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Intelligence and interpersonal sensitivity: A meta-analysis

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ABSTRACT

A meta-analytic review investigated the association between general intelligence and interpersonal sensitivity. The review involved 38 independent samples with 2988 total participants. There was a highly significant small-to-medium effect for intelligence measures to be correlated with decoding accuracy ($r = .19$, $p < .001$). Significant moderators included the type of decoding judgment (emotion vs. intended meaning judgments), decoding channel (audio-only vs. audio-plus-video channel), and target gender (both male-and-female targets vs. female-only targets). Interpersonal decoding accuracy requires some level of social sophistication and results of this meta-analysis suggest that part of that social sophistication involves the cognitive abilities comprising general intelligence.

Psychologists have long acknowledged the influence of personality on the outcome of social interactions. In particular, the relationship between intelligence and interpersonal sensitivity (IS) has been studied almost as long as the field of social psychology has existed. As early as 1937, G. W. Allport asserted that intelligence was related to the ability to judge others. "Experimental studies have found repeatedly that some relationship exists between superior intelligence and the ability to judge others" (Allport, 1937, p. 514). Allport speculated that accurate judgments involve the perception of expressive behaviors and inner traits and that intelligence is a skill that allows for such accurate perceptions. Two decades later, Taft (1955) reviewed a number of studies which tested the relationship between intelligence measures and the ability to judge others. He concluded that, "There seems to be a positive relationship between intelligence and the ability to judge others analytically" (p. 10). General intelligence or cognitive abilities may influence how well an individual processes information from a social interaction. In turn, the advanced information processing may lead to a better judgment about a social interactant and even a more successful social interaction.

Efforts to measure interpersonal sensitivity as part of the larger construct of social intelligence have existed since early in the last century. Some of the early measuring approaches to interpersonal sensitivity fell into disrepute on psychometric design grounds (Cronbach, 1955). Other early instruments drew criticism because they could not be defended from the charge that they were measuring little more than general intelligence (Walker & Foley, 1973). Alleged interpersonal measures designed to assess "social intelligence," such as the George Washington Social Intelligence Test (Moss, 1926), the Chapin Social Insight Test (Chapin, 1967), and the Six Factor Tests of Social Intelligence (O'Sullivan & Guilford, 1966), all reported substantially high correlations with general intelligence, even though theory always supposed that general intelligence and social intelligence were distinct domains of ability (Walker & Foley, 1973). What the early social intelligence instruments had in common was a reliance on social reasoning ability about typical or appropriate behavior patterns. For example, the Chapin Social Insight Test consisted of written descriptions of social situations for which the participant chooses from four interpretations that varied in their "insightfulness." Though such skills are consistent with the concept of social intelligence as a broad concept, the correlations with general intelligence undermined the

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discriminant validity of the instruments. The construct under examination in the present meta-analysis – the ability to accurately process others' states or traits based on audiovisual cues – is a narrower definition of social intelligence that may depend less on logical reasoning abilities and attunement to social norms.

There are reasons to believe either that intelligence may be related to IS or that intelligence may *not* be related to IS. On the one hand, intelligence, or general cognitive ability such as *g*, indicates better performance on a variety of skill-based measures, and IS may simply be another one of those skills. Thus, higher intelligence would be associated with better performance on IS measures. On the other hand, IS skills could be considered a distinct set of abilities that are not captured in a cognitive capabilities skill set. In this case, IS might be partially a consequence of general intelligence, but not simply another measurement of it. The following sections review research that examined the relationship between intelligence and IS.

1. Measured associations between intelligence and interpersonal sensitivity

Evidence for the relative independence of IS and general intelligence comes from studies that found little association between IS and intelligence. For example, the developers of the Profile of Nonverbal Sensitivity (PONS; Rosenthal, Hall, DiMatteo, Rogers, & Archer, 1979), a widely used audiovisual test of accuracy in judging the meanings of face, body, and voice tone cues, reported on six samples of participants in which the PONS was given along with measures of cognitive functioning. There was only a weak relationship between the PONS and general intelligence level, with correlations ranging from −.02 to .18 (mean $r = .11$). Similarly, the authors of the extensively validated emotion-recognition test called the Diagnostic Analysis of Nonverbal Accuracy (DANVA; Nowicki & Duke, 1994) reported that "there were no significant correlations between DANVA receptive... scores and IQ" (p. 29), although the exact correlations were not reported. Hall, Murphy, and Schmid Mast (2006) reported that ability to recall another's nonverbal behavior from a recorded social interaction was not significantly correlated ($r = .15$) with scores on the IQ measure, the Wonderlic Personnel Test (WPT; Wonderlic, 2001). In general, researchers seeking to establish discriminant validity for particular IS measures interpret low and/or nonsignificant correlations between general cognitive ability measures and IS measures as an indicator that the two are distinct constructs.

