THE EFFECTS OF TARGETS' SHYNESS ON PERCEPTIONS OF THEIR INTELLIGENCE

by

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Abstract

The effects of a target's shyness on others' perceptions of his/her intelligence were investigated. Subjects met weekly for 7 weeks in discussions groups of 4 or 5 members. Subjects rated all group members, including self, on intelligence, creativity, and wisdom (collectly "mental abilities"). Despite no actual relation between measured IQ and shyness, shy subjects were judged both by themselves and by peers to be lower in mental abilities. This relation was stronger for the state shyness measure (i.e. self-rating of shyness in the group context) than for the dispositional measure of shyness. Thus the specific behavior of the target in the group appeared to determine the evaluation of ability. Quantity of participation in the group discussion appeared to be the primary link between shyness and perceived intelligence, for both self and peer ratings. It is also possible that shy subjects' negative affect in the social situation prevented them from performing at their intellectual capacity and thus lower ratings could be an accurate reflection of performance in the specific situation. Self presentation strategies are another possible explanation.

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The Effects of Targets' Shyness on Perceptions of Their Intelligence

An individual's life course is a function not only of his/her personality, but also of the way in which that individual is perceived by others. This relation is even more complex, since others' perceptions are, in turn, influenced by various aspects of the target's personality. Certain traits may help observers more accurately assess a target person, but other traits may distort the picture that others form of the target. This thesis examines the possibility that the character of shy people may be misperceived, particularly with regard to their mental abilities.

Perceptions of Intelligence

Intelligence is one important determinant of an individual's life course. It is also a dimension of personality about which others form judgments. These judgments may have an impact on the individual's success in educational and vocational, as well as social settings. Although objective intelligence¹ has been studied extensively, little attention has been given to perceptions of intelligence (for a review, see Paulhus, 1993).

One notable exception is the extensive research by Robert Sternberg and his colleagues. As part of his comprehensive examination of mental abilities, Sternberg has studied "implicit intelligence", that is, subjective conceptions of intelligence in some detail (Sternberg, 1988, chapter 9; Sternberg, Conway, Ketron, & Bernstein, 1981). One clear finding is that subjects

make a clear distinction between intelligence and two other mental abilities--creativity and wisdom.

In one study, Sternberg (1988) asked a large sample of judges to nominate behaviors characteristic of intelligence, creativity, and wisdom; next, these characteristics were rated for prototypicality by other subjects. For intelligence, the six basic qualities were problem-solving, verbal ability, intellectual integration, goal orientation, contextual intelligence, and rapid thinking. For wisdom, the top qualities included sagacity, good judgment, and learning from experience. For creativity, the top qualities included unconventional ideas, aesthetic imagination, and flexibility. A number of related studies are reviewed in Sternberg's (1988) book.

A few other studies have explored perceptions of intelligence within specific contexts. Rossman and Gollob (1975) were interested in discriminating between perceptions of intelligence and creativity. They found that the availability of more diverse information increased the tendency of subjects to discriminate between judgments of creativity and intelligence. Subjects were asked to rate art students' creativity and intelligence based on three types of profile information: ability information only, personality information only, biographical information only, and finally, all three types of information.

Results indicated that subjects defined creativity and intelligence differently but that a variety of types of information was required before subjects discriminated between the two in forming judgments of these traits. Ability cues were

more important in judging intelligence whereas personality cues were more important in evaluating creativity.

Another study explored the relation between criticality and judgments of intelligence (Amabile, 1983). Results indicated that book reviewers who gave negative reviews were perceived as more intelligent than positive reviewers. This result held even when the positive reviews were independently judged as better in quality and more forceful.

Accuracy of Intelligence Perceptions

The basic issue of accuracy in perceptions of intelligence has received surprisingly little attention: that is, are individuals able to accurately estimate the intelligence of others? And if so, what cues or traits do observers use in forming accurate judgments? Perhaps, this literature has been limited by the necessity of administering an objective measure of intelligence.

Although small, the relevant research literature is scattered across seven decades. In 1916, Pintner found a correlation of .28 between objective and judged intelligence. Some time later, Brunswik (1956) reported a comparable correlation of .32.

Less successful was a later study of fifth, seventh, and ninth graders of both sexes by Bailey and Hatch (1979). They found that, of the six groups, only the seventh grade boys accurately estimated the intelligence of a friend. Unfortunately, the ability of these researchers to find significant correlations was constrained by small sample sizes. The two accuracy studies most relevant to the present study are very recent (Paulhus, 1992; Borkenau, 1993); therefore I will present these in some detail.

Paulhus (1992). This study examined the ways in which judgments of competence--that is intelligence and performance-are affected by the target's actual ability and by his/her personality. Subjects completed the NEO Five Factor Inventory (McCrae and Costa, 1987). The Big Five personality traits are a well-validated set of broad dimensions of personality which subsume numerous more specific traits (Norman, 1963; Costa & McCrae, 1989; McCrae and Costa, 1987). As labeled by McCrae and Costa (1987) the Big Five are Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness to Experience.

Subjects participated in small discussion groups which met on a weekly basis. After several meetings, each member of the group rated all members, including self, on several measures of competence. Ratings of intelligence, creativity, and wisdom were obtained; these three together comprised overall mental ability. Performance was assessed by ratings on contribution to group Specific abilities were also rated, i.e. problem-solving, qoals. verbal skill, social competence, everyday intelligence, and topic expertise. Results indicated that all of the above criteria correlated significantly with an objective measure of intelligence. Only three of the Big Five, Extraversion, Conscientiousness, and Openness to Experience, had significant correlations with any of the competence ratings. Overall, Openness was the trait most related to raters' perceptions of global and specific abilities while Extraversion and

Conscientiousness correlated highest with perceived performance. Regression analyses revealed that Openness was the best overall predictor of perceived intelligence. IQ scores did not contribute to perceived intelligence independently of Openness. In contrast, Extraversion and Conscientiousness were the best predictors of perceived performance.

