J. J., Carstensen, L. L., Tsai, J., Skorpen, C. G., & Hsu, A. Y. C. (1997). Emotion and aging: Experience, expression and control. *Psychology and Aging, 12*, 590-599. doi: 10.1037/0882-7974.12.4.590
- Grühn, D., Gilet, A.-L., Studer, J., & Labouvie-Vief, G. (2011). Age-relevance of person characteristics: Person's beliefs about developmental change across the lifespan. *Developmental Psychology*.
- Grühn, D., Kotter-Grühn, D., & Röcke, C. (2010). Discrete affects across the adult lifespan: Evidence for multidimensionality and multidirectionality of affective experiences in

- young, middle-aged and older adults. *Journal of Research in Personality*, 44, 492-500. doi: 10.1016/j.jrp.2010.06.003
- Hawkley, L. C., Thisted, R. A., Masi, C. M., & Cacioppo, J. T. (2010). Loneliness predicts increased blood pressure: 5-year cross-lagged analyses in middle-aged and older adults. *Psychology And Aging*, 25, 132-141. doi:10.1037/a0017805
- Hernandez, C. R., & Gonzalez, M. Z. (2008). Effects of intergenerational interaction on aging. *Educational Gerontology*, 34, 292-305. doi: 10.1080/03601270701883908
- Hoffman, M. L. (1977). Empathy, its development and prosocial implications. *Nebraska Symposium on Motivation*, 25, 169-217.
- John, O. P., Naumann, L. P., & Soto, C. J. (2008). Paradigm Shift to the Integrative Big-Five Trait Taxonomy: History, Measurement, and Conceptual Issues. In O. P. John, R. W. Robins, & L. A. Pervin (Eds.), *Handbook of personality: Theory and research* (pp. 114-158). New York, NY: Guilford Press.
- John, O. P., Donahue, E. M., & Kentle, R. L. (1991). The Big Five Inventory--Versions 4a and 54. Berkeley, CA: University of California, Berkeley, Institute of Personality and Social Research.
- Kalat, J. W., & Shiota, M. N. (2007). *Emotion*: Thomson Wadsworth.
- Kang, S. K., & Chasteen, A. L. (2009). The development and validation of the Age-Based Rejection Sensitivity Questionnaire. *The Gerontologist*, 49, 303-316. doi: 10.1093/geront/gnp035

- Kessler, E., & Staudinger, U. M. (2009). Affective experience in adulthood and old age: The role of affective arousal and perceived affect regulation. *Psychology And Aging, 24*, 349-362. doi:10.1037/a0015352
- Kunzmann, U., & Grühn, D. (2005). Age Differences in Emotional Reactivity: The Sample Case of Sadness. *Psychology and Aging, 20*, 47-59. doi: 10.1037/0882-7974.20.1.47
- Lazarus, R. S. (1984). On the primacy of cognition. *American Psychologist, 39*, 124–129. doi: 10.1037/0003-066x.39.2.124
- Lazarus, R. S. (1991). Cognition and motivation in emotion. *American Psychologist, 46*, 352-367. doi: 10.1037/0003-066x.46.4.352
- Labouvie-Vief, G. (2003). Dynamic integration: Affect, cognition, and the self in adulthood. *Current Directions in Psychological Science, 6*, 201–206.
- Leary, M. R. (2001). *Interpersonal rejection*. New York, NY US: Oxford University Press.
- Leary, M. R., Cottrell, C. A., & Phillips, M. (2001). Deconfounding the effects of dominance and social acceptance on self-esteem. *Journal of Personality and Social Psychology, 81*, 898–909. doi: 10.1037/0022-3514.81.5.898
- Leary, M. R., Haupt, A. L., Strausser, K. S., & Chokel, J. T. (1998). Calibrating the sociometer: The relationship between interpersonal appraisals and the state self-esteem. *Journal of Personality and Social Psychology, 74*, 1290-1299. doi: 10.1037/0022-3514.74.5.1290

- Leary, M. R., Koch, E. J., & Hechenbleikner, N. R. (2001). Emotional responses to interpersonal rejection. In M. Leary (Ed.), *Interpersonal rejection* (pp. 145-166). New York, NY: Oxford University Press.
- Leary, M. R., Twenge, J. M., & Quinlivan, E. (2006). Interpersonal rejection as a determinant of anger and aggression. *Personality and Social Psychology Review, 10*, 111–132. doi: 10.1207/s15327957pspr1002\_2
- Lefkowitz, E. S., & Fingerman, K. L. (2003). Positive and negative emotional feelings and behaviors in mother– daughter ties in late life. *Journal of Family Psychology, 17*, 607–617. doi: 10.1037/0893-3200.17.4.607
- Levy, S. R., Ayduk, O., & Downey, G. (2001). The role of rejection sensitivity in people’s relationships with significant others and valued social groups. In Mark R. Leary (Ed.), *Interpersonal rejection*. (pp. 251-289). New York, NY US: Oxford University Press.
- Levy, B. R., & Banaji, M. R. (2002). Implicit ageism. In Todd D. Nelson (Ed.), *Ageism: Stereotyping and prejudice against older persons*. (pp. 49-75). Cambridge, MA US: The MIT Press.
- Levy, B., & Langer, E. (1994). Aging free from negative stereotypes: Successful memory in China among the American deaf. *Journal of Personality and Social Psychology, 66*, 989-997. doi: 10.1037/0022-3514.66.6.989
- MacDonald, G., & Leary, M. R. (2005). Why Does Social Exclusion Hurt? The Relationship Between Social and Physical Pain. *Psychological Bulletin, 131*, 202-223. doi: 10.1037/0033-2909.131.2.202