On the other hand, some research finds more overlap between intelligence and IS. Judges' higher measured intelligence was significantly correlated with higher accuracy in judging targets' extraversion ($r = .34$, $p < .01$; Lippa & Dietz, 2000) and vocal expressions of emotional meaning ($r = .37$, $p < .01$; Davitz, 1964). Verbal ability, as measured by the Extended Range Vocabulary Test (Ekstrom, French, & Harman, 1976), was strongly correlated ($r = .50$, $p < .01$) with an IS measure (the Interpersonal Competence Instrument, ICI; Stricker, 1982). Barchard (2003) found a significant correlation between verbal ability and accurately recognizing emotion in facial expressions, as measured by the MSCEIT Faces subtest ($r = .25$, $p < .01$; Mayer, Salovey, & Caruso, 1999). These findings raise the possibility that possessing higher intelligence may simply mean one is better at many skill-based tasks, including IS.

In sum, some research suggests that there is little relationship between intelligence and IS while other research indicates a more substantial correlation between intelligence and IS. As mentioned earlier, many IS researchers sought to distinguish their IS measure from intellectual functioning based on finding little to no relationship between IS and intelligence. However, many of these interpretations were based on the nonsignificance of results (i.e., *p*-values). Significance testing is affected by the sample size, and therefore nonsignificant results may indicate low statistical power, not necessarily the lack of a relationship between two variables. Effect size is a more appropriate measure to assess the relationship between variables. Meta-analysis is an effective method not only for determining the direction and strength of an effect but also for establishing whether even a small effect may be statistically significant over a collection of studies (Lipsey & Wilson, 2001; Prentice & Miller, 1992; Rosenthal, 1991).

Davis and Kraus (1997) conducted a preliminary meta-analysis on the relationship between intellectual functioning and interpersonal accuracy, as part of a larger project investigating possible personality traits associated with being a "good judge" of interpersonal characteristics. Based on 21 different effects reflecting the association between intellectual functioning and interpersonal accuracy, the authors found a mean effect size of $r = .23$; the authors suggested that intelligence is a modest yet reliable factor in interpersonal accuracy.

However, a number of considerations regarding the Davis and Kraus (1997) analysis need to be taken into account when interpreting their findings. First, a review of the intellectual functioning measures included in their analysis shows that the number of measures was fairly limited. Included were some recognizable intelligence measures such as the Cattell Culture-Fair test (Cattell, 1940), the Henmon-Nelson Test of Mental Ability (Nelson & Lamke, 1973), the SAT Reasoning Test (the SAT; College Board, n.d.), the Mill Hill Vocabulary Scales (Raven, Raven, & Court, 1998), the Shipley-Hartford Vocabulary test (Zachary, 1986), and Raven's Progressive Matrices (Raven, Court, & Raven, 1992). Achievement measures were also included such as grade-point average. However, a number of standard measures were missing including the Stanford-Binet Intelligence Scale (Thorndike, Hagen, & Sattler, 1986), the WAIS-R (Wechsler, 1981), and the WPT (Wonderlic, 2001). Our literature search located studies not included by Davis and Kraus that involved these and other intelligence measures. Another consideration is the lack of examination of potential moderators. As Davis and Kraus noted, the different types of IS measures (e.g., judging states, traits, or future behavior) may entail different skills and thus the different interpersonal accuracy measures may be differentially related to intellectual functioning. Thus, the Davis and Kraus meta-analysis was not complete.

2. The present research

In the present work, we adopted a broad operationalization of intelligence. Intelligence was defined as a score on measures testing cognitive ability, aptitude, and/or problem-solving skills, which are all typical aspects tested on IQ tests (Gottfredson, 1997; Neisser et al., 1996; Sternberg, 2000). All intelligence measures were objectively scored performance measures and included no self-reports of intelligence levels.

