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The Influence of Facial Masking and Sex on Older Adults' Impressions of Individuals with Parkinson's Disease

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Abstract

Parkinson's disease (PD) involves facial masking, which may impair social interaction. Older adult observers who viewed segments of videotaped interviews with individuals with PD expressed less interest in relationships with women with higher masking and judged them as less supportive. Masking did not affect ratings of men in these domains, possibly because higher masking violates gender norms for expressivity in women but not in men. Observers formed less accurate ratings of the social supportiveness and social strain of women than men, and higher masking decreased accuracy for ratings of strain. Results suggest that some of the problems with social relationships in PD may be due to inaccurate impressions and reduced desire to interact with individuals with higher masking, especially women.

Keywords

Parkinson's disease; first impressions; social support; social strain; older adults

Parkinson's disease (PD) affects 1.5 million individuals in the United States alone (National Parkinson Foundation, 2008), most of whom are older adults. PD is characterized by difficulties controlling movement including akinesia, tremor, and rigidity (Lang & Lozano, 1998), but may also include other problems such as cognitive impairment, depression, difficulty sleeping, and pain (Weintraub, Comella, & Horn, 2008a, 2008b, 2008c). Because the movement difficulties are not specific to gross motor movements, individuals with PD may also experience challenges controlling the musculature of the face and mouth, resulting in problems with communication. In fact, social relationships and communication problems are common complaints among individuals with PD (Schreurs, DeRidder, & Bensing, 2000), potentially affecting relationships with family, friends, and health care professionals. The aim of the current study was to examine the potential influence of facial masking on social interactions between older adults with PD and their age peers and how these effects may differ by observer and target sex. The study of relationships with peers is important because they may be fundamental to well-being (Pinquart & Sörensen, 2000), and because they are

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more likely to be based on personal choice and preferences than relationships with family members or service providers.

With increasing levels of facial masking, the face becomes rigid and fixed and spontaneous expression is impaired (Simons, Pasqualini, Reddy, & Wood, 2004; Tickle-Degnen & Lyons, 2004). This impairment can appear similar to the unresponsive face of dementia or the flat affect of depression (Schrage et al., 2007; Shulman, Taback, Rabinstein, & Weiner, 2002), posing challenges to successful interaction with others. PD symptoms can lead to social disengagement or lifestyle alterations to minimize shame and embarrassment (Brozgold, Borod, Martin, Pick, Alpert, & Welkowitz, 1998; Ellgring, Seiler, Perleth, Frings, Gasser, & Oertel, 1993; Macht, Schwarz, & Ellgring, 2005; Nijhof, 1995; Schrage, Jahanshahi, & Quinn, 2000). Higher facial masking has been associated with observers forming inaccurate impressions of individuals with PD. For example, Lyons and colleagues (2004) found that practitioners were unable to detect individual differences in patients' neuroticism or extraversion from videotaped segments of interviews about patients' favorite activities. This inaccuracy provides a stark contrast to judgments about individuals without expressive disorders, which are characterized by consensus and accuracy, especially for extraversion (Ambady & Rosenthal, 1992; Hall & Mast, 2007; Kenny, Albright, Malloy, & Kashy, 1994; Kenny, Horner, Kashy, & Chu, 1992). Other research suggests a systematic negative bias for ratings of individuals with PD (Pentland, 1991; Pentland, Pitcairn, Gray, & Riddle, 1987; Simons et al., 2004; Tickle-Degnen & Lyons, 2004). For example, Pentland and colleagues (1988) reported that a sample of speech pathology and therapy students who were instructed to provide their first impressions of individuals with neurological disorders based on silent videotapes rated individuals with PD as more somber, introverted, anxious, dependent, and angrier than control individuals with heart disease even though the PD and cardiac groups did not differ significantly on these traits (Pentland, Pitcairn, Gray, & Riddle, 1987). The current study will help elucidate whether negative ratings of individuals with PD are characteristic of processes that occur in daily life by focusing on observers who do not have a medical background, specifically older adults who have not previously served as observers in these types of studies.

Tickle-Degnen and Lyons (2004) investigated how expertise with PD influenced impressions formed of individuals with PD. Practitioners with either expert training (practicing occupational, speech, or physical therapy professionals, and physicians) or novice training (students of occupational, speech, or physical therapy, and medicine) incorrectly rated individuals with higher facial masking as less extraverted and less agreeable than individuals with lower masking, suggesting that higher masking is perceived more negatively. However, novices relied upon masking for making their judgments of neuroticism and conscientiousness more than did experts, suggesting that individuals with less medical training are more prone to negative impressions of individuals with higher masking.

If health care professionals are prone to inaccurate ratings of personality in PD, it seems likely that age peer observers, who have less experience with PD, would be equally, if not more, inaccurate. McComb and Tickle-Degnen (2005) reported that spouses overrated the extent of the problems reported by individuals with PD, especially in socioemotional domains. This suggests that the association between facial masking and observers' judgments may extend beyond clinical settings into daily life. Specifically, observers may assume that an individual with higher facial masking would not be a good social partner and act accordingly. This may contribute to missed opportunities for interaction that could fulfill social needs for both an individual with PD and an age peer.