- Maner, J. K., DeWall, C. N., Baumeister, R. F., & Schaller, M. (2007). Does social exclusion motivate interpersonal reconnection? Resolving the “porcupine problem.” *Journal of Personality and Social Psychology*, *92*, 42-55. doi: 10.1037/0022-3514.92.1.42
- Mayer, J. D., & Gaschke, Y. N. (1988). The experience and meta-experience of mood. *Journal of Personality and Social Psychology*, *55*, 102-111. doi: 10.1037/0022-3514.55.1.102
- Neupert, S. D., Almeida, D. M., Mroczek, D. K., & Spiro, A., III. (2006). Daily stressors and memory failures in a naturalistic setting: Findings from the va normative aging study. *Psychology and Aging*, *21*, 424-429. doi: 10.1037/0882-7974.21.2.424
- Oatley, K., & Johnson-Laird, P. N. (1987). Towards a cognitive theory of emotions. *Cognition and Emotion*, *1*, 29-50. doi: 10.1080/02699938708408362
- Palmore, E. B. (1988). *The facts on aging quiz: A handbook of uses and results*. New York, NY US: Springer Publishing Co.
- Pitkala, K. H., Routasalo, P., Kautiainen, H., & Tilvis, R. S. (2009). Effects of psychosocial group rehabilitation on health, use of health care services, and mortality of older persons suffering from loneliness: A randomized, controlled trial. *The Journals of Gerontology: Series A: Biological Sciences and Medical Sciences*, *64*, 792-800. doi: 10.1093/gerona/glp011
- Posthuma, R. A., & Campion, M. A. (2009). Age stereotypes in the workplace: Common stereotypes, moderators, and future research directions. *Journal of Management*, *35*, 158-188. doi: 10.1177/0149206308318617

- 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. doi: 10.1177/014662167700100306
- Rammstedt, B., & John, O. P. (2007). Measuring personality in one minute or less: A 10-item short version of the Big Five Inventory in English and German. *Journal Of Research In Personality, 41*, 203-212. doi:10.1016/j.jrp.2006.02.001
- Rook, K. S. (1984). Promoting social bonding: Strategies for helping the lonely and socially isolated. *American Psychologist, 39*, 1389-1407. doi: 10.1037/0003-066x.39.12.1389
- Russell, D. W., Cutrona, C. E., de la Mora, A., & Wallace, R. B. (1997). Loneliness and nursing home admission among rural older adults. *Psychology and Aging, 12*, 574-589. doi: 10.1037/0882-7974.12.4.574
- Sedikides, C., Campbell, W. K., Reeder, G. D., & Elliot, A. J. (1999). The relationship closeness induction task. *Representative Research in Social Psychology, 23*, 1-4.
- Scharf, T., Phillipson, C. & Smith, A E. (2005). Social exclusion of older people in deprived urban communities of England. *European Journal of Ageing, 2*, 76-87. doi: 10.1007/s10433-005-0025-6
- Scherer, K.R. (1997). The role of culture in emotion-antecedent appraisal. *Journal of Personality and Social Psychology, 73*, 902-922. doi: 10.1037/0022-3514.73.5.902
- Smart Richman, L., & Leary, M. R. (2009). Reactions to discrimination, stigmatization, ostracism, and other forms of interpersonal rejection: A multimotive model. *Psychological Review, 116*, 365-383. doi:10.1037/a0015250

- Snapp, C. M., & Leary, M. R. (2001). Hurt feelings among new acquaintances: Moderating effects of interpersonal familiarity. *Journal of Social and Personal Relationships, 18*, 315-326. doi: 10.1177/0265407501183001
- Sommer, K. L., & Baumeister, R. F. (2002). Self-evaluation, persistence, and performance following implicit rejection: The role of trait self-esteem. *Personality and Social Psychology Bulletin, 28*, 926-938. doi: 10.1177/01467202028007006
- Sorkin, D. H., & Rook, K. S. (2004). Interpersonal Control Strivings and Vulnerability to Negative Social Exchanges in Later Life. *Psychology and Aging, 19*, 555-564. doi: 10.1037/0882-7974.19.4.555
- Terracciano, A., McCrae, R. R., Brant, L. J., & Costa, P. T. (2005). Hierarchical linear modeling analyses of the NEO-PI-R Scales in the Baltimore Longitudinal Study of Aging. *Psychology and Aging, 20*, 493-506. doi: 10.1037/0882-7974.20.3.493
- Tong, E.M. W., Ellsworth, P. C., & Bishop, G. D. (2009). An S-shaped relationship between changes in appraisals and changes in emotions. *Emotion, 9*, 821-837. doi: 10.1037/a0017812
- Twenge, J. M., Baumeister, R. F., DeWall, C. N., Ciarocco, N. J., & Bartels, J. M. (2007). Social exclusion decreases prosocial behavior. *Journal of Personality and Social Psychology, 92*, 56-66. doi: 10.1037/0022-3514.92.1.56
- Twenge, J. M., Baumeister, R. F., Tice, D. M., & Stucke, T. S. (2001). If you can't join them, beat them: Effects of social exclusion on aggressive behavior. *Journal of Personality and Social Psychology, 81*, 1058-1069. doi: 10.1037/0022-3514.81.6.1058

- Twenge, J. M., Catanese, K. R., & Baumeister, R. F. (2002). Social exclusion causes self-defeating behavior. *Journal of Personality and Social Psychology*, *83*, 606-615. doi: 10.1037/0022-3514.83.3.606
- Twenge, J. M., Catanese, K. R., & Baumeister, R. F. (2003). Social Exclusion and the Deconstructed State: Time Perception, Meaninglessness, Lethargy, Lack of Emotion, and Self-Awareness. *Journal of Personality and Social Psychology*, *85*, 409-423. doi: 10.1037/0022-3514.85.3.409
- Uchino, B. N., Cacioppo J. T., & Kiecolt-Glaser, J. K. (1996). The relationship between social support and physiological processes: A review with emphasis on underlying mechanisms and implications for health. *Psychological Bulletin*, *119*, 488-531. doi: 10.1037/0033-2909.119.3.488
- Vandevelde, L., & Miyahara, M. (2005). Impact of group rejections from a physical activity on physical self-esteem among university students. *Social Psychology of Education*, *8*, 65-81. doi: 10.1007/s11218-004-3951-9
- Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology*, *54*, 1063-1070. doi: 10.1037/0022-3514.54.6.1063
- Wechsler, D. (1981). The psychometric tradition: Developing the Wechsler Adult Intelligence Scale. *Contemporary Educational Psychology*, *6*, 82-85. doi: 10.1016/0361-476x(81)90035-7