The definition of IS was defined as a score on measures assessing "decoding" skills, that is, an individual's ability to accurately detect the state(s) or trait(s) of unacquainted others (Hall, Andrzejewski, Murphy, Schmid Mast, & Feinstein, 2008).[1] All IS measures were objectively scored performance measures and included no self-report instruments.

We extended previous research in this area by investigating five possible moderators between intelligence and IS. One potential type of moderator is the (1) *type of intelligence measure* (e.g., WAIS-R, Stanford-Binet, or academic measures such as the SAT or GRE). Each type may differentially relate to IS. The (2) *type of IS measure* was also investigated as a potential moderator; type of IS measure refers to whether the measure was standard or nonstandard (see full description in Method section). The (3) *type of IS judgment* could also affect the magnitude of the relationship between sensitivity and intelligence. Different types of IS judgments include decoding skills such as judging emotional expressions, interpreting the intended meaning of a target individual's behavior, or judgments about a social interaction and/or a measured characteristic of the targets (e.g., judgment about the rapport between two strangers or targets' extraversion levels). Another potential moderator is the (4) *channel of the IS measure*. Some measures involve judgments of static photos whereas other measures may use video-only, audio-only, or a combination of video and audio. Some research suggests that judgments made with video-plus-audio information are more accurate than judgments made with video information alone (e.g., Murphy, Hall, & Colvin, 2003). Finally, (5) *participant gender and gender of the target* were investigated as potential moderators. There are significant gender differences in many interpersonal sensitivity tasks (Hall, 1978, 1984), as well as some intelligence tasks (Mackintosh, 1998), so gender may play a moderating role in any potential relationship between interpersonal sensitivity and intelligence.

3. Method

3.1. Literature retrieval

Two sets of keywords were used to obtain relevant articles. The first set included general terms relating to intelligence and the names or acronyms of various intelligence and cognitive ability measures: achievement measure, achievement test, GPA (grade-point average), intelligence, IQ, GRE (*Graduate Record Exam*), LSAT (*Law School Admission Test*) MCAT (*Medical College Admission Test*), Raven's Matrices, SAT, Stanford-Binet, Wechsler, and Wonderlic. The second set of keywords included terms related to IS and the names or acronyms of interpersonal sensitivity measures: interpersonal sensitivity, nonverbal communication, person perception, rapport, deception, thin slices, nonverbal sensitivity, empathic accuracy, PONS, DANVA, Interpersonal Perception Task (IPT; Costanzo & Archer, 1989), Brief Affect Recognition Test (BART; Ekman & Friesen, 1974), and Communication of Affect Receiving Ability Test (CARAT; Buck, 1976). Various permutations of all keywords were searched in PsycINFO. Relevant articles were obtained by investigating titles and abstracts of each search result. Additional studies were retrieved from the present authors' files. Studies that fit the inclusion criteria were then coded and analyzed. Literature searching took place through 2006.

3.2. Inclusion criteria

Published articles or book chapters were included in the meta-analysis if they matched the following criteria. Eligible studies had to include a measure of intelligence and an IS measure. Eligible studies had to be written in English. Only studies where an effect size could be computed were eligible; studies that only reported partial *r*s (e.g., a correlation that controlled for gender) were not included.

3.2.1. Participants

Participants in the studies had to be of high-school age or older. Participants could not be acquainted with or know the target individual(s) in the IS measure. Participants had to speak English as a first language; only studies where the majority of participants were of Euro-American background were included as definitions of intelligence and intelligence tests are likely to be culturally embedded. Participants could not belong to a clinical population or have any developmental disabilities.

3.2.2. Intelligence measures

Intelligence measures were broadly construed to include standardized measures such as those resulting in an IQ score (e.g., WAIS-R, Stanford-Binet, etc.) or other standardized score (e.g., SAT), as well as achievement-related measures such as GPA or school grades. Data based on subscales of standardized intelligence measures were eligible for inclusion (e.g., verbal scores from the GRE). Studies with self-reports of intelligence were not eligible.