When social networks have changed due to death, illness, and other reasons beyond one's control (Blieszner, 2006), establishing and maintaining relationships with age peers may provide an important source of support and companionship besides that received from family. Furthermore, even though previous research has suggested that older adults prune their social networks to focus on enduring, meaningful relationships (Carstensen, Isaacowitz, & Charles, 1999), older adults in dissatisfying relationships may seek out new relationships with more appealing social partners. An individual with PD may be a potentially satisfying social partner, but applying standard impression formation strategies to someone with higher facial masking may lead an observer to avoid pursuing social interaction with that person. This dearth of quality interaction could lead to stress and exacerbation of symptoms for individuals with PD (Ellgring et al., 1993) and potentially to more difficulties with social relationships.

When rating others' social behaviors, observers may consider how likely a target individual is to engage in interactions that would be satisfying to the observer. The norm of reciprocity for relationships suggests that individuals are most satisfied with relationships characterized by approximately equal amounts of giving and receiving of support between social partners, although this does not necessarily require that the supports exchanged are of the same type (Antonucci & Jackson, 1990). For example, research suggests emotional support or companionship may reciprocate physical support in PD (Platt, 2004; Tanji et al., 2008). Perceptions of reciprocity may be based on the type of social behaviors in which an observer believes a target would engage after observing that target's behavior in an interaction. Supportive behaviors, such as participating in activities of interest, providing advice, or appearing engaged and interested, may be central to perceptions of reciprocity. However, straining behaviors, such as asking for too much help, ignoring someone's concerns, or appearing disengaged, may also affect perceptions of reciprocity. Observers may judge a potential social partner with higher facial masking as unable to provide the reciprocal companionship or support that they are seeking because that individual may appear negative, rigid, or insincere (Simons et al., 2004) due to increased staring and diminished or apparently insincere smiling (Pentland, 1991; Pitcairn, Clemie, Gray, & Pentland, 1990).

The role of sex in facial masking has received little research attention; however, a recent study suggested that PD may be experienced differently by men and women (Solimeo, 2008). Solimeo found that although men and women experience similar symptoms, men primarily reported difficulties regarding self-presentation due to symptoms, whereas women reported greater symptom impact on their more intimate relationships. Although non-verbal expressivity by both sexes can lead to more positive first impressions (Riggio & Friedman, 1986), women are expected to be more expressive and socially-oriented than men (Briton & Hall, 1995; Deaux, 1995; DePaulo, 1992; Diekman & Goodfriend, 2006). Consequently, a woman with higher facial masking may experience more negative social outcomes than a man because the woman's diminished expressivity is a stronger violation of social norms, especially within the context of closer relationships. The contrast of higher masking to expectations about women's expressivity may make their behavior seem much less affiliative and sincere than that of lower masking women, which could be less true for men. The contrast effect may also make it harder to discern actual personality traits, since many of the expressivity cues that individuals typically rely upon when judging women may not be available to observers when rating higher masking women. Although a decrease in accuracy may also occur when rating higher masking men, diminished facial expressivity may have a smaller effect for men because observers may have more experience making judgments about men based on fewer facial cues.

The current study extended the previous literature focusing on observers with health care backgrounds to a more naturalistic sample of age peer observers with whom individuals with

PD may interact in community settings. Following thin-slice procedures used in previous research (Ambady, LaPlante, & Johnson, 2001; Lyons & Tickle-Degnen, 2005; Tickle-Degnen & Lyons, 2004), men and women with PD were presented in short video clips. We tested the following hypotheses: 1) observers would report less interest in beginning relationships with individuals with higher facial masking, 2) observers would rate individuals with higher facial masking as less likely to provide social support and more likely to be a source of social strain, and 3) observers would show less accurate ratings of individuals with higher facial masking, as assessed by correspondence with the targets' self-reports. We also tested hypotheses concerning sex differences: 1) higher facial masking would elicit more negative ratings of women than men, and 2) ratings of women would be less accurate than ratings of men.

Method

Age Peer Observers

This study included 58 older adults from the greater Boston area. The sample was 69% female and all observers identified as Caucasian, with a mean age of 75.76 ($SD = 8.14$; Range = 55–91). To enhance ecological validity, previous experience or knowledge of PD was not required for participation in this study since a majority of the public may not have extensive exposure or experience with PD (Moore & Knowles, 2006). Median education level was an associate's degree and the median income range was \$20,001–50,000. Observers were recruited through existing participant databases and fliers posted at senior centers in the Boston area. To be eligible for participation, all observers were required to have adequate vision and hearing for viewing the videotaped targets. Age peer observers provided informed consent through a procedure approved by the Brandeis University and Tufts University institutional review boards.

Video clips

The video clips for this study were obtained from a concurrent study of health care practitioners' diagnostic impression formation of PD (Tickle-Degnen & Ma, 2006) at the Center for Neurorehabilitation (for which second author was Associate Director for Research) at Sargent College of Health and Rehabilitation Sciences of Boston University, in association with Boston University Medical Center Department of Neurology. Targets were selected from 24 individuals who participated in the Center's research studies and who met inclusion criteria that included a diagnosis of PD confirmed by the presence of at least two cardinal signs (resting tremor, bradykinesia, rigidity), age of 40 or older, walking without supervision, score 25 or above on the Mini-Mental Status Exam (Folstein, Folstein, & McHugh, 1975) indicating absence of dementia, score 5 or less on the short form Geriatric Depression Scale (Sheikh & Yesavage, 1986) indicating low probability of clinical depression, no visually salient disfiguring condition of the upper body or abnormal movement condition other than those related to the cardinal signs, and providing informed consent. A trained graduate speech therapy research assistant interviewed the targets about their experience living with the disease, and interviews were videotaped. A video clip was extracted starting at the point when the target began responding to a question about a positive coping experience from the last week. Only the target's face and upper body were visible in the video clips; the interviewer was not physically or verbally present in the clips. The audio track for each clip was content filtered to preserve loudness, prosody, emotionality, and other non-verbal qualities of speech but to obscure the verbal content of the interviews so that impressions would be based on nonverbal information and not speech content.