- Wesselmann, E. D., Bagg, D., & Williams, K. D. (2009). "I feel your pain": The effects of observing ostracism on the ostracism detection system. *Journal of Experimental Social Psychology, 45*, 1308-1311. doi: 10.1016/j.jesp.2009.08.003
- Williams, K. D., Cheung, C. K. T., & Choi, W. (2000). Cyberostracism: Effects of being ignored over the Internet. *Journal of Personality and Social Psychology, 79*, 748-762. doi: 10.1037/0022-3514.79.5.748
- Williams, K. D., Forgas, J. P., & von Hippel, W. (2005). *The social outcast: Ostracism, social exclusion, rejection, and bullying*. New York, NY US: Psychology Press.
- Zadro L., Williams, K. D., & Richardson, R. (2004). How low can you go? Ostracism by a computer lowers belonging, control, self-esteem, and meaningful existence. *Journal of Experimental Social Psychology, 40*, 560–567.
- Zuckerman, M., Kuhlman, D. M., Thornquist, M., & Kiers, H. (1991). Five (or three) robust questionnaire scale factors of personality without culture. *Personality and Individual Differences, 12*, 929-941. doi: 10.1016/0191-8869(91)90182-b

APPENDICES

## Appendix

**Table of Contents**

---

|   |            |
|---|------------|
| List of all measures .....              | Appendix A |
| Measures of Emotion .....               | Appendix B |
| Measures of Empathy .....               | Appendix C |
| Measures of Appraisals.....             | Appendix D |
| Measures of Cognitive Functioning.....  | Appendix E |
| Measures of Personality .....           | Appendix F |
| Measures of Rejection Sensitivity ..... | Appendix G |
| Measures of Emotional Functioning.....  | Appendix H |
| Additional Results.....                 | Appendix I |
| Cover Story .....                       | Appendix J |
| Measures of Demographics.....           | Appendix K |

## Appendix A

### List of all measures

---

1. Background Questionnaires
  2. Digit Symbol Substitution Task (Wechsler, 1981)
  3. Shipley Vocabulary Test (Zachary, 1986)
  4. Big Five Inventory (BFI, John, Donahue, & Kentle, 1991; John, Naumann, & Soto, 2008)
  5. Positive and Negative Affect Schedule (Watson et al., 1988)
  6. Rejection Sensitivity Questionnaire (6 items) (adapted from RSQ; Downey & Feldman, 1996)
  7. Davis Empathy Scale (DES, Davis, 1994)
  8. Center for Epidemiological Studies – Depression scale (CES-D; Radloff, 1977)
  9. Measures of emotion (adapted from Brief Mood Introspection Scale (BMIS; Mayer & Gaschke, 1988), and Buckley et al., 2004)
  10. Measures of empathy (adapted from DeWall & Baumeister, 2006)
  11. Measures of appraisals
-

## Appendix B

**Measure of Emotions**

| Item <sup>a</sup> | Subscale      | Sources                    |
|-------------------|---------------|----------------------------|
| Happy             | Happiness     | BMIS; Buckley et al., 2004 |
| Angry             | Anger         |                            |
| Delighted         | Happiness     |                            |
| Tense             | Anxiety       | Buckley et al., 2004       |
| Depressed         | Sadness       |                            |
| Annoyed           | Anger         |                            |
| Cheerful          | Happiness     |                            |
| Sad               | Sadness       | BMIS; Buckley et al., 2004 |
| Pleased           | Happiness     | Buckley et al., 2004       |
| Content           | Satisfaction  | BMIS                       |
| Mad               | Anger         |                            |
| Injured           | Hurt feelings | Buckley et al., 2004       |
| Grouchy           | Anger         | BMIS                       |
| Dejected          | Sadness       | Buckley et al., 2004       |
| Nervous           | Anxiety       | BMIS                       |
| Hurt              | Hurt feelings | Buckley et al., 2004       |
| Gloomy            | Sadness       | BMIS                       |
| Uneasy            | Anxiety       |                            |
| Pained            | Hurt feelings |                            |
| Wounded           | Hurt feelings | Buckley et al., 2004       |
| Anxious           | Anxiety       |                            |

*Note.* BMIS stands for Brief Mood Introspection Scale (Mayer & Gaschke, 1988)

<sup>a</sup> Items are presented in the same order as in the experiment.

## Appendix C

### Measures of Empathy

(adapted from DeWall & Baumeister, 2006)

In the following section, we are interested in people's perception of others in non-conversational form. There are two essays which were written by two participants who had been experiencing a difficult time. Please read the essays and rate how *sympathetic*, *compassionate*, *soft-hearted*, and *tender* do you feel toward each author of the essays. (*1=not at all*; *7=very much*)

#### Essay 1

*Two days ago I broke my leg playing intramural sports. I've been playing on the same intramural team for the past three years and I'm upset that my season has been cut short. I'm experiencing pain because of my injury. I'm also having a tough time getting around campus, as there are lots of hills and stairs that make it hard to use my crutches on. The parking people won't let me get a handicapped permit because they said my injury was only temporary. I've been real down. It's all I think about.*

#### Essay 2

*Yesterday I got into a fight with my best friend. We were deciding on a vacation spot for the summer. My friend wanted to go to Europe but I wanted to go the Caribbean. We've known each other for many years. I usually go along with what my friend wants but I was hoping my friend would go along with my plan this time since I have been wanting to go to the Caribbean for years. I am upset with my friend not only because we might not be able to go on the trip but also because I feel my friend doesn't care what I want. Now I am wondering why I considered my friend to be a friend at all. I am sad and disappointed.*

Note that in the experiment, the essays were hand-written.