3.2.3. IS measures

IS measures were defined as tests that assessed an individual's ability to accurately detect and/or interpret the state(s) or trait(s) of others (Hall et al., 2008). The tests usually involved watching a videotape or looking at photographs; judges' perceptions were compared to either the measured construct (e.g., personality traits, intelligence, etc.) of the targets or the state that the actors were trying to portray (e.g., posed expressions of emotions). Studies using self-reports of IS were not eligible. IS had to be measured via audio or visual channels; that is, no test where target individuals were judged via written descriptions were

[1] IS is a separate construct from emotional intelligence. While both may involve some level of social skill, emotional intelligence refers specifically to understanding and interpreting emotional information, proficiency in regulating and solving emotional problems, and accurate emotion decoding (Mayer, Caruso, & Salovey, 1999). IS refers to an ability to accurately perceive interpersonal constructs such as the internal states of others (which may or may not be emotion-related) (Bernieri, 2001). For the most part, IS researchers are interested in "decoding" skills, that is, the ability to appropriately judge a message being sent (e.g., judge a target's personality or inner state). The present analyses involved IS measures only.

included. Participants had to see the target individual(s) through photos or videos, or hear targets' voices.[2]

Both standard and nonstandard tests of IS were included. Standard refers to an IS measure constructed to be used repeatedly in several (or many) studies and the measure was in fact used in different laboratories by different researchers (Hall et al., 2008). Standard tests typically have published reliability and validity data. An example of a standard test is the PONS (Rosenthal et al., 1979). In the PONS, the participant views short video and/or audio clips of a woman and makes judgments about her intentions, feelings, or thoughts. The participant chooses between two options on printed answer sheet for each video clip. The PONS has been used extensively in many studies by many researchers with a variety of population samples (e.g., Ambady & Gray, 2002; Berenbaum & Prince, 1994; Bernieri, 1991; Toomey, Wallace, Corrigan, Schuldberg, & Green, 1997).

Nonstandard IS measures were similar but were typically developed for one-time or limited use and therefore lack extensive psychometric and validity data. These measures included accuracy of judging deception, status, intelligence, thoughts and feelings (i.e., empathic accuracy), as well as other states and personality traits. As an example, Schmid Mast, Hall, Murphy, and Colvin (2003) investigated whether participants could accurately assess the assertiveness level of strangers. Participants viewed video clips of target individuals engaged in a social interaction and then rated each target's assertiveness level. A comparison between participants' ratings and targets' self-reported assertiveness levels revealed that participants could judge strangers' assertiveness levels at above-chance levels.

3.3. Coding procedure

Each study that fulfilled the earlier mentioned criteria was coded on the following dimensions: (1) type of publication (published article or book chapter), (2) sample size, (3) mean age of sample (if reported), (4) number of males and females in sample (if reported), (5) age range (if reported), (6) whether the IS measure was standard or nonstandard, (7) IS channel (e.g., audio, video, photo, or combination), (8) type of judgment made by participants (e.g., emotion recognition, deception, targets' intelligence, etc.), (9) gender of targets (if reported), (10) whether the intelligence measure was an IQ test, standardized test, school grades, or other measure of cognitive abilities, and (11) *r*, the effect size indicator used to describe the relationship between IS and intelligence. If more than one IS measure or intelligence measure was used, effect sizes for each relationship were recorded.

Both authors coded every article. Agreement was assessed by comparing each author's coding for each article; any discrepancies were resolved with discussion until agreement was reached.

3.4. Study characteristics

A total of 27 articles or book chapters containing 38 independent samples fit the inclusion criteria. A total of 72 effect sizes from these samples were recorded from these samples (2988 participants altogether). Based on studies that reported mean age ($k = 12$), the mean age of participants was 29 years ($SD = 10.07$).[3] However, for more than half the samples, exact age information was not available, though 16 samples were reported as "college age." On average, samples were comprised of 61% female participants, but a number of studies did not report this information.

3.5. Calculations

Effect sizes are reported as correlations between IS and intelligence measure(s). The magnitude of effect sizes is conventionally classified as small ($r = .10$), medium ($r = .30$), or large ($r = .50$) (Cohen, 1988). Many studies contained more than one correlation between an IS measure and an intelligence measure. For example, Campbell and McCord (1996) reported correlations between an IS test (IPT; Costanzo & Archer, 1989) and several subtests of the WAIS-R (Wechsler, 1981). These effect sizes were averaged to obtain one effect size for the sample. This averaged effect size was then entered into the meta-analysis.[4] Averaging effect sizes is generally considered a robust yet conservative procedure and likely reduces the magnitude of the effect sizes (Rosenthal, 1991; Rosenthal & Rubin, 1986). Combined significance tests were one-tailed with α set at .05. A random-effects model for estimating mean effects is reported (Lipsey & Wilson, 2001). The Comprehensive Meta-Analysis Software program was used for primary analysis (Biostat, 2005).