Borkenau, 1993. This study followed the lens-model format (see Brunswik, 1956) and compared four types of measures on the same 100 targets. First, questionnaire measures (including IQ) were collected from the targets. Next, all targets were rated by several panels of judges who were unacquainted with the targets. Judges watched a 90 second videotape of each target as s/he walked across a room, sat down, and read a weather report. One group of judges watched the video with the sound on, other judges watched with the sound off. A third group of judges rated targets' observable behavior and attributes. Only judges in the sound film condition accurately estimated targets' intelligence $(\underline{r} = .38, \underline{p} < .01)$. Further analysis indicated that only the verbal subscales of the IQ test were significantly related to judges' ratings ($\underline{r} = .43$, $\underline{p} < .01$). Moreover, a multiple regression analysis showed that only the verbal subscales of the IQ test contributed to the judges' perceptions of intelligence; the non-verbal scales made no independent contribution. Thus it seems that accuracy in perceptions of intelligence was related to auditory cues and that only verbal intelligence was picked up.

Finally, Borkenau correlated ratings of observable attributes by the third group of judges with objective intelligence. Three visual attributes correlated significantly with an objective measure of intelligence: self-assured expression was positively correlated, showy dress and stiff walking were both negatively correlated. Six auditory attributes were related to actual intelligence: easy to understand, standard language, and effortful reading were positively related whereas halting speech, unpleasant voice, and hectic speech were negatively correlated with intelligence. Further analyses of the auditory cues revealed that all were significantly related to verbal intelligence only.

Judges in the sound film condition used five of the six auditory cues which were correlated with actual intelligence. Judges' ratings of intelligence in both film conditions correlated with a number of visual attributes which were not in fact related to actual intelligence, this was especially the case among the silent film judges. It appears that judges in both film conditions shared illusory stereotypes about the relationship between visual characteristics and intelligence.

Based on the Paulhus and Borkenau studies, it seems that judges are fairly accurate ($\underline{r} = .30$ to .40) in their evaluations of intelligence. Moreover, these perceptions are related to the specific traits of Extraversion, Conscientiousness, and Openness. The accuracy of judgments of intelligence and the personality and behavioral predictors appears to vary with the kind of intelligence being evaluated.

Shyness as a Dimension of Personality

The present study examines the effects of one particular personality trait, shyness, on perceptions of intelligence. Buss's (1980) definition of shyness as tension, ackwardness, and

behavioral inhibition in social interactions (Buss, 1980, pp. 124, 184-5) is similar to that of other major writers on the topic (e.g. Cheek, 1989; Leary, 1986; Zimbardo, 1977; Crozier, 1979).

Shyness appears to be a fundamental dimension of personality with enormous and far-reaching implications. In a factor analysis of twenty dimensions of personality, shyness emerged as the first factor (Browne & Howarth, 1977). Moreover, there is strong evidence for a genetic basis for shyness (see Plomin & Daniels, 1986 for a review of relevant studies). Shyness is manifested by remarkably similar behaviors in young children and adults (Asendorpf, 1992).

Shyness is related to self concept, e.g. low self esteem (Cheek & Buss, 1981) and has been found to correlate with a variety of variables, e.g. loneliness (Jones & Carpenter, 1986), fearfulness (Jones, Briggs, & Smith, 1986), guilt and anxiety (Fehr & Stamps, 1979), depression (Traub, 1983), and conformity (Santee & Maslach, 1982). It has also been shown to be inversely related to dating frequency and satisfaction, number of friends, and level of self disclosure to friends (Jones & Briggs, 1984).

Shyness has far-reaching implications beyond the immediate social situation. Phillips and Bruch (1988), for example, found that shy students seek less information about possible careers and are less decisive about career choices. The effects of shyness appear to be lifelong. In a longitudinal study of shy individuals born in the 1920's (Caspi, Elder, & Bem, 1988), shy male subjects married later, had less stable marriages, and became parents later than nonshy men. They were also delayed in settling into a career which limited their overall career achievements. The study also found that shy women suffered fewer long-term consequences of their shyness, although they were more likely than their peers to adopt the traditional roles of wife and mother. It may be that shy women in later cohorts would experience consequences more similar to the males in this study.

Shyness is thus a basic dimension of personality which affects the individual's self concept, relationships, roles, and career success; its influence appears to be lifelong.

Shyness, Extraversion, and Neuroticism

One of the ways in which shyness may be understood is in relation to two of the Big Five personality traits: Extraversion and Neuroticism. Various studies have found significant negative correlations between shyness and Extraversion. Using the Eysenck Personality Inventory (Eysenck & Eysenck, 1968), Jones, Briggs and Smith (1986) obtained correlations for five shyness scales. Correlations between shyness and Extraversion ranged from -.29 to -.45. Pilkonis (1977a) obtained correlations between E and shyness of -.43. In a study designed to develop adjective markers for the Big Five, Goldberg (1992) found a correlation of -.73 between "shy" and E for both peer and self rating.

Correlations between shyness scales and Neuroticism obtained by Jones, Briggs, and Smith (1986) range from .32 to .43. Pilkonis (1977a) reported a correlation of .28 between N and shyness.

Various researchers have sought to explicate the nature of the relation between E, N, and shyness. Using items from Guilford's (1940) social introversion factor, Eysenck (1956)

found that one group of items correlated with Extraversion but not with Neuroticism, while another group of items correlated with N but not with E. He concluded that there were two types of shyness: introverted shyness, which is a lack of interest in other people, and neurotic shyness, which involves fear and anxiety in social interactions. Nonetheless, most researchers prefer to use the term "shyness" to mean some combination of the two.

A factor analytic study of four shyness scales (Briggs, 1988) found that all four scales (and the majority of items) correlated significantly and approximately equally with Introversion and Neuroticism. Briggs concluded that shyness is negatively related to the sociability aspect of Extraversion and the self confidence dimension of Neuroticism but is conceptually distinct from both Extraversion and Neuroticism since shyness is a primary trait and thus more pure than E or N (See also Howarth, 1986).

Others have explored the relation between shyness and a component of Extraversion, namely, sociability. Correlations range from -.30 to -.47 (Cheek & Buss, 1981; Bruch, Gorsky, Collins, & Berger, 1989; Lennox, 1984). Cheek and Buss (1981) distinguish between shyness and sociability and conclude that shyness is closer to psychological insecurity (e.g. Ainsworth & Ainsworth, 1958; Maslow, 1942) because of its high correlation with self esteem (-.51).

Shyness thus appears to be related conceptually and statistically to both Introversion and Neuroticism (see Crozier, 1979). To our knowledge, however, no writer has specifically

defined shyness as the combination of Introversion and Neuroticism.