## Appendix D

**Measure of Appraisals**

The following statements may describe what you think of the interaction with the evaluator. Please indicate to what extent you agree with each statement.

*1=strongly disagree; 7=strongly agree*

1. I expected the interviewer to want to meet with me.
2. I was trying to make the interviewer want to meet with me.
3. I don't really care whether the interviewer wants to meet with me or not.
4. I answered the questions in a way to impress the interviewer.

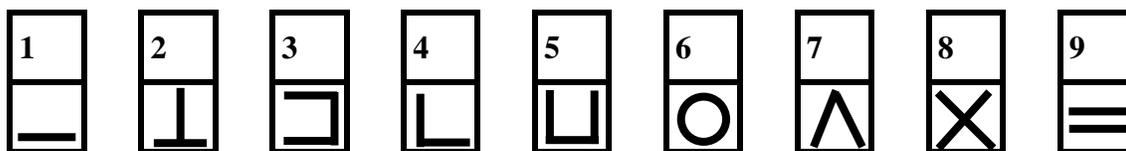
## Appendix E

**Measures of Cognitive Functioning****Fluid Intelligence - Digit Symbol Substitution Task (Wechsler, 1981)**

---

In this task, each number from 1 to 9 is assigned a certain symbol. In the rows below, the space under the numbers is blank. Your task is it to enter the correct symbol under each number as fast as possible. Please enter the symbols in sequence.

Please practice the entering of symbols for the following digits!



|   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|
| 2 | 1 | 3 | 7 | 2 | 4 | 8 |
|   |   |   |   |   |   |   |

On the next page, you will find number sequences. Please enter the correct symbol successively under each number. It is not important to print very nice symbols; however, the symbol should be recognizable.

Please work with all speed! Try to fill in as many symbols as possible! You have 90 seconds.

**Crystallized Intelligence - Shipley Vocabulary Test (Zachary, 1986)**

---

In the test below, the first word in each line is printed in capital letters. Opposite it are four other words. Circle the *one word* which means the *same thing*, or most nearly the same thing, as the first word. If you don't know, guess. Be sure to circle the *one word* in each line that means the same thing as the first word.

- |    |          |         |        |        |       |
|----|----------|---------|--------|--------|-------|
| 1) | TALK     | draw    | eat    | speak  | sleep |
| 2) | PERMIT   | allow   | sew    | cut    | drive |
| 3) | PARDON   | forgive | pound  | divide | tell  |
| 4) | COUCH    | pin     | eraser | sofa   | glass |
| 5) | REMEMBER | swim    | recall | number | defy  |

|     |            |                         |            |            |           |
|-----|------------|-------------------------|------------|------------|-----------|
| 6)  | TUMBLE     | drink                   | dress      | fall       | think     |
| 7)  | HIDEOUS    | silvery                 | tilted     | young      | dreadful  |
| 8)  | CORDIAL    | swift                   | muddy      | leafy      | hearty    |
| 9)  | EVIDENT    | green                   | obvious    | skeptical  | afraid    |
| 10) | IMPOSTOR   | conductor               | officer    | book       | pretender |
| 11) | MERIT      | deserve                 | distrust   | fight      | separate  |
| 12) | FASCINATE  | welcome                 | fix        | stir       | enchant   |
| 13) | INDICATE   | defy                    | excite     | signify    | bicker    |
| 14) | IGNORANT   | red                     | sharp      | uninformed | precise   |
| 15) | FORTIFY    | submerge                | strengthen | vent       | deaden    |
| 16) | RENOWN     | length                  | head       | fame       | loyalty   |
| 17) | NARRATE    | yield                   | buy        | associate  | tell      |
| 18) | MASSIVE    | bright                  | large      | speedy     | low       |
| 19) | HILARITY   | laughter                | speed      | grace      | malice    |
| 20) | SMIRCHED   | stolen                  | pointed    | remade     | soiled    |
| 21) | SQUANDER   | tease                   | belittle   | cut        | waste     |
| 22) | CAPTION    | drum                    | ballast    | heading    | ape       |
| 23) | FACILITATE | help                    | turn       | strip      | bewilder  |
| 24) | JOCOSE     | humorous                | paltry     | fervid     | plain     |
| 25) | APPRISE    | reduce                  | strew      | inform     | delight   |
| 26) | RUE        | eat                     | lament     | dominate   | cure      |
| 27) | DENIZEN    | senator                 | inhabitant | fish       | atom      |
| 28) | DIVEST     | dispossess              | intrude    | rally      | pledge    |
| 29) | AMULET     | charm                   | orphan     | dingo      | pond      |
| 30) | INEXORABLE | untidy                  | involatile | rigid      | sparse    |
| 31) | SERRATED   | dried                   | notched    | armed      | blunt     |
| 32) | LISSOM     | moldy                   | loose      | supple     | convex    |
| 33) | MOLLIFY    | mitigate                | direct     | pertain    | abuse     |
| 34) | PLAGIARIZE | appropriate             | intend     | revoke     | maintain  |
| 35) | ORIFICE    | brush                   | hole       | building   | lute      |
| 36) | QUERULOUS  | maniacal<br>complaining | curious    | devout     |           |
| 37) | PARIAH     | outcast                 | priest     | lentil     | locker    |
| 38) | ABET       | waken                   | ensue      | incite     | placate   |

|     |          |          |          |        |          |
|-----|----------|----------|----------|--------|----------|
| 39) | TEMERITY | rashness | timidity | desire | kindness |
| 40) | PRISTINE | vain     | sound    | first  | level    |

## Appendix F

### Measure of Personality

**Big Five Inventory** (BFI, John, Donahue, & Kentle, 1991; John, Naumann, & Soto, 2008)

Please to indicate the extent to which you agree or disagree with that statement.