The following statistics are reported with each effect size estimate. The random-effects 95% confidence interval (CI) around the estimate was calculated. The combined Z reflects the significance of the effect size estimate (i.e., whether it differs from zero). A Q test assesses the homogeneity of the distribution of effect sizes; a significant Q indicates that there is more variability in the effect than expected by chance alone (Rosenthal & Rosnow, 1991), suggesting that the effect size may not estimate a common population mean. This may be due to potential moderators or other differences between the sampled studies (Lipsey & Wilson, 2001). The possibility of publication bias was assessed using the trim and fill

[2] Total scores from Mayer–Salovey–Caruso Emotional Intelligence Tests (Mayer, Salovey, & Caruso, 2002) were not eligible for inclusion as several subtests of the MSCEIT are self-report measures of a participant's assessment of his/her understanding of emotions or perception of emotion in abstract forms (such as matching abstract landscape drawings to emotion labels). Only the MSCEIT Faces Test (a subtest of total MSCEIT where participants match facial emotional expressions to emotion labels) fits our inclusion criterion of an IS measure. If authors employing the MSCEIT reported results from the MSCEIT Faces subtest separately, those correlations were eligible for inclusion in the meta-analysis.

[3] In one sample from Rosenthal et al. (1979), the median age of participants was reported, rather than an average age. The median age was substituted for analysis.

[4] The correlations reported in Rosenthal et al. (1979) were based on median values. The authors report a "median PONS-IQ *r*" which "refers to the median of the set of correlations between all the available intelligence measures and the PONS variables" (p. 235). These median values were used in the meta-analysis.

Table 1
Description and effect size estimates for 38 independent samples included in meta-analysis.

Author(s)	Year	*N*	Intelligence measure	IS judgment	*r*
Barchard	2003	150	Mixed	Emotion	.18
Barnes & Sternberg	1989	40	IQ test	Combination	.19
Bernieri & Gillis	1995	45	Mixed	Rapport	−.12
Borman	1979	146	Mixed	Job performance effectiveness	.31
Campbell & McCord	1996	50	IQ test	Combination	.24
Christiansen et al.	2005	122	IQ test	Combination	.13
Cline	1965	109	IQ test	Combination	.30
Davitz, sample 1	1964	61	Mixed	Emotion	.36
Davitz, sample 2	1964	45	IQ test	Emotion	.46
Davitz, sample 3	1964	44	IQ test	Emotion	.31
Ferguson & Fletcher	1989	75	Standardized test	Combination	.10
Hall et al.	2006	56	IQ test	Nonverbal behavior recall	.15
Ickes et al.	2000	74	IQ test	Combination	.02
Ickes et al.	1990	76	School grades	Combination	.28
Kanner	1931	198	IQ test	Emotion	.21
Lavrakas & Maier	1979	100	IQ test	Deception	.14
Lippa & Dietz	2000	109	IQ test	Personality	.24
Livingston	1981	42	Standardized test	Intended meaning	.12
Phillips et al.	2002	60	IQ test	Emotion	.21
Pickett et al.	2004	46	Mixed	Emotion	.31
Realo et al.	2003	280	IQ test	Combination	.21
Rosenthal et al., sample 1	1979	56	IQ test	Intended meaning	.14
Rosenthal et al., sample 2	1979	83	IQ test	Intended meaning	.13
Rosenthal et al., sample 3	1979	50	School grades	Intended meaning	.03
Rosenthal et al., sample 4	1979	47	School grades	Intended meaning	.03
Rosenthal et al., sample 5	1979	80	Mixed	Intended meaning	.18
Rosenthal et al., sample 6	1979	30	IQ test	Intended meaning	−.02
Rosenthal et al., sample 7	1979	130	Mixed	Intended meaning	.20
Rosenthal et al., sample 8	1979	44	Mixed	Intended meaning	.13
Rosenthal et al., sample 9	1979	38	Standardized test	Intended meaning	.15
Sternberg & Smith	1985	52	IQ test	Combination	.07
Stricker	1982	56	Standardized test	Intended meaning	.50
Stricker & Rock [a]	1990	115	Mixed	Combination	.15
Toomey et al.	1997	19	Mixed	Intended meaning	.13
Weisgerber, sample 1	1956	67	Mixed	Emotion	.22
Weisgerber, sample 2	1956	81	Mixed	Emotion	.09
Westbrook	1974	100	IQ test	Emotion	.38
Zuckerman et al.	1975	101	Standardized test	Emotion	−.01

Note. IS judgment = interpersonal sensitivity judgment. “Mixed” in the Intelligence measure column refers to studies where the authors assessed intelligence using a combination of tests or subtests. Rosenthal et al.'s (1979) calculations were based on median correlation values between intelligence measures and the PONS (see Footnote 4).