Perceptions of the Shy

Shyness is generally operationalized as the subjective experience of the actor, e.g. in questionnaires. However, it is associated with specific behaviors during social interactions which sometimes make it visible. During social interactions, shy individuals wait longer before they begin speaking, speak less frequently, and are silent a higher percentage of the time than nonshy individuals; they also make less eye contact and engage in more nervous self manipulation gestures compared to non-shy subjects (Conger & Farrell, 1981; Pilkonis, 1977b; Cheek & Buss, 1981). Observers judged shy individuals to be less friendly, less assertive, less relaxed and more shy when compared to nonshy individuals (Pilkonis, 1977b). Observers correctly labeled shy subjects as shy 67% of the time, using self-reported shyness as the criterion (Pilkonis, 1977b).

Shyness and Intelligence

Few studies have examined the relation between intellectual performance and shyness. Although a few scattered studies have found a small relation between shyness, Extraversion, or Neuroticism and some type of intelligence or achievement-related performance, there is little basis for supposing a general relation between shyness and overall intelligence.

Researchers found no relation between shyness and SAT scores (Gough & Thorne, 1986), or between shyness and GPA (Maroldo, 1986). Hedrick (1972) found no relation between shyness and intelligence or performance on achievement tests among children. Although Cheek and Stahl (1986) found a negative correlation between shyness and creativity (operationalized by writing poetry), they attributed this to cognitive interference or worry about negative evaluation. Traub (1983) found a small positive correlation between shyness and grade point average, whereas another study found no relation between shyness and GPA (Mamrus, O'Connor, & Cheek, 1983). Southworth (1989) found a small positive correlation between extraversion and math performance among fourth graders. In one study, introverts tended to outperform extraverts on the verbal component of the WAIS whereas extraverts tended to receive higher scores on the performance scale. However, there were no differences on overall intelligence (Robinson, 1985). A study of wisdom found small positive correlations with Introversion (Maciel, Staudinger, Smith & Baltes, 1991).

Neuroticism has also been shown to be associated with intellectual performance. Among fourth grade children, Neuroticism was negative correlated with grades (Southworth, 1989). In a study employing an IQ test with progressively more difficult sets, Neurotics outperformed Stables on easier sets while the pattern reversed for more difficult sets (Mohan & Kumar, 1979). In a study of the Big Five and course grades, neither E nor N were related to midterm exam performance or overall course grade (Dollinger, & Orf, 1991).

The results of these studies indicates that overall there is little, if any, relation between shyness and IQ.

Shyness and the Perception of Intelligence

Little research has addressed the question of how a target's shyness influences the perceptions that others have of his/her intellectual abilities. One study found that trained interviewers of shy subjects rated shy females as less intellectually competent than their nonshy counterparts; the relationship did not reach significance for shy male subjects (Gough & Thorne, 1986). Another study asked raters to judge targets who were observed talking about themselves on videotape; the shyness of the target was inversely related to ratings of talent (Jones, Cavert, & Indart, 1983). Jones, Briggs, and Smith (1986) found no relation between shyness and ratings of intelligence by friends and relatives.

In the same study, Jones and his colleagues found that shyness negatively correlated with self-perceived intelligence (\underline{r} = -.17, p. < .01). Zimbardo's study of shyness (1977) included an investigation of the relation between shyness and self perceptions of intelligence among junior high girls and college women. In both age groups, shy subjects considered themselves less intelligent than nonshy subjects. Examining the relation between shyness and various dimensions of self esteem, Cheek, Melchior, and Carpentieri (1986) found that shyness was significantly related to academic self esteem for women (\underline{r} =-.39, p. < .01); the relation did not achieve significance for men, although results were in the same direction.

Overview of Present Study

The present study examines the role that the target's shyness plays in determining observers' perceptions of the

intelligence of the target in the context of small discussion groups. Groups met weekly for a total of seven weeks. Prior to assignment to groups, subjects completed an intelligence test and a personality inventory, which included two shyness questionnaires. All group members rated each other and themselves on various mental abilities and on shyness. Ratings of time talking during group meetings were also obtained. <u>Hypotheses</u>

<u>Hypothesis 1:</u> The three measures of shyness (i.e., questionnaire, self ratings, and peer ratings) will converge. This hypothesis is based on the assumption that shyness has construct validity (see Wiggins, 1973).

Hypothesis 2: There will be no relation between shyness and objective intelligence. Previous studies cited above have found either no relation between shyness and intelligence (Gough & Thorne, 1986; Maroldo, 1986) or small correlations with specific components of intelligence (Traub, 1983; Cheek & Stahl, 1986). Moreover, the correlations in the Traub study and in the Cheek and Stahl study were in opposite directions. Although there is some basis for an association between Introversion and verbal intelligence and between Extraversion and performance or quantitative ability, (Southworth, 1989; Robinson, 1985) the results of studies specific to shyness indicate that the association is not likely to extend to shyness.

<u>Hypothesis 3</u>: Shy individuals will be perceived as lower in mental abilities compared to nonshy individuals. Studies by Gough and Thorne (1986) and Jones, Cavert, and Indart (1983) cited above found that shy individuals were judged as less intellectually competent and less talented.

In addition to support in the literature, there is a strong rational basis for this hypothesis. It seems reasonable that most persons would expect intelligent individuals to participate in intellectual discussions. Since shy individuals are often reticent to speak, their silence may be misattributed to lack of ability.

Hypothesis 4: Perceived ability will be more strongly associated with self ratings of shyness, than with questionnaire shyness scores. The rationale behind this hypothesis is situational specificity. The shyness questionnaires tapped a global self-concept of shyness and thus assess shyness as a trait. The self ratings of shyness, in which the individual ranked him/herself in relation to other group members, reflect the direct influence of the specific context. In completing the shyness questionnaires the individual could use a variety of past information about the self to which peers had no access. When rating self on shyness in the specific context of the discussion groups, the target presumably used many of the same behavioral cues that peer raters employed.

Method

<u>Subjects</u>

Subjects were 48 students, 20 male and 28 female, enrolled in a third year psychology course at a large university.