*1=strongly disagree, 4= neither agree nor disagree, 7=strongly agree*

*I am someone who...*

1. \_\_\_\_\_ Is talkative
2. \_\_\_\_\_ Tends to find fault with others
3. \_\_\_\_\_ Does a thorough job
4. \_\_\_\_\_ Is depressed, blue
5. \_\_\_\_\_ Is original, comes up with new ideas
6. \_\_\_\_\_ Is reserved
7. \_\_\_\_\_ Is helpful and unselfish with others
8. \_\_\_\_\_ Can be somewhat careless
9. \_\_\_\_\_ Is relaxed, handles stress well.
10. \_\_\_\_\_ Is curious about many different things
11. \_\_\_\_\_ Is full of energy
12. \_\_\_\_\_ Starts quarrels with others
13. \_\_\_\_\_ Is a reliable worker
14. \_\_\_\_\_ Can be tense
15. \_\_\_\_\_ Is ingenious, a deep thinker
16. \_\_\_\_\_ Generates a lot of enthusiasm
17. \_\_\_\_\_ Has a forgiving nature
18. \_\_\_\_\_ Tends to be disorganized
19. \_\_\_\_\_ Worries a lot
20. \_\_\_\_\_ Has an active imagination
21. \_\_\_\_\_ Tends to be quiet

22. \_\_\_\_\_ Is generally trusting
23. \_\_\_\_\_ Tends to be lazy
24. \_\_\_\_\_ Is emotionally stable, not easily upset
25. \_\_\_\_\_ Is inventive
26. \_\_\_\_\_ Has an assertive personality
27. \_\_\_\_\_ Can be cold and aloof
28. \_\_\_\_\_ Perseveres until the task is finished
29. \_\_\_\_\_ Can be moody
30. \_\_\_\_\_ Values artistic, aesthetic experiences
31. \_\_\_\_\_ Is sometimes shy, inhibited
32. \_\_\_\_\_ Is considerate and kind to almost everyone
33. \_\_\_\_\_ Does things efficiently
34. \_\_\_\_\_ Remains calm in tense situations
35. \_\_\_\_\_ Prefers work that is routine
36. \_\_\_\_\_ Is outgoing, sociable
37. \_\_\_\_\_ Is sometimes rude to others
38. \_\_\_\_\_ Makes plans and follows through with them
39. \_\_\_\_\_ Gets nervous easily
40. \_\_\_\_\_ Likes to reflect, play with ideas
41. \_\_\_\_\_ Has few artistic interests
42. \_\_\_\_\_ Likes to cooperate with others
43. \_\_\_\_\_ Is easily distracted
44. \_\_\_\_\_ Is sophisticated in art, music, or literature

## Appendix G

**Measure of Rejection Sensitivity**

**Adapted from Rejection Sensitivity Questionnaire** (Downey & Feldman, 1996).

Please imagine each situation described in the following and answer the question (1=*very unconcerned*, 7=*very concerned*; 1=*very unlikely*, 7=*very likely* )

---

1. *Imagine that your significant other has plans to go out with friends tonight, but you really want to spend the evening with him/her, and you tell him/her so.*

How concerned or anxious would you be over whether your significant other wants to spend the evening with you?

I would expect he or she would want to spend the evening with me.

---

2. *Imagine that you plan a dinner party at your house/apartment.\**

How concerned or anxious would you be over whether the dinner party would go well?

I would expect the dinner party to go well.

---

3. *Imagine that you approach a close friend to talk after doing or saying something that seriously upset him or her.*

How concerned or anxious would you be over whether you upset your friend?

I would expect he or she would be upset.

---

4. *Imagine that you call your significant other after a bitter argument and tell him/her you want to see him/her.*

How concerned or anxious would you be over whether your significant other wants to see you or not?

I would expect he or she would want to see me.

---

5. *Imagine that your boss gives you a lot of work with an urgent deadline.\**

How concerned or anxious would you be over whether you can finish the work in time?

I would expect I could finish the work before deadline.

---

6. *Imagine that you ask a friend if you can borrow something of his/hers.*

How concerned or anxious would you be over whether your friend is willing to lend you the thing?

I would expect he or she would be willing to lend it to me

---

7. *Imagine that you ask your parents/children to come to an occasion important to you.*

How concerned or anxious would you be over whether your parents/children are willing to come?

I would expect they would be willing to come to the occasion.

---

8. *Imagine that you take your significant other to a movie.\**

How concerned or anxious would you be over whether the movie is entertaining?

I would expect the movie be entertaining.

---

9. *Imagine that you ask a friend to do you a big favor.*

How concerned or anxious would you be over whether your friend is willing to help you?

I would expect my friend be willing to do me a big favor.