We selected the final group of 12 targets from the 24 potential targets in order to represent equal numbers of Caucasian women and men (6 each), matched on facial masking (3 lower and 3 higher within each 6). These targets were selected to maximize matching across women and men on their facial masking ratings, self-rated personality traits of extraversion and anxiousness, disease severity, and age. Final categorization into lower versus higher facial masking groups occurred by way of ratings made by five neurorehabilitation researchers experienced in PD who had been trained in evaluating masking symptoms. Raters assessed different features of facial masking on a 1–5 scale, with 1 = low masking and 5 = high masking, including positive and negative emotional expressivity, changing emotion in the face, movement in the upper and lower face, blinking, and degree of open lips when not speaking; these ratings were combined to form a masking composite score. The masking items were based on the Unified Parkinson's Disease Rating Scale (UPDRS) Facial Expression item (Fahn, Marsden, Calne, & Goldstein, 1987) and on an earlier study that had found similar ratings of facial expressivity (the inverse of masking) to be strongly negatively associated with the UPDRS (Lyons & Tickle-Degnen, 2005). Targets in the lower masking group had an average masking composite of $M = 2.40$, $SD = .53$, whereas those in the higher masking group had a significantly higher masking composite of $M = 3.56$, $SD = .41$, $t(10) = 4.22$, $p < .01$. The stability of masking throughout each clip was determined by having raters judge three separate segments of the clip (average inter-segment correlation $r = .78$). The final 12 targets selected for this study had a mean age of 65.08 years ($SD = 7.03$) and were all between Hoehn and Yahr Stage II and III, representing bilateral, mild-to-moderate symptoms. Each target's video clip was 80 seconds and was repeated three times consecutively to allow for sufficient time to complete ratings so that observers could refer back to the target when making ratings. The total presentation time for the video clips was approximately 60 minutes.

Observer Measures

Background information about observers—Observers responded to 10 questions assessing demographics such as their age, sex, race, ethnicity, annual income, and highest level of education obtained.

Observers' ratings of target individuals—Two items assessed how likely observers would be to form a relationship with each of the targets in the video clips. The items included, "How likely do you think it is that you could have a happy/fulfilling social life with this person?" and "Would you be interested in getting to know this person better?" Responses to these items were collected on a five-point scale, with higher scores representing more interest. The Pearson product-moment correlation between these items was high, $r = .82$, so the mean of these two items was computed to estimate interest in future relationships.

Observers also rated the likelihood of targets engaging in positive and negative social behaviors, support and strain, respectively, with twenty-four items based on the Positive and Negative Social Exchange Assessment (Newsom, Rook, Nishishiba, Sorkin, & Mahan, 2005). Social support and social strain were assessed independently because support and strain are separate domains of social experience, not endpoints along a continuum (Rook, 1984). Responses were collected on a five-point scale, with higher scores indicating higher probabilities of support and strain behaviors. Items were presented in one of two random orders, following the two general relationship interest items described above. For the current study, Cronbach's $\alpha = .94$ for the support scale; Cronbach's $\alpha = .88$ for the strain scale. Bivariate correlations revealed that the observer ratings were significantly related as expected: rated support and rated strain were negatively correlated, $r = -.61$, $p < .01$, rated

support and relationship interest were positively correlated, $r = .64, p < .01$, and rated strain and relationship interest were negatively correlated, $r = -.47, p < .01$.

Target Measures

Observers' ratings were compared to information the target individuals provided at the time of the interview taping. Targets completed questionnaires assessing PD-related quality of life (PDQ-39; Peto, Jenkinson, Fitzpatrick, & Greenhal, 1995), Big Five personality traits (TIPI; Gosling, Rentfrow, & Swann, 2003), and activity preferences (adapted from Clark and Bond, 1995), from which items were selected as accuracy criteria to estimate targets' self-reported probability of engaging in social support and social strain behaviors. Self-reported support and strain domains were created based on a priori conceptions of support and strain. The social support criterion consisted of nine items that were associated with the provision of instrumental and emotional support, companionship, and advice, such as items like "outgoing, warm," "doing thoughtful things for friends and family," and "would like activities that can promote interpersonal harmony." The social strain criterion was created from eleven items representing lack of instrumental or emotional support, negative interpersonal behaviors, and burdensome or limiting characteristics, such as items like "disorganized, careless," "felt angry or bitter," and "had difficulty looking after your home, for example, housework, cooking or yard work." Higher scores on the support and strain composites represent higher potential for supportive and straining behaviors, respectively. The support and strain domains that we created for this study demonstrated acceptable reliability, Cronbach's $\alpha = .81, \alpha = .79$, respectively. We also computed multi-trait multi-method matrices (MTMM) to examine the convergent and divergent validity of our support and strain items. Our MTMM results support the theoretical distinction between support and strain as separate constructs, with higher intercorrelations within the support and strain items than between the support and strain items.

Procedure

Observers completed the experimental protocol individually or in small groups of no more than 15 people at a location of their choosing (Brandeis, Tufts, or senior/community centers). Clips, questionnaires, and presentation were standardized across observers.