Measures

Self-report questionnaires. To measure the Big Five, the 60-item NEO Five Factor Inventory (NEO-FFI) was used; the NEO-FFI was developed by P. Costa and R. McCrae (1989; McCrae & Costa, 1987); its validity and reliability have been well established (McCrae & Costa, 1987; Costa & McCrae, 1989). The Revised Shyness Scale (Cheek, 1983) is a 13 item revision of the Shyness Scales (Cheek & Buss, 1981) and was devised to assess both the behavioral and subjective aspects of shyness. Subjects also completed all subscales of the Self-Consciousness Scale (Fenigstein, Scheier, and Buss, 1975), i.e. public selfconsciousness, private self-consciousness, and social anxiety. Subjects completed both the Cheek Scale and the Social Anxiety Scale using 7 point scales.

A modified version of the Wonderlic Intelligence Test (1977) was administered as an objective measure of intelligence. The Wonderlic is a timed test which correlates strongly with the Stanford-Binet, a well-established intelligence test. The modifications of the Wonderlic were intended to simplify wording, eliminate antiquated language, and clarify response scales.

Peer and self ratings. In weeks four and seven students rated group members on the single scale shy/nonshy. Use of this single item has been found to be a valid indicator of shyness (Pilkonis, 1977a). Ratings of intelligence were obtained in weeks two and seven and included the following scales: creative, intelligent, wise, verbally skilled, social competence, problem solving, everyday intelligence, overall mental ability. These terms were chosen to represent Sternberg's (1988) tripartite theory of intelligence. In addition, in week seven, subjects were asked to consider the individuals to whom s/he had given lower intelligence ratings and to indicate, in free response form, the reason for the low ratings. In the final week, ratings of amount of time talking in the group were also obtained, this scale was anchored by the phrases, "talks little" and "talks a lot".

Procedure

This study was part of a larger project which examined perceptions of a variety of personality traits in a small group context. During the first two weeks of class and prior to being assigned to groups, students completed a number of self-report questionnaires, four of which are relevant to this study.

During the third week of the course, students were organized into ten groups; eight of the groups had five members, the remaining two groups were composed of four members. Groups were designed to be heterogeneous with regard to gender and ethnicity. The groups met weekly for 20-30 minutes during classtime for seven consecutive weeks. Students were requested to avoid interaction with fellow group members outside of official meetings. No instructions were given regarding leadership within the groups, but students were informed that each individual was to participate in each meeting. Each week a discussion topic or task was assigned. Topics were selected to encourage interaction with class readings and lecture topics and to provide opportunity for a variety of personality dimensions to be brought into play. Group assignments were, in chronological order: descriptions of family's/friend's personality, verbal and quantitative problem-solving, positive and negative qualities of the self, worries and concerns, creative and absorbing experiences, social issues, and Allport's characteristics of well-adjusted persons.

After completion of each group meeting, subjects were given a rating sheet in an envelope and asked to return the completed sheet, sealed in the envelope, at the next class session. The rating sheets asked the subject to rate each member of his/her discussion group, including self, on a variety of adjectives using a 15 point scale. No two members were to be assigned the same number on any one scale.

Results

Personality Questionnaires

The descriptive statistics for the self-report scales are given in Table 1. Means for all of the Big Five factors are similar to those reported in the NEO-FFI manual (Costa & McCrae, 1989).²

Insert Table 1 about here

Table 2 provides the intercorrelations among the selfreport questionnaires. Among the Big Five, Neuroticism correlated significantly and negatively with Extraversion, Conscientiousness, and Openness. The only other significant Big Five correlation was between Extraversion and Conscientiousness. These results are similar to those reported by Paulhus and Bruce (1992), who used a similar design involving discussion groups. Insert Table 2 about here

Note that the two measures of shyness, the Cheek Scale (1983), and the Social Anxiety Scale (Fenigstein, Scheier, & Buss, 1975) correlate similarly with other variables: with Extraversion correlations were -.52 (p < .01) and -.56 (p < .01), with Neuroticism .58 (p < .01) and .59 (p < .01), and with Conscientiousness -.26 (p < .05) and -.30 (p < .05) respectively. This consistent pattern of correlations and the high correlation (r = .85, p < .01) between the two shy measures suggest that both scales assessed the same construct. For this reason, the two scales were standardized and combined for subsequent analyses. Henceforth, the combined measure will be called "questionnaire shyness".

The correlations of questionnaire shyness with Extraversion and Neuroticism were consistent with previous studies, although correlations with Neuroticism were somewhat higher than has previously been reported (Pilkonis, 1977b; Crozier, 1979; Jones, Briggs, & Smith, 1986; Goldberg, 1992; Lawrence & Bennett, 1992). Objective Intelligence: Wonderlic IQ Test

Also included in Tables 1 and 2 are results for the Wonderlic IQ test. The only questionnaire variable that correlated significantly with IQ was Openness ($\underline{r} = .50$, $\underline{p} < .01$). This finding replicates Paulhus (1993).

As expected, questionnaire shyness did not correlate with the IQ test ($\underline{r} = -.11$, n. s.). Thus Hypothesis 2 was supported,

that is, there was no relation between objective intelligence and shyness.

To follow up this analysis, we rationally divided the Wonderlic items to yield separate verbal and quantitative scores. Of 50 questions, 15 were clearly quantitative; the other 35 were classified as verbal. Logic questions were included in the verbal category since they involved verbal reasoning. Neither component correlated significantly with questionnaire shyness. <u>Self Ratings</u>

Given that subjects rated all members of the group, including themselves, self-perceptions in the context of the group meetings (i.e., self-ratings) can be compared to more global self-perceptions (i.e. questionnaires). In addition, self and peer judgments can be compared. Means and standard deviations for self ratings are given in Table 3. Note that the mean ratings for mental abilities tend to be above 10 on the 15point scales.

Insert Table 3 about here

Intercorrelations of self ratings are listed in Table 4. Recall that the three components of mental abilities-intelligence, creativity, and wisdom--were rated in weeks 2 and 7. Ratings of each component of mental abilities were significantly intercorrelated across the two points in time. Intercorrelations among the three components were slightly stronger at week 2 than at week 7. Overall Mental Ability is the aggregate of all six ratings. Insert Table 4 about here

Total self-rated mental ability was significantly and negatively related to overall self ratings of shyness ($\underline{r} = -.40$, $\underline{p} < .01$). This relation increased substantially over time. Early self-ratings of shyness and ability were marginally related on the dimensions of creativity ($\underline{r} = -.24$, $\underline{p} < .10$), and wisdom ($\underline{r} = -.24$, $\underline{p} < .10$). The final week's ratings of shyness and ability were significant for all three dimensions: intelligence ($\underline{r} = -.30$, $\underline{p} < .05$), creativity ($\underline{r} = -.43$, $\underline{p} < .01$), and wisdom ($\underline{r} = -.43$, $\underline{p} < .01$). While self perceptions of the shy were not the focus of the present study, this result does support the findings of previous research that shyness is associated with low self esteem in the academic domain (Cheek, Melchior, and Carpentieri, 1986; Zimbardo, 1977).