---

*Note.* \* indicates distractor items

## Appendix H

**Measures of Emotional Functioning**

---

**Trait Empathy - Davis Empathy Scale (DES, Davis, 1994)**

---

To what extent do you agree with each statement that describes you? (1=*strongly disagree*, 7=*strongly agree*)

1. I often have tender, concerned feelings for people less fortunate than me.
  2. Sometimes I don't feel very sorry for other people when they are having problems.
  3. When I see someone being taken advantage of, I feel kind of protective toward them.
  4. Other people's misfortunes do not usually disturb me a great deal.
  5. When I see someone treated unfairly, I sometimes don't feel very much pity for them.
  6. I am often quite touched by things that I see happen.
  7. I would describe myself as a pretty soft-hearted person
- 

**Trait Positive and Negative Affect - Positive and Negative Affect Schedule (Watson et al., 1988)**

---

Please indicate how well each statement describes you generally. (1=*very rarely*; 7=*very frequently*)

1. In general, I am *attentive*.
  2. In general, I am *strong*.
  3. In general, I am *irritable*.
  4. In general, I am *irritable*.
  5. In general, I am *inspired*.
  6. In general, I am *afraid*.
  7. In general, I am *alert*.
  8. In general, I am *upset*.
  9. In general, I am *active*.
  10. In general, I am *guilty*.
  11. In general, I am *nervous*.
  12. In general, I am *excited*.
  13. In general, I am *hostile*.
  14. In general, I am *proud*.
  15. In general, I am *jittery*.
  16. In general, I am *ashamed*.
  17. In general, I am *scared*.
  18. In general, I am *enthusiastic*.
  19. In general, I am *distressed*.
  20. In general, I am *determined*.
-

---

---

*Depressive Symptoms - Center for Epidemiological Studies – Depression scale (CES-D; Radloff, 1977)*

---

Below is a list of the ways you might have felt or behaved. Please tell me how often you have felt this way during the past week.

*1=Rarely or none of the time (less than 1 day); 2=Some or a little of the time (1-2 days); 3=Occasionally or a moderate amount of time (3-4 days); 4=Most or all of the time*

1. I was bothered by things that usually don't bother me.
  2. I did not feel like eating; my appetite was poor.
  3. I felt that I could not shake off the blues even with help from my family or friends.
  4. I felt I was just as good as other people.
  5. I had trouble keeping my mind on what I was doing.
  6. I felt depressed.
  7. I felt that everything I did was an effort.
  8. I felt hopeful about the future.
  9. I thought my life had been a failure.
  10. I felt fearful.
  11. My sleep was restless.
  12. I was happy.
  13. I talked less than usual.
  14. I felt lonely.
  15. People were unfriendly.
  16. I enjoyed life.
  17. I had crying spells.
  18. I felt sad.
  19. I felt that people dislike me.
  20. I could not get "going."
-

## Appendix I

**Additional Results in the Experiment**

Table II  
*Analyses of Variance for Sample Characteristics*

|                                 | Age      |                |            | Condition |            |            | Age × Condition |            |            |
|---------------------------------|----------|----------------|------------|-----------|------------|------------|-----------------|------------|------------|
|                                 | <i>F</i> | <i>p</i>       | $\eta^2$   | <i>F</i>  | <i>p</i>   | $\eta^2$   | <i>F</i>        | <i>p</i>   | $\eta^2$   |
| <i>Self-Reported Well-being</i> |          |                |            |           |            |            |                 |            |            |
| Life Satisfaction               | 0.16     | .69            | <.01       | 2.63      | .11        | .02        | 1.40            | .24        | .01        |
| Subjective Health               | 1.12     | .29            | <.01       | 0.01      | .95        | .00        | 0.01            | .93        | .00        |
| Depressive Symptoms             | 6.54     | <b>.01</b>     | <b>.05</b> | 0.06      | .81        | .00        | 0.37            | .54        | .01        |
| <i>Intellectual Functioning</i> |          |                |            |           |            |            |                 |            |            |
| Fluid Intelligence              | 59.86    | <b>&lt;.01</b> | <b>.34</b> | 6.65      | <b>.01</b> | <b>.05</b> | 1.97            | .16        | .02        |
| Crystallized Intelligence       | 50.31    | <b>&lt;.01</b> | <b>.30</b> | 0.91      | .34        | <.01       | 4.46            | <b>.04</b> | <b>.04</b> |
| <i>Personality</i>              |          |                |            |           |            |            |                 |            |            |
| Rejection Sensitivity           | 0.85     | .36            | <.01       | 0.09      | .76        | <.01       | 0.47            | .49        | <.01       |
| Trait Empathy                   | 4.24     | <b>.04</b>     | <b>.04</b> | 0.35      | .55        | <.01       | 0.50            | .48        | <.01       |
| Trait PA <sup>a</sup>           | 0.97     | .33            | <.01       | 1.75      | .19        | .02        | 1.58            | .21        | .01        |
| Trait NA <sup>b</sup>           | 0.21     | .63            | <.01       | 1.44      | .23        | .01        | 1.67            | .20        | .01        |
| Extraversion                    | 0.95     | .33            | .01        | 0.03      | .88        | .00        | 0.57            | .45        | <.01       |
| Agreeableness                   | 2.09     | .15            | .02        | 0.10      | .75        | <.01       | 1.15            | .29        | <.01       |
| Neuroticism                     | 0.57     | .45            | .01        | 0.48      | .49        | <.01       | 0.00            | .95        | .00        |
| Conscientiousness               | 13.06    | <b>&lt;.01</b> | <b>.10</b> | 0.10      | .75        | <.01       | 0.12            | .73        | <.01       |
| Openness                        | 0.70     | .42            | .01        | 0.09      | .76        | <.01       | 0.11            | .74        | <.01       |

*Note.* All ANOVAs were run with age (young vs. old) and condition (rejection vs. acceptance) as between-subject factors. The degrees of freedom for all F-Tests were (1, 117). Significant effect sizes ( $p < .05$ ) were shown in bold.