After all observers in a session completed the informed consent procedure and the initial background information forms, they received instructions for viewing the video clips and making their ratings. Observers were presented with one of two randomized clip orders, each including the same interview segments from the same targets. Observers were informed prior to viewing the video that all of the individuals they would see had been diagnosed with PD. We disclosed diagnosis of PD to observers because the focus of this study was on the effects of facial masking beyond the effects of PD alone. Observers were instructed to complete a rating form for each target while watching the video clips for that target. After the first target's video was finished, observers were given an opportunity to ask additional questions about the procedure. Video clips for each remaining target were presented in direct succession, with a short break given at the approximate midpoint of the study to reduce fatigue. After the video rating protocol, observers received a short debriefing and were given the option to discuss how they formed their ratings of the targets. Observers received \$20 compensation for participating in this study. The total study duration was 60–90 minutes.

Results

Overview of Data Analysis

Mixed 2 (facial masking) \times 2 (target sex) \times 2 (observer sex) ANOVAs were performed on observers' interest in a relationship with the target, ratings of target supportiveness, and ratings of target strain, with facial masking and target sex manipulated within subjects, and observer sex as a between subjects variable. Effect sizes for all results based on ANOVAs were reported using the r (Rosenthal & Rosnow, 1991). A higher r suggests a stronger effect, with $r = .10$ representing a small effect, $r = .30$ representing a medium effect, and $r = .50$ representing a large effect (Cohen, 1992).

Accuracy coefficients were obtained by correlating each observer's support and strain ratings with the composites representing each target's self-reported support and strain behaviors, respectively, in a procedure described by Tickle-Degnen and Lyons (2004). Each observer received four separate accuracy coefficient scores, one each for lower and higher masking men and women. Each accuracy coefficient was based on $n = 3$ since there were three targets in each of the masking by target sex cells. This coefficient was then standardized using a Fischer Z transformation (Rosenthal & Rosnow, 1991). A strong, positive coefficient indicates that observers were sensitive to the targets' self-reports (i.e., accurate in their ratings), whereas a coefficient near zero suggests that the observer ratings did not correspond with targets' self-reports, and a strong, negative coefficient suggests that observers' ratings were systematically biased away from targets' self-reports. Each observer's standardized coefficients were treated as individual data points for the 2 (facial masking) \times 2 (target sex) \times 2 (observer sex) mixed ANOVAs on the level of observer accuracy. Mean standardized accuracy coefficients were then converted back to Pearson r s for presentation and ease of interpretation.

Effects of Facial Masking

Means and standard deviations for the facial masking and target sex effects on all dependent variables are presented in the Table.

Interest in future relationships—The mixed model ANOVA revealed a significant main effect for target sex, $F(1, 55) = 30.35, p < .01, r = .60$, reflecting significantly more interest in beginning a relationship with women with PD than men. This main effect was qualified by a target sex by facial masking interaction, $F(1, 55) = 5.86, p < .05, r = .31$, revealing that the preference for women over men was stronger when considering relationships with lower masking targets, $t(55) = 5.33, p < .01$, than higher masking targets, $t(55) = 2.65, p = .01$. In addition, as predicted, higher facial masking was more detrimental to desired relationships with women, $t(55) = 2.12, p < .05$, than men, for whom there were no significant masking effects, $t(55) = .51, p = .61$ (Figure 1). Observer sex had no significant effects on interest in future relationships.

Social support ratings—As hypothesized, observers perceived that targets with higher facial masking would be significantly less supportive than targets with lower facial masking, $F(1, 55) = 4.56, p < .05, r = .28$, even though lower and higher masking targets did not differ in self-reported supportiveness (lower masking $M = .11, SD = .58$, higher masking $M = -.11, SD = .70$), $t(10) = .57, p = .58$. There was also a significant main effect for target sex, $F(1, 55) = 49.76, p < .01, r = .69$, revealing that women with PD were rated as significantly more supportive than men, despite no effect of target sex on self-reported supportiveness (women $M = -.18, SD = .74$, men $M = .18, SD = .49$), $t(10) = .98, p = .35$. This effect was qualified by a marginally significant target sex by masking interaction, $F(1, 55) = 3.75, p = .06, r = .25$. Consistent with the prediction that higher facial masking would be more

detrimental to women with PD, observers rated higher masking women as less supportive than lower masking women, $t(55) = 2.79, p < .05$, whereas masking had no significant effect on the rated supportiveness of men, $t(55) = .52, p = .60$ (Figure 2). The main effect of target sex was also qualified by a marginally significant target sex by observer sex interaction, $F(1, 55) = 3.81, p = .06, r = .25$, revealing that the tendency to rate women with PD as more supportive than men was stronger for female observers ($M = 2.93, SD = .07; M = 2.62, SD = .06$, respectively), $t(55) = 8.01, p < .01$, than for male observers ($M = 3.06, SD = .10; M = 2.88, SD = .09$, respectively), $t(55) = 3.08, p < .05$.

Social strain ratings—There was a significant main effect for target sex, $F(1, 55) = 16.25, p < .01, r = .48$, revealing that men with PD were rated as more likely to be a source of social strain than women, even though there were no significant sex differences in targets' self-reported strain (men $M = -.12, SD = .65$, women $M = .12, SD = .51$), $t(10) = -.74, p = .48$. This main effect was qualified by a target sex by masking interaction, $F(1, 55) = 4.16, p < .05, r = .26$. Contrary to expectations, lower masking men were perceived as more straining than higher masking men, $t(55) = 2.33, p < .05$. Masking did not affect observers' ratings of women's social strain, failing to support predictions, $t(55) = .05, p = .96$ (Figure 3). Observer sex had no significant effects on ratings of straining behaviors.