The correlation between self rated talk time, which was assessed in week 7, and overall shyness was extremely high ($\underline{r} =$ -.76, $\underline{p} < .01$); talk time was also associated with self ratings of ability ($\underline{r} = .58$, $\underline{p} < .01$).

Peer Ratings

Table 5 lists the descriptive statistics for peer ratings. Note that the means ratings for mental abilities were all rather positive--above 10 on the 15 point scales. In contrast, the shyness ratings were very close to the midpoint, that is, 7.50.

Insert Table 5 about here

Intercorrelations of peer ratings are provided in Table 6. Peer ratings of intelligence, creativity, and wisdom were highly intercorrelated in both week 2 and week 7. Unlike self ratings, peer ratings were more highly intercorrelated in week 7.

Insert Table 6 about here

Total peer ratings of shyness and peer-rated Mental Abilities very highly correlated, $\underline{r} = -.72$ ($\underline{p} < .01$). By week 7, this relation was significant for each of the three ability components. Thus, those who were perceived to be shy were also judged to be lower in intelligence, creativity, and wisdom.

Total shyness rating and talk time correlated very strongly $(\underline{r} = -.94, \underline{p} < .01)$, indicating that raters' perceptions of talk time were virtually interchangeable with their perceptions of shyness. Talk time was also strongly associated with perceived ability ($\underline{r} = .73, \underline{p} < .01$); judges apparently also used talk time as the primary criterion for assessing mental ability. Intercorrelations of Questionnaires and Ratings

Table 7 gives the intercorrelations among questionnaire shyness, objective mental ability, and self and peer ratings of shyness and ability. Analyses involving mental ability ratings were conducted using the overall mental abilities correlations (i.e. the aggregate of all three components over both points in time). Given high correlations between shyness ratings at weeks 4 and 7, we combined the two ratings for a total shyness rating in subsequent analyses. Insert Table 7 about here

Note from Table 7 that the three indicators of shyness converge significantly, thereby supporting Hypothesis 1. First, questionnaire shyness correlated .59 (p < .01) with self-rated shyness. Recall that the questionnaires assess trait shyness while the self ratings can be regarded as a state measure of shyness given that shyness was evaluated in the specific context of the group meetings. The moderately strong correlation between questionnaire and self-rated shyness indicates that there is some consistency between trait and state shyness, yet the measures are not interchangeable.

There was particularly strong agreement about who was shy during the meetings: Self and peer ratings of shyness correlated .69 (p < .01). Peer raters also accurately picked up on trait shyness although to a lesser degree ($\underline{r} = .40$, $\underline{p} < .01$). In sum, this convergence of three indicators of shyness supports the Hypothesis 1, in particular, and, more generally supports the validity of the construct of shyness.

Note also from Table 7 that the shyness measures all correlate negatively with the ability ratings. Questionnaire shyness correlated -.46 (p < .01) with self-rated ability and -.24 (p < .05, one-tailed test) with peer rated ability. Trait shy individuals not only perceived themselves as less intelligent than nonshy individuals but were also judged as less intelligent by their peers, supporting Hypothesis 3. However, the correlation between self ratings of shyness and peer rated

intelligence ($\underline{r} = -.53$, $\underline{p} < .01$) was even stronger. The difference was marginally significant ($\underline{t} = 1.38$, $\underline{p} < .08$). This supports Hypothesis 4--that perceived intelligence will be more strongly associated with self rated shyness than with questionnaire shyness.

Individuals who were judged by peers to be shy were also judged to be lower in mental ability ($\underline{r} = -.72$, $\underline{p} < .01$). Recall that the correlation between self-rated shyness and peer-rated mental ability was -.53 ($\underline{p} < .01$) We were interested in whether actual shyness as experienced in the situation (i.e. self-rated shyness) or perceived shyness was more important in influencing judgments of ability. Using the Spearman-Brown formula, we compared the correlation of self-rated shyness and peer-rated ability to the correlation of peer-rated shyness and peer-rated ability; we found that the strength of the two correlations were similar.

Not only were shy individuals rated less intelligent by peers, subjects who were lower in intelligence were also perceived as shy, i.e. the correlation between objective ability and peer-rated shyness was -.31, ($\underline{p} < .05$).

The correlation between self and peer rated ability was .28, (p < .05). Thus there was some agreement on judgments of intelligence during the meetings. The level of agreement, however, was substantially less than that for self- and other-rated shyness (.69)

Subjects also showed some accuracy judging their own and their group members' mental ability. Both self ratings and peer ratings of ability significantly correlated with objective IQ (<u>r</u> = .37, $\underline{p} < .01$ and $\underline{r} = .27$, $\underline{p} < .05$, respectively); note that these results were similar to those obtained by Paulhus (1992) and Borkenau (1993).

We suspected that the judges' ability to estimate the targets' objective ability was constrained by the discussion group format: That is, only the targets' verbal abilities are evident. To pursue this possibility, we re-calculated the correlations separately for the verbal and quantitative subscales (see above). When the verbal IQ was used, the correlation with peer-rated ability increased from .27 to .42. Given the discussion group format, we would argue that the latter figure is a more fair estimate of judges' ability to estimate others' intelligence.

<u>Gender Effects</u>

The possibility of gender effects was examined in several ways. We looked at the correlation between shyness and objective intelligence separately for male and female subjects. We also examined whether the target's gender affected abilities ratings or shyness ratings, considering both peer and self ratings, and trait and state shyness. We then tested for gender effects on accuracy of intelligence ratings, agreement between peers and target on shyness and intelligence ratings, and relation between peer-perceived shyness and peer-rated intelligence. Finally, we compared men and women subjects' correlations between intelligence and perceived shyness.