<sup>a</sup>Trait Positive Affect

<sup>b</sup>Trait Negative Affect

Table I2  
*Analyses of Variance for Positive Mood and Negative Mood*

|                        | <i>F</i> | <i>df</i> | <i>p</i>       | $\eta^2$   |
|------------------------|----------|-----------|----------------|------------|
| <i>Positive Mood</i>   |          |           |                |            |
| Time                   | 2.47     | 1 118     | .12            | .02        |
| Age                    | 5.63     | 1 118     | <b>.02</b>     | <b>.05</b> |
| Condition              | 7.84     | 1 118     | <b>&lt;.01</b> | <b>.06</b> |
| Time × Age             | 0.10     | 1 118     | .75            | <.01       |
| Time × Condition       | 17.30    | 1 118     | <b>&lt;.01</b> | <b>.13</b> |
| Age × Condition        | 0.00     | 1 118     | .96            | .00        |
| Time × Age × Condition | 0.40     | 1 118     | .53            | <.01       |
| <i>Negative Mood</i>   |          |           |                |            |
| Time                   | 15.56    | 1 118     | <b>&lt;.01</b> | <b>.12</b> |
| Age                    | 1.01     | 1 118     | .32            | <.01       |
| Condition              | 1.57     | 1 118     | .21            | .01        |
| Time × Age             | 3.20     | 1 118     | .08            | .03        |
| Time × Condition       | 9.04     | 1 118     | <.01           | .07        |
| Age × Condition        | 0.00     | 1 118     | .99            | .00        |
| Time × Age × Condition | 3.05     | 1 118     | .08            | .03        |

*Note.* All ANOVAs were run with time (baseline vs. post-test) as a within-subject factor, and age (young vs. old) and condition (rejection vs. acceptance) as between-subject factors. Significant effect sizes ( $p < .05$ ) were shown in bold.

Table I3  
*Analyses of Variance for Positive Mood and Negative Mood (Change of Rejection)*

|                      | <i>F</i> | <i>df</i> | <i>p</i>       | $\eta^2$   |
|----------------------|----------|-----------|----------------|------------|
| <i>Positive Mood</i> |          |           |                |            |
| Time                 | 19.19    | 1 55      | <b>&lt;.01</b> | <b>.26</b> |
| Condition            | 0.30     | 1 55      | .58            | .01        |
| Time × Condition     | 0.03     | 1 55      | .87            | <.01       |
| <i>Negative Mood</i> |          |           |                |            |
| Time                 | 6.04     | 1 55      | <b>.02</b>     | <b>.10</b> |
| Condition            | 1.60     | 1 55      | .21            | .03        |
| Time × Condition     | 3.23     | 1 55      | .08            | .06        |

*Note.* All ANOVAs were run with time (baseline vs. post-test) as a within-subject factor, and age (young vs. old) and condition (increasing rejection vs. constant rejection) as between-subject factors. Significant effect sizes ( $p < .05$ ) were shown in bold.

Table I4  
*Analyses of Variance for Anger, Sadness, and Hurt Feelings*

|                        | <i>F</i> | <i>df</i> | <i>p</i>       | $\eta^2$   |
|------------------------|----------|-----------|----------------|------------|
| <i>Anger</i>           |          |           |                |            |
| Time                   | 1.47     | 1 118     | .19            | .02        |
| Age                    | 1.19     | 1 118     | .28            | .01        |
| Condition              | 0.89     | 1 118     | .35            | .01        |
| Time × Age             | 0.14     | 1 118     | .71            | <.01       |
| Time × Condition       | 8.20     | 1 118     | <b>&lt;.01</b> | <b>.07</b> |
| Age × Condition        | 0.03     | 1 118     | .86            | .00        |
| Time × Age × Condition | 0.29     | 1 118     | .59            | <.01       |
| <i>Sadness</i>         |          |           |                |            |
| Time                   | 2.28     | 1 118     | <b>&lt;.13</b> | <b>.02</b> |
| Age                    | 0.41     | 1 118     | .84            | .00        |
| Condition              | 3.09     | 1 118     | .08            | .03        |
| Time × Age             | 0.14     | 1 118     | .71            | <.01       |
| Time × Condition       | 5.64     | 1 118     | <b>.02</b>     | <b>.05</b> |
| Age × Condition        | 0.05     | 1 118     | .82            | .00        |
| Time × Age × Condition | 0.11     | 1 118     | .74            | <.01       |
| <i>Hurt feelings</i>   |          |           |                |            |
| Time                   | 0.02     | 1 118     | .89            | .00        |
| Age                    | 0.13     | 1 118     | .72            | <.01       |
| Condition              | 2.85     | 1 118     | .09            | .02        |
| Time × Age             | 6.40     | 1 118     | <b>.01</b>     | <b>.05</b> |
| Time × Condition       | 12.68    | 1 118     | <b>&lt;.01</b> | <b>.10</b> |
| Age × Condition        | <0.01    | 1 118     | .98            | .00        |
| Time × Age × Condition | 10.79    | 1 118     | <b>&lt;.01</b> | <b>.09</b> |

*Note.* All ANOVAs were run with time (baseline vs. post-test) as a within-subject factor, and age (young vs. old) and condition (rejection vs. acceptance) as between-subject factors. Significant effect sizes ( $p < .05$ ) were shown in bold.

Table I5  
*Means (SDs) and Analyses of Variance for Appraisals*

|                   | Young Adults |          | Older adults |          | Total    |          |          |
|-------------------|--------------|----------|--------------|----------|----------|----------|----------|
|                   | <i>F</i>     | <i>p</i> | <i>F</i>     | <i>p</i> | <i>F</i> | <i>p</i> | $\eta^2$ |
| Goal Expectancy   | 3.40         | (1.15)   | 3.90         | (0.99)   | 1.61     | .21      | .03      |
| Motive Congruency | 2.51         | (1.21)   | 2.80         | (1.57)   | 0.42     | .52      | <.01     |

*Note.* Standard Deviations are in parentheses.

## Appendix J

### Cover Story and Instructions

#### Cover Story in the Informed Consent Form

In this study, we investigate how people make decision about whether they want to meet with a person they met online. Specifically, we are interested in the factors that influence persons' decisions about communicating with other persons online.