[a] Stricker and Rock (1990) reported *N*s which “vary from 108 to 122” (p. 837). The midpoint ($N = 115$) was used in analyses.

procedure (Duval & Tweedie, 2000) as well as others provided with the Comprehensive Meta-Analysis software.[5]

Contrast analysis tested potential moderators of the relationship between IS and intelligence (Rosenthal & Rosnow, 1991). Contrast analyses were conducted within each moderator type for categories in which 5 or more studies were involved. The significance levels of contrast analyses are reported as two-tailed.

[5] In addition, a fail-safe *N* was calculated, which is the number of new or unretrieved studies with an average *Z* of zero that would bring the combined probability to a one-tail combined *p*-value of greater than .05 (Rosenthal & Rosnow, 1991). For the overall effect, the fail-safe *N* was 1360, meaning that 1360 results averaging zero would be required to cancel out the effect. If the unretrieved results included a large number of correlations that were negative, so that the net unretrieved effect was a negative value rather than having a *Z* of 0.00, it would take fewer to cancel out the effect. For this literature, however, there is no a priori reason to expect negative correlations.

4. Results

Table 1 is a summary of the 38 independent samples and corresponding effect size estimates. The mean weighted effect size across the 38 samples was $r = .19$, 95% CI = .16–.23; $Z = 10.66$, $p < .001$.[6] Thus, there was a highly significant small-to-medium effect for intelligence measures to be correlated with IS measures. A homogeneity test (Q) was not significant, $Q = 41.30$, $p = .29$, indicating that the studies came from a common population and that there was no more heterogeneity among the samples' effect sizes than expected by chance. The trim and fill procedure assesses whether there are asymmetries in the distribution of effect sizes that might indicate publication bias. This analysis revealed no evidence of bias. Orwin's fail-safe *N*, Begg and

[6] Two additional studies did not report exact values for the correlation between intelligence and IS but noted that the correlation was nonsignificant (Rutherford, Baron-Cohen, & Wheelwright, 2002; Toomey et al., 1997). Including these nonsignificant results as $r = .00$ in the meta-analysis yielded the same results, $r = .19$; $Z = 10.54$, $p < .001$.

Table 2
Stem and leaf display of effect sizes (*r*) from 38 samples.

Stem	Leaf
.5	0
.4	6
.3	0, 1, 1, 1, 6, 8
.2	0, 1, 1, 1, 2, 4, 4, 8
.1	0, 2, 3, 3, 3, 3, 4, 4, 5, 5, 5, 8, 8, 9
.0	2, 3, 3, 7, 9
−.0	1, 2
−.1	2

Note. If a sample had more than one effect size, the mean effect size was calculated and is reported in the table.

Mazumdar's rank correlation test, and Egger's Test of the intercept (Biostat 2005) similarly gave no evidence of publication bias. Table 2 is a stem-and-leaf plot of obtained effect sizes.

4.1. Moderator analyses

Because it is possible to find moderator effects even when the distribution is statistically homogeneous (Hall & Rosenthal, 1991), potential moderators of the relationship between IS and intelligence were tested with contrast analyses (Rosenthal & Rosnow, 1991). Table 3 presents results for different subgroup analyses of studies.

4.1.1. Type of intelligence measure

Intelligence measures were coded into 4 possible categories: IQ test (e.g., the Stanford-Binet), standardized test (e.g., GRE), school grades (e.g., GPA), or mixed, where several different kinds of intelligence measures were assessed. As shown in Table 3, estimated effect sizes were significantly above zero for IQ tests, standardized tests, and studies which used a mixture of intelligence measures. School grades had a marginally significant effect size ($p = .06$). The largest effect sizes were found for IQ tests ($r = .21$) and mixed measures ($r = .22$). Standardized tests and school grades yielded smaller effect sizes (both $rs = .14$). All effect size estimates produced nonsignificant *Q*-values, indicating homogeneity among the effect sizes within each category. A contrast analysis comparing the IQ test and mixed measures estimates with standardized test estimates was not significant, $Z_{contrast} = 0.95$.