Accuracy Analyses

Social support—There was a significant main effect for target sex on agreement between observer and target ratings of social support, $F(1, 53) = 4.51, p < .05, r = .28$, revealing that observers were significantly more accurate when rating supportiveness of men with PD ($M = .48, SD = .12$) than women ($M = .04, SD = .17$), as predicted. Observers' agreement with self-ratings of men was significantly greater than zero (i.e., chance), $t(54) = 3.95, p < .01$, whereas agreement with women did not differ from zero, $t(54) = .29, p = .77$. There was also a significant observer sex by masking interaction, $F(1, 53) = 4.14, p < .05, r = .27$. The predicted tendency to be less accurate when rating higher masking targets was significant for male observers (lower masking $M = .53, SD = .27$; higher masking $M = -.19, SD = .21$), $t(53) = 2.17, p < .05$, but not for female observers (lower masking $M = .30, SD = .19$; higher masking $M = .39, SD = .15$), $t(53) = .45, p = .66$ (Figure 4). In addition, female observers formed more accurate ratings than male observers when viewing targets with higher masking (female $M = .39, SD = .15$; male $M = -.19, SD = .21$), $t(53) = 2.35, p < .05$, while there were no significant observer sex differences observed for lower masking targets (female $M = .30, SD = .19$; male $M = .53, SD = .27$), $t(53) = .89, p = .38$. Male observers' agreement with targets' self-ratings was significantly greater than zero for lower masking targets, $t(54) = 2.27, p < .05$, but did not differ from zero for higher masking targets, $t(54) = 1.40, p = .17$. In contrast, female observers' agreement with self-ratings was significantly greater than zero for both lower masking, $t(54) = 2.27, p < .05$, and higher masking targets, $t(54) = 3.05, p < .01$.

Social strain—Analyses examining accuracy of ratings of social strain revealed that observers ratings showed more agreement with the self-ratings of lower masking targets ($M = .33, SD = .18$) than higher masking targets ($M = -.14, SD = .18$), $F(1, 51) = 7.90, p < .01, r = .37$, as predicted. Observers' accuracy for lower masking targets was significantly greater than zero, $t(52) = 2.47, p < .05$, whereas accuracy did not differ from zero for ratings of higher masking targets, $t(52) = 1.00, p = .32$. Neither target sex nor observer sex were significantly associated with accuracy of strain ratings.

Discussion

As predicted, higher facial masking in individuals with PD had detrimental effects on observers' ratings of them as well as observers' accuracy in judging the targets' self-reported qualities. Moreover, these effects were moderated in predictable ways by the sex of the target and the observer. As hypothesized, higher facial masking led age peers to rate targets' supportiveness more negatively. This is consistent with other research suggesting that facial masking may lead to negative impressions of individuals with PD (Pentland et al., 1988; Tickle-Degnen & Lyons, 2004) or be mistaken for dementia or depression (Schrag et al., 2007; Shulman et al., 2002). While a chronic illness like PD may threaten perceived reciprocity in any dyad, it is unlikely that facial masking would completely disqualify a target from being a satisfying social partner. However, dyads experiencing higher facial masking may need to adapt to prevent relationships from becoming unbalanced and unsatisfactory.

Also as predicted, the more negative effects of higher masking on ratings of supportiveness and interest in beginning new relationships were more pronounced for women than men with PD, supporting Tickle-Degnen, Ma and Huang (2008) finding that facial masking was especially detrimental to women with PD when practitioners evaluated socioemotional competence. These results are consistent with the literature showing that cues such as smiling, eye contact, and nodding that are altered or reduced by facial masking (Pentland, 1991) are associated with perceptions of warmth and caring (DePaulo, 1992; Hack & Carlston, 2008) and with social norms suggesting that femininity is characterized by emotional expressivity, sensitivity, and nurturing (Deaux, 1995; DePaulo, 1992; Diekmann & Goodfriend, 2006; Tickle-Degnen, Ma and Huang (2008)). The sex and facial masking interactions could reflect observers' concerns about reciprocity, specifically whether an individual is likely to repay their efforts, which may be more salient when considering women as social partners because women are perceived as more likely to engage in reciprocal relationships in general.

The exception to the more negative effects of masking for women with PD was observers' ratings of how socially straining an individual with PD would be. Paradoxically, men with higher facial masking were perceived as less likely to be a source of social strain, whereas degree of masking in women had no significant effect on ratings of likely strain. A possible explanation for this result is that facial masking may reduce sexual dimorphism associated with typical male faces seeming angrier than typical female faces (which, in turn, seem happier than typical male faces; Becker, Kenrick, Neuberg, Blackwell, & Smith, 2007; Hess, Adams, & Kleck, 2004). Masking may also blunt the expressivity associated with stereotypes that men are more aggressive and dominant than women (Briton & Hall, 1995), therefore leading observers to believe that men with higher facial masking would be less aggressive and dominant, and thus less socially straining than men without expressive difficulties.

As predicted, higher facial masking yielded lower observer accuracy in judging targets' social strain. Observers also showed lower accuracy when judging the social supportiveness of women with PD than men. This is consistent with the prediction that facial masking will have a more detrimental effect on ratings of women with PD than men. Observer sex, like target sex, influenced observers' accuracy. Male observers showed the predicted pattern of decreased accuracy with higher facial masking, but female observers did not. The finding that women were more accurate than men when judging the supportiveness of targets with higher facial masking is consistent with previous evidence for a female decoding advantage (Hall, 2006; Rosip & Hall, 2004).