We found no significant gender effects for any of these variables. Given Gough and Thorne's (1986) finding that shy women were judged more harshly on intellectual competence than

were men, our failure to find similar results is somewhat surprising. Nevertheless, given our small sample size this failure to find a similar gender effect must be interpreted cautiously.

Explanations for Intelligence Ratings

Recall that, at week 7, subjects were asked to consider the individuals to whom they had given lower intelligence ratings and to provide explanations for these low ratings. Altogether, 82 reasons were listed. In a content analysis, two judges classified these explanations into one of five categories: quantity of participation, quality of participation, poor communication skills, lack of motivation, and other. The fifth category consisted of characteristics that did not fit into any of the other categories.

Judges agreed on the classification of 66 of the 82 explanations or 80%. Of these 66 explanations, 24 were classified as quantity of participation (e.g. "quiet"), 23 referred to quality of participation and included negative evaluations of content of the target's participation (e.g. "lack of original ideas") or the style of participation (e.g. "responses were quick and choppy"). Seven of the explanations fell in the poor communication skills category, five referred to the target's lack of motivation (e.g. "they were unenthusiastic") and five described other characteristics of the target (e.g. "narrow-mindedness").

Discussion

Despite the lack of relation between actual IQ and shyness, shy targets were rated lower in mental abilities compared to nonshy targets. This relation held true whether the ability ratings were made by others or by the targets themselves. Moreover, the relation was similar for all three components of mental ability and, by week 7, all three were significant in both self and peer ratings. Therefore, to simplify the discussion, we will refer only to the results with overall mental abilities (i.e. the mean of the three components across two points in time).

Self-Perceptions

Although there was no correlation between shyness and objective intelligence, there was a clear negative relation between shyness and self-perceived mental abilities: The correlations were significant both for questionnaire shyness and self-ratings of shyness. The effect on self-perceived ability may be the result of shy subjects being overly negative in their This explanation is consistent with the wellself evaluations. documented relation between shyness and low self esteem (e.g. Cheek & Buss, 1981; Jones, Briggs, & Smith, 1986) and, more specifically, with the application of this relation to the academic domain (Cheek, Melchior, & Carpentieri, 1986, Zimbardo, In the depression literature, Beck (1967) has argued 1977). specifically that depressed individuals negatively distort their self-perceptions. Shy subjects' self perceptions may well be negatively distorted in a similar manner.

Alternatively, the correlation between shyness and selfrated intelligence could be the result of nonshy individuals being overly positive about their own abilities. A substantial literature supports the notion that most individuals employ a

variety of self-serving illusions (for reviews see Taylor and Brown, 1988; and Greenwald, 1980). However, certain individuals, namely, those who are depressed or low in self esteem, have been shown in some studies to refrain from the typical self-serving illusions (e.g. Ruehlman, West, & Pasahow, 1985). Perhaps our shy subjects were realistic in self-ratings of intelligence in a process similar to depressive realism (see Alloy & Abramson, 1988). Given that we have no absolute metric for comparing perceived and objective intelligence, we cannot answer this question with the present dataset.

Other-Perceptions

Our primary interest, however, was the perceptions of others. As hypothesized, we found that shy targets were judged by others to be less intelligent. The strength of this finding varied depending on whether the variable is trait or state shyness.

The high correlation between the trait and state shyness (.59) indicates that they overlap substantially, yet are not interchangeable. Perhaps some trait-shy individuals were relatively at ease in the groups. For example, a highly intelligent shy individual could have labeled the group discussions as an "academic" rather than a "social" situation and thus felt competent and acted accordingly. Conversely, other individuals who do not normally consider themselves shy (e.g. those who are doubtful about their intellectual abilities) may have acted shy in this context. However, given that there was no relation between objective IQ and self-rated shyness the state shy are not simply equivalent to those lower in intelligence.

The correlation between trait-shyness and peer-rated ability just reached significance (-.24) whereas the correlation for state shyness was much stronger (-.53). Had the trait shy correlation been the stronger of the two, it would have seemed reasonable that a more global and pervasive self schema of the shy had been communicated to other group members. However, because state shyness was more strongly associated with peerrated intelligence, it appears that specific behaviors within the context of the group situation accounted for peer judgments.

Talk time. What behavior in the groups could account for the relation between state shyness and lower abilities ratings? We suspect that the amount of time the individual spoke in the group was the primary cue. This conclusion is supported by the very high correlation (-.76) between self-rated shyness and selfrated talk time. Recall that talk time was a rating obtained in the final group meeting anchored by the phrases "talks little" and "talks a lot". These two ratings may be virtually equivalent, given that this correlation approaches the reliabilities of the individual measures. Peer ratings of intelligence also correlated strongly (.73) with peer-rated talk time. Reasonably enough, raters assumed that those who had something intelligent to say spoke up. In general this assumption was accurate since the correlation between objective IQ and talk time was .56. The persons to whom this link between talk time and ability ratings proved disadvantageous were the shy, who were just as intelligent as those who spoke more, but were less able to show it.

At least two kinds of group members presumably would have kept their level of participation to a minimum: the shy, because of anxiety due to the social context, and the less intelligent, because they were intimidated by the academic context or because they could not think of anything to say. Inability to distinguish between these two motivations for minimal participation could thus account for the lower ability ratings given to shy individuals. Talk time could thus also explain the significant correlation (-.31) between objective intelligence and peer-rated shyness. In sum, those who participated less were judged to be less intelligent. Subjects who received lower IQ scores did, in fact, participate less and were judged to be shy.

Not only did subjects use talk time as a cue for intelligence, they were aware that they did so and reported this in their explanations for low intelligence ratings. Recall that in the content analysis of these explanations the largest category was quantity of participation with 36 percent of the coded explanations falling in this category. Talking thus appears to be the major link between shyness and perceived intelligence. In passing it should be noted that targets' self ratings showed the same connection between talk time and intelligence ($\underline{r} = .58$). Perhaps subjects even used talk-time as a cue to their own intelligence.