You will then be asked to engage in an online communication with another participant. Depending on the role that you will be assigned to, you need to either ask or answer questions. If you are assigned as the “interviewer”, you will need to ask the other participant questions and make decision about whether you would like to get to know that person. If you are assigned as the “interviewee”, you will need to answer the questions that the other participant asks. This communication process will last for 15 to 20 minutes and will be video-taped.

#### Instructions in the Lab Session

At random, you are assigned to the interviewee role. Another participant, who is in another location, is assigned to the interviewer role. As an interviewee, you will need to answer questions that the interviewer asks. He or she will make a decision about whether he or she wants to get to know you in person. Again, you cannot see each other's face. In order to control confounding factors, the interviewer will type the questions into the text box and you will see those questions in this text box. You do not need to type your answers; instead you can answer the questions by speaking into the microphone. During the interview, the interviewer will ask you 15 questions about yourself. All the questions are the same for all the participants and there will not be questions that are sensitive. Please answer the questions based on your own experiences and feelings so that the interviewer could make a decision and we can get accurate results. Interview will be video-recorded. Your responses will be treated confidentially and only be analyzed for the purpose of this study. Your name and address will not be associated to the video or your responses.

Again, there are 15 questions in total. You have 1 to 2 minutes to answer each question. There is no need to think about each question for a long time, but you can provide details in your answers if it is necessary. After every 3 questions, the interview will give you a feedback on how much he or she wants to meet you on a 7-point scale. This screen looks exactly like the one you see when you speak to the interviewer. “1” means he or she does not want to meet you at all. “7” means he or she wants to meet you very much. When the interview gives a rating, the corresponding button will turn red. So there will be five feedback ratings in total. We ask the interviewer to rate five times during the communication course because in real life, people sometimes change their opinion about another person as they know more about that person.

At the end of the communication, if the interviewer indicates that he or she wants to meet you, you two can participate in another side project. As compensation, you can be enrolled in a lottery to win a \$10 cash prize. You can choose whether you want to participate. However, if the interviewer indicates that he or she does not want to meet you, you will not be enrolled in this lottery. Whether you participate in the side project or not will not affect your original compensation for this study.

## Appendix K

**Measure of Demographic Information**

- 1) What is your date of birth? (mm/dd/yyyy) \_\_\_\_/\_\_\_\_/\_\_\_\_
- 2) As of today's date, how old are you? \_\_\_\_\_ years
- 3) What is your sex?
  - [1] Male
  - [2] Female
- 4) Are you of Hispanic, Spanish, or Latino origin? (e.g., Mexican, Puerto Rican)
  - [1] Yes
  - [2] No
- 5) Which do you feel best describes your racial background? (Multiple answers are possible!)
  - [1] White and/or European American
  - [2] Black and/or African American
  - [3] Native American or Alaska Native
  - [4] Asian
  - [5] Native Hawaiian or Pacific Islander
  - [6] Other (Please Specify):
- 6) What is the highest level of education you have completed?
 

|                                     |      |       |       |       |                 |       |                 |  |
|-------------------------------------|------|-------|-------|-------|-----------------|-------|-----------------|--|
| Grade School                        | 1st  | 2nd   | 3rd   | 4th   | 5th             | 6th   |                 |  |
| Junior/High School                  | 7th  | 8th   | 9th   | 10th  | 11th            | 12th  |                 |  |
| Trade, Business or Technical School | 1 yr | 2 yrs | 3 yrs | 4 yrs | more than 4 yrs |       |                 |  |
| College                             | 1 yr | 2 yrs | 3 yrs | 4 yrs | more than 4 yrs |       |                 |  |
| Graduate School                     | 1 yr | 2 yrs | 3 yrs | 4 yrs | 5 yrs           | 6 yrs | more than 6 yrs |  |
- 7) What is the highest degree you have received?
  - [1] High school diploma or equivalency (GED)
  - [2] Associate Degree
  - [3] Bachelor's Degree
  - [4] Master's Degree
  - [5] Doctorate (e.g., PhD, MD, JD, EdD, PsyD)
  - [6] Other (Please Specify):
- 8) What is your current employment situation? (Check all that apply!)
  - [1] Working full-time
  - [2] Working part-time
  - [3] In training / education (e.g. student)
  - [4] Retired or retired on disability
  - [5] Unemployed or laid off
  - [6] Keeping house or raising children full-time
  - [7] Other (Please Specify):
- 9) What kind of work do (did) you do? (Job Title)
- 10) What is your current total household income for the past 12 months? (Check one!)
  - [1] Between \$0 and \$9,999
  - [2] Between \$10,000 and \$19,999
  - [3] Between \$20,000 and \$29,999
  - [4] Between \$30,000 and \$39,999
  - [5] Between \$40,000 and \$49,999

- [6] Between \$50,000 and \$59,999
  - [7] Between \$60,000 and \$69,999
  - [8] Between \$70,000 and \$79,999
  - [9] Between \$80,000 and \$89,999
  - [10] Between \$90,000 and \$99,999
  - [11] \$100,000 or more
- 11) Marital Status: Are you currently:
- [1] Single, never married
  - [2] Married, or living in a long-term relationship
  - [3] Divorced, not remarried
  - [4] Widowed, not remarried
- 12) Do you have children?
- [1] Yes                      If Yes, how many?
  - [2] No
- 13) Overall, how satisfied are you with your life?  
1=extremely unsatisfied, 4=average, 7=extremely satisfied
- 14) Overall, how would you rate your physical health?  
1=poor, 4=good, 7=excellent
- 15) Compared to other people of your age, your physical health is?  
1=much worse, 4=similar, 7=much better
- 16) Has your physical health changed during the last 12 months?  
1=much worse, 4=similar, 7=much better
- 17) Overall, how do you feel right now?  
1=very bad /very negative, 4=average, 7=very good /very positive