A few limitations should be noted when interpreting the results of this study. First, ratings were based on a small sample of individuals with mild-to-moderate PD. Although the targets were selected on the basis of their level of facial masking, it was impossible to match the targets on all potentially relevant characteristics. Second, ratings formed while watching a videotape may differ from ratings formed during interaction and when continued interaction is a possibility. The ratings obtained for this study also may have been influenced by social desirability; however, these demand characteristics were minimized by collecting ratings anonymously and asking observers to answer honestly. Moreover, if social desirability did influence the validity of observers' ratings, it is likely that it would have reduced the predicted effects because observers who wanted to present themselves more favorably would try to be less biased by target sex or facial masking. It is unlikely that social desirability affected targets' responses to questionnaires because the items selected for this study were selected from a separate study which assessed activity preferences and PD-related quality of life. Finally, because the criteria for targets' support and strain scales were not based on items designed to assess support and strain behaviors, but were created by combining items from a different study, caution must be used when interpreting results from the accuracy analyses.

In summary, older adults, like health care practitioners, used facial masking as a cue when forming first impressions of individuals with PD (e.g., Pentland et al., 1987; Tickle-Degnen & Lyons, 2004; Tickle-Degnen, Ma and Huang (2008)), showing sensitivity to the symptom of facial masking above and beyond the effects of PD alone. Higher facial masking led observers to rate targets more negatively, especially in the case of female targets, for whom masking violates gender stereotypes. Moreover, these negative ratings were not supported by actual differences in self-reported support and strain behaviors by higher and lower masking targets, yielding less accurate ratings of targets with higher masking. It seems that age peers do not consider individuals with higher masking as good social partners due to their diminished expressivity, which could be affecting perceptions of cognitive and socioemotional reciprocity. Further research is needed to examine which cues older adults rely upon for rating social behaviors and how the use of these cue configurations may vary by both observer and target sex. Research addressing how older adults form and manage impressions and how these impressions affect social interaction could help researchers and practitioners better understand why individuals with PD report difficulties with social quality of life (Schreurs, DeRidder, & Bensing, 2000), which could then lead to interventions to help address this problem.

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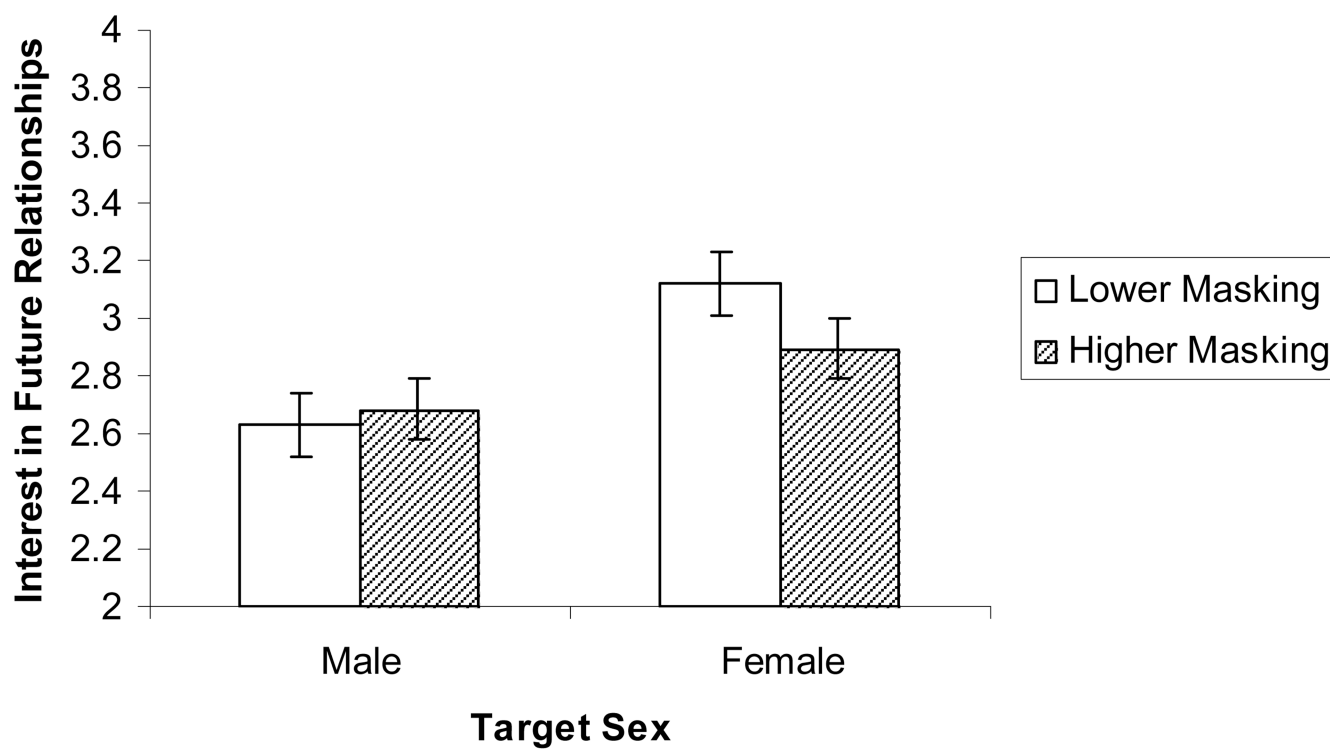


Figure 1. Facial masking by target sex interaction for observers' interest in beginning a new relationship with targets with PD.