Because no ratings were obtained for specific behaviors other than talk time, we cannot ascertain whether raters used other behaviors in addition to amount of participation as cues for rating both intelligence and shyness. However, the content analysis of explanations for intelligence ratings hints at

additional links between intelligence ratings and shyness. Several explanations of low ability ratings in the quality of participation category described anxiety-related behaviors frequently associated with shyness: "nervous, concerned with what we might have thought about her responses", "little personal comments", "she wasn't willing to assert herself", and one subject simply wrote "shy" to explain low intelligence ratings. Thus, behaviors typically associated with shyness, i.e. anxiety, fear of negative evaluation (e.g. Smith & Sarason, 1974), and lack of self disclosure (Schlenker & Leary, 1985), as well as the label "shy" itself were used explicity as indicators of lower intelligence. In sum, talk time and possibly other behavioral cues may have misled raters about the intelligence of shy subjects.

Affective disruption. Another possible interpretation of the lower intelligence ratings for shy subjects assumes that rater perceptions were accurate assessments of what they observed. Though shy subjects were objectively as intelligent as nonshy subjects as assessed by the IQ test, it is possible that their actual performance during the group discussions was poor because of affective disruption.

Research has shown that positive mood enhances intellectual functioning by increasing the number of unusual associations-thus enhancing creativity (Isen, Johnson, Mertz, & Robinson, 1985)--and by facilitating the retrieval of positive information (Isen, Shalker, Clark, & Karp, 1978). This would give an advantage to group members who found the group interaction pleasant--namely, nonshy subjects. Although the effects of negative mood on intellectual performance are less clearcut (for a review see Isen, 1984) some have found that negative mood at times facilitates recall of negative information (Teasdale & Russell, 1983). Thus, shy individuals who were uncomfortable in the group setting may have had more difficulty retrieving positive answers, for example, when asked to describe creative experiences she or he has had. Another line of research suggests that if shy subjects found the social interaction in the group to be anxiety-provoking, the anxiety may have disrupted their performance by interfering with their ability to attend (Hartman, 1983).

Self presentation. Another possible explanation for the difference in ability ratings for shy and nonshy targets is that the two groups have a different self presentation style. This possibility is supported by the finding that subjects low in social anxiety made more positive self presentations than did socially anxious subjects when led to believe they would have future interactions with the same individuals (Greenberg, Pysczynski, and Stine, 1985). This finding is consistent with Arkin, Lake, and Baumgardner's (1986) suggestion that the shy use a protective as opposed to an acquisitional self presentational The finding is also consistent with Carver and Scheier's stvle. (1986) self-regulation approach to shyness and Leary's (1986) self-presentation theory. Shy group members may have refrained from trying to make a positive impression on group members because they assumed that such attempts would make them look worse than would being quiet. Thus they participated less and hence were assumed to be less intelligent.

Implications of the Study

The findings of the study suggest that shy individuals' intellectual abilities may be underestimated in situations which involve social interactions. The potential implications of this are far-reaching. In classes which require participation, shy students may be at a distinct disadvantage in the evaluations they receive. In social encounters, too, shy individuals may a poor impression of their intelligence: Hence an intelligent but shy person would have difficulty making friends with persons who would make a good intellectual match.

The present study also suggests that the typical job interview would be an inaccurate method of assessing the ability of shy applicants; objective tests would be a more valid predictor of the performance of shy individuals, at least for positions which would not require a great deal of social interaction.

Another aspect of this study has implications for the definition of shyness. The strong correlations of the shyness questionnaires with Neuroticism, and with Introversion, a finding in several other studies (Jones, Briggs, & Smith, 1986; Pilkonis, 1977a; Goldberg, 1992), together with Briggs' (1988) factor analytic study of four shyness scales suggest that it may be appropriate to conceptualize shyness as a combination of Neuroticism and Extraversion. Indeed, when we developed a third questionnaire measure of shyness by subtracting trait Extraversion scores from trait Neuroticism scores, we obtained a similar pattern of correlates that was indistinguishable from that of the Social Anxiety or Shyness questionnaires.

Limitations of the Study

The modest sample size (N = 48) was one clear limitation of the study. In particular, a larger sample size might be necessary to uncover possible gender effects.

In addition, the academic context of the study--the fact that the study was part of a university course and the discussion topics were intellectual in nature, may have made mental abilities particularly salient. If the study were carried out in a social context the association between shyness and intelligence may not have emerged. That is, raters may have attributed shy subjects' quietness to social discomfort and thus they may not have been influenced by the lack of participation when rating the shy targets' mental abilities.

One might argue that, because subjects knew they would be asked to rate group members they may have been particularly attentive to behaviors which, in ordinary interactions, would have gone unnoticed. Perhaps shy subjects would not have been spontaneously perceived as less intelligent if group members had not known in advance that they would be asked to provide ratings. Note, however, the impact of anticipating evaluations was purposely minimized by not informing subjects which traits and behaviors they would be rating until after the meeting ended.

There is another reason, however, why anticipation of being rated may have differentially influenced the behavior of shy and nonshy targets. DePaulo, Epstein, and Le May (1990) found that when they expected to be evaluated, socially anxious group members disclosed less information about themselves than nonsocially anxious group members. When no evaluation was anticipated, there were no differences between the two groups. Suggestions for Further Research

Several interesting findings were hinted at which could be further explored in future studies. The observed relation between shyness and self-rated ability raises some intriguing questions. Were our shy subjects more realistic in self-ratings of intelligence than the nonshy subjects--in a process similar to depressive realism--or were their self perceptions negatively distorted? This question could be tested in future studies by including a metric that could be compared to objective ability measures. For example, subjects could be asked to estimate their percentile performance or absolute score on an IQ test relative to other subjects. Alternatively, rankings of self- and other could be used instead of ratings.

The overlap between shy behaviors and cues used to evaluate intelligence may be larger than the design of this study allowed us to ascertain. Additional self and peer ratings could be obtained for specific behaviors in addition to talk time. Of particular interest would be nonverbal behaviors such as eye contact, smiling, and fidgeting. Ideally, such behaviors would be rated by a separate panel of judges from videotapes of the discussions. The relation between perceived shyness and perceived intelligence could be further explored by asking subjects to explain what cues they used for high ratings of shyness. These could be compared to explanations for low intelligence ratings.