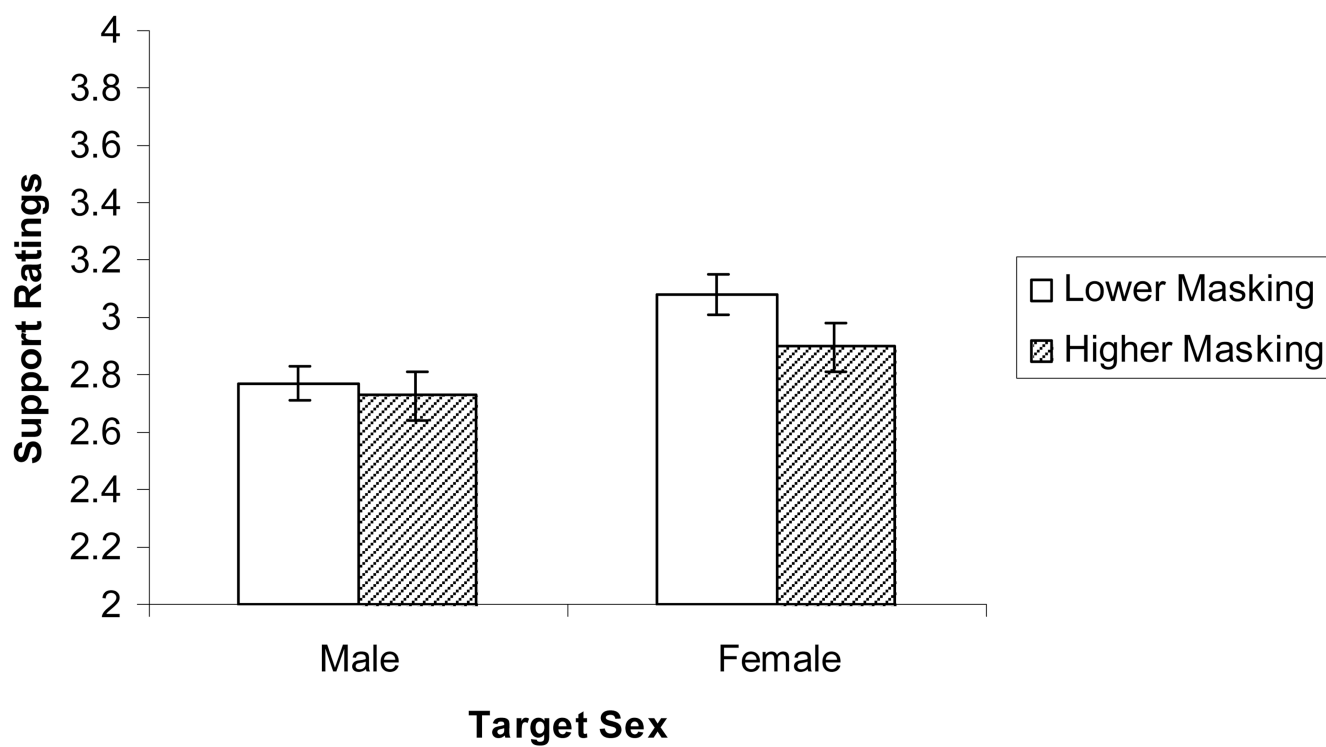


Figure 2. Facial masking by target sex interaction for observers' perceptions of how supportive targets with PD would be.

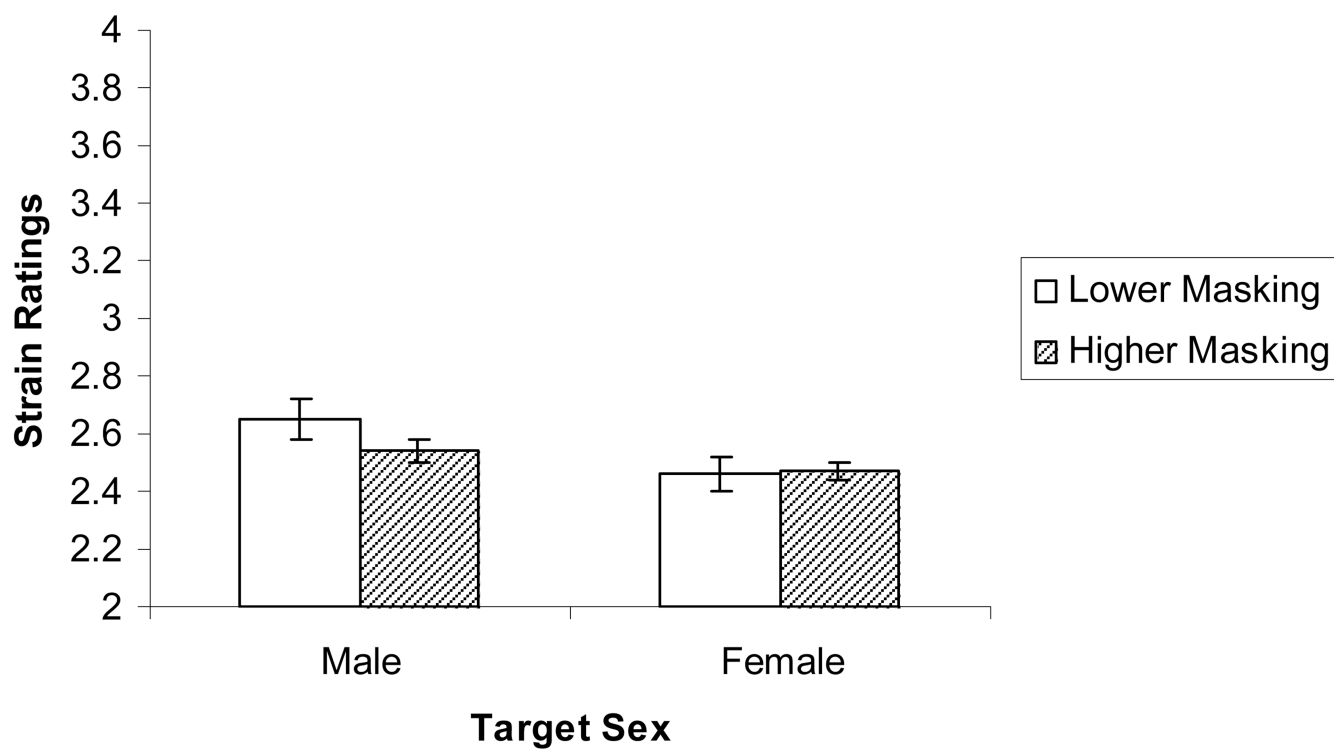


Figure 3. Facial masking by target sex interaction for observers' perceptions of how straining targets with PD would be.

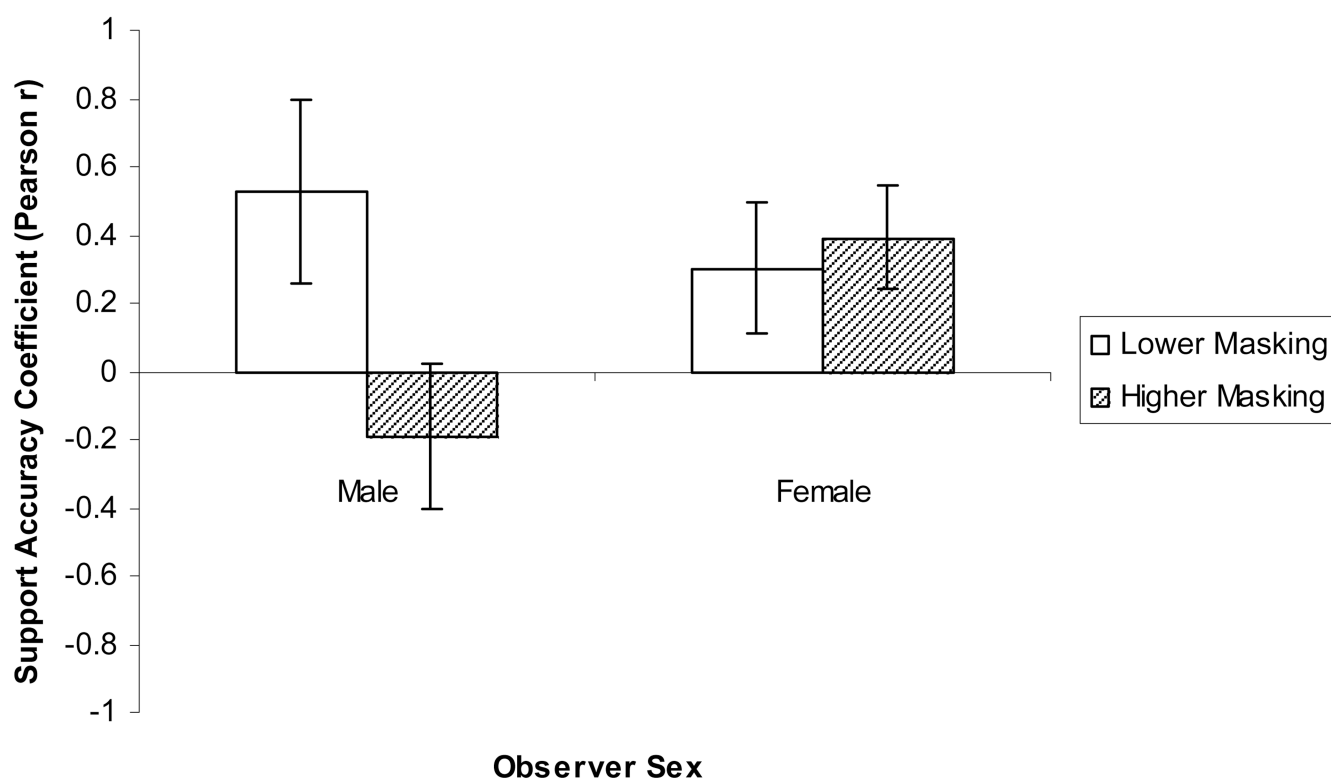


Figure 4. Facial masking by observer sex interaction for accuracy of observers' perceptions of how supportive targets with PD would be.

Means and standard deviations (in parentheses) for ANOVAs examining the influence of target sex and facial masking on observers' ratings of targets with PD

Table

Outcome:	Relationship Interest			Support Behaviors			Strain Behaviors		
	Target Sex			Target Sex			Target Sex		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Lower Mask	2.63 (.11)	3.12 (.12)	2.87 (.11)	2.77 (.06)	3.08 (.07)	2.92 (.06)	2.65 (.07)	2.46 (.07)	2.56 (.06)
Higher Mask	2.68 (.11)	2.89 (.10)	2.79 (.10)	2.73 (.07)	2.90 (.07)	2.82 (.06)	2.54 (.06)	2.47 (.07)	2.50 (.06)
Total	2.65 (.10)	3.01 (.10)	2.83 (.09)	2.75 (.06)	2.99 (.06)	2.87 (.06)	2.60 (.06)	2.47 (.06)	2.53 (.06)