Conclusions

The results of this study illuminate how one personality trait--shyness--can profoundly influence perceptions of intelligence. Despite the lack of a relation between objective intelligence and shyness, perceived intelligence was negatively correlated with shyness, for both self and peer evaluations. The connection for peer ratings was particularly strong for situationally-specific shyness, indicating that specific behavioral cues were being used to judge intelligence. Amount of time talking in the discussion groups was apparently the cue which linked shyness and perceptions of lower intelligence. An alternative explanation is that negative affect in response to the social situation may have temporarily disrupted shy subjects' intellectual performance. Variations in self-presentation strategies may also have contributed to the differences in perceived ability for shy and nonshy targets.

Finally, the practical implications discussed above add to the literature suggesting that shyness has negative and farreaching implications for the shy individual's life that extend beyond the social domain.

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Footnotes

1. The term, objective intelligence, will be used to refer to scores on objectively-scored performance measures such as IQ tests.

2. It is difficult to compare the means of the two shyness scales with previous studies because the present study used seven point scales for each whereas previous researchers used five point scales.

		Standard	Reliability
Variable	Mean	Deviation	(alpha)
Extraversion	30.63	6.95	.85
Agreeableness	31.06	6.48	.80
Conscientiousness	32.65	7.99	.75
Neuroticism	21.27	9.38	.77
Openness	29.83	7.07	.83
Cheek Shy	43.06	13.36	.81
SCS Social Anxiety	15.08	7.26	.76
Wonderlic IQ	25.13	5.01	

Table 1 Descriptive Statistics of Self-Report Scales

The first five variables were scored from the NEO-FFI. Possible scores range from 0 to 48. Cheek Shy is the Revised Shyness Scale (Cheek, 1983), a revision of the Shyness Scale (Cheek & Buss, 1981). SCS Social Anxiety is a subscale of the Fenigstein, Scheier, and Buss (1975) Self-Consciousness Scale. Wonderlic IQ is the Wonderlic Intelligence Test (1977). Table 2 Intercorrelations of Self-Report Questionnaires

		1	2	3	4	5	6	7	8	9
1.	Extraversion		.00	.33	33	.10	52	56	68	.17
2.	Agreeableness			.16	21	.05	.02	.07	.05	21
3.	Consciousness				43	.19	26	30	36	.05
4.	Neuroticism					38	.58	.59	.56	12
5.	Openness						 19	 17	18	.50
6.	Cheek Shy							.85	.96	14
7.	SCS Social Anxiety								.96	08
8.	Questionnaire Shynes	SS								11
9.	Wonderlic IQ									
Cor	relations exceeding	.27	are	signi	ficar	nt at	p < .	.05, t	two-ta	ailed

test; correlations exceeding .35 are significant at p < .01, two-tailed test.

		Standard
Variable	Mean	Deviation
Intelligence Week 2	10.91	2.51
Creative Week 2	10.33	2.81
Wise Week 2	10.87	2.23
Intelligence Week 7	10.96	2.05
Creative Week 7	9.96	3.06
Wise Week 7	11.24	2.21
Mental Ability Total	10.78	1.88
Shy Week 4	6.11	2.72
Shy Week 7	6.47	3.48
Shy Total	6.34	2.97
Talk time Week 7	9.83	3.26

Note: All ratings were on scales from 1 to 15. It was impossible to calculate alpha reliabilities on the self-ratings because only one rating was collected per target. Table 4 Intercorrelations of Self-Ratings

		1	2	3	4	5	6	7	8	9	10	11
1.	Intell Wk 2		.59	.74	.47	.39	.35	.79	11	02	09	.24
2.	Creative Wk 2			.48	.37	.51	.53	.80	24	22	28	.28
3.	Wise Wk 2				.48	.28	.45	.75	24	16	19	.37
4.	Intell Wk 7					.40	.54	.70	15	30	24	.51
5.	Creative Wk 7						.48	.73	38	43	41	.56
6.	Wise Wk 7							.74	44	43	45	.56
7.	Mental Ability	Tot	cal						37	37	40	.58
8.	Shy Wk 4									.74	92	66
9.	Shy Wk 7										.95	76
10.	Shy Total											76
11.	Talk time											

Correlations exceeding .27 are significant at p < .05, two-tailed test; correlations exceeding .35 are significant at p < .01, two-tailed test.

Table 5 Descriptive Statistics of Peer-Ratings

		Standard	Reliability
Variable	Mean	Deviation	(alpha)
Intelligence Week 2	10.59	1.29	.70
Creative Week 2	9.68	1.54	.65
Wise Week 2	10.37	1.20	.61
Intelligence Week 7	10.36	1.59	.85
Creative Week 7	9.29	2.53	.85
Wise Week 7	9.94	1.75	.77
Mental Ability Total	10.04	1.09	.89
Shy Week 4	7.36	3.15	.85
Shy Week 7	7.49	3.29	.85
Shy Total	7.42	3.09	.85
Talk time Week 7	8.87	3.67	.93

Note: All ratings were on scales from 1 to 15. For the peerratings, the alphas were based on 3-4 ratings, depending on the group size and attendance at the discussions. Table 6 Intercorrelations of Peer-Ratings

		1	2	3	4	5	6	7	8	9	10	11
1.	Intell W2		.26	.58	.19	 25	01	.31	11	03	07	.09
2.	Creative W2			.37	.34	.50	.38	.73	44	46	47	.52
3.	Wise W2				.39	.06	.21	.56	38	32	37	.34
4.	Intell W7					.38	.61	.75	49	46	49	.57
5.	Creative W7						.56	.71	58	63	64	.59
6.	Wise W7							.76	62	52	59	.60
7	Mental Abili	lty	Tota	al					71	67	72	.73
8.	Shy W4									.83	.96	83
9.	Shy W7										.96	94
10.	Shy Total											93
11.	Talk time W7	7										

Correlations exceeding .27 are significant at p < .05, two-tailed test; correlations exceeding .35 are significant at p < .01, two-tailed test.

Table 7 Correlations of Questionnaires and Ratings

		1	2	3	4	5	6
1.	Questionnaire Shyness		.59	.40	11	46	24
2.	Self Rated Shy Total			.69	10	40	53
3.	Peer Rated Shy Total				31	27	72
4.	Objective Mental Ability					.37	.27
5.	Self Rated Mental Ability Total						.28
6.	Peer Rated Mental Ability Total						

Correlations exceeding .27 are significant at p < .05, two-tailed test; correlations exceeding .35 are significant at p < .01, two-tailed test. Note however that some of these correlations were predicted and therefore were tested with a one-tailed test.