4.1.2. Type of interpersonal sensitivity measure

IS measures were categorized as standard, nonstandard, or a mixture of standard and nonstandard, as listed in Table 3. Effect size estimates for standard and nonstandard measures were significantly above zero ($rs = .18$ and .21, respectively), whereas studies utilizing a mixture of standard and nonstandard measures yielded a nonsignificant estimate. However, there were only 2 studies included in the mixed category. The *Q*-values for each category were nonsignificant indicating homogeneity among the samples. Contrast analyses were not conducted among the categories for types of IS measures; the effect sizes for standard and nonstandard measures were very close and there were only 2 studies in the mixed category, which would not make for meaningful analysis.

4.1.3. Type of interpersonal sensitivity judgment

IS measures were categorized as judgments of targets' emotion, deception, personality, intended meaning of target

Table 3
Summary of subgroup (moderator) analyses of the relationship between intelligence and interpersonal sensitivity (IS) measures.

Subgroup variable	Mean weighted *r*	Total *N*	*k*	95% CI	*Z*	Q
Type of intelligence measure						
IQ test	.21	1133	21	.16–.25	8.74**	20.70
Standardized test	.14	490	8	.05–.23	3.07**	12.55
School grades	.14	173	3	−.01–.29	1.85	2.69
“Other” or mixed intelligence measure(s)	.22	581	6	.13–.29	5.17**	3.06
Type of IS measure						
Standard	.18	1054	16	.12–.24	5.77**	12.06
Nonstandard	.21	1929	20	.16–.25	9.00**	27.75
Mixed	.09	94	2	−.12–.29	0.87	0.06
Type of IS judgment						
Emotion	.22	953	11	.16–.28	6.90**	15.32
Deception	.14	100	1	−.06–.33	1.39	–
Personality trait(s)	.24	109	1	.025–.41	2.52*	–
Intended meaning	.17	675	12	.09–.24	4.21**	10.89
Combination of judgments	.18	993	10	.12–.24	5.67**	6.37
Other	.20	247	3	.08–.32	3.16**	6.52*
IS Channel						
Audio only	.27	500	6	.18–.35	6.15**	7.28
Pictures only	.21	653	8	.13–.28	5.27**	3.68
Audio-and-video	.18	1426	20	.12–.23	6.57**	21.21
Other	.14	498	4	.06–.23	3.18**	3.81
IS target gender						
Males only	.27	218	2	.14–.39	4.04**	0.22
Females only	.13	677	11	.06–.21	3.40**	2.42
Both males and females	.23	1096	13	.17–.28	7.44**	21.36*
Unknown	.18	1086	12	.12–.24	5.96**	12.13

Note. IS = Interpersonal sensitivity. Total *N* = total sample size across all studies included in analysis. *k* = number of studies in the analysis.
* $p < .05$.
** $p < .01$.

encoder (e.g., PONS items where participants view posed expressive behavior and decide what situation the target person was portraying), combination of judgments, or "other" type of judgment (e.g., the judgment of rapport between two targets, as in Bernieri & Gillis, 1995). With the exception of deception judgments, all effect size estimates for the remaining interpersonal sensitivity judgment categories were significantly above zero. (The effect size for deception judgments was based on one study.) Emotion, personality, and "other" judgments yielded the highest effect sizes (*r*s between .20 and .24). However, the effect size for personality judgments was based on one study. Lower effect sizes were found for intended meaning judgments ($r = .17$) and combination judgments ($r = .18$). The *Q*-value for "other" judgments was significant, indicating a nonhomogeneous distribution. The remaining categories all had nonsignificant *Q*-values indicating homogeneous samples within each category. A contrast comparing emotion judgments and intended meaning judgments yielded a significant difference, $Z_{contrast} = 2.05$, $p < .05$, indicating that the effect size for emotion judgments ($r = .22$) was significantly higher than the effect size for intended meaning judgments ($r = .17$). A contrast comparing the effect sizes of emotion judgments with combination judgments was not significant, $Z_{contrast} = 1.61$.

4.1.4. Channel of interpersonal sensitivity measure

The channels of IS measures were categorized as audio-only, photograph-only, audio-and-video, or mixed-other (e.g., one audio measure and one photo measure were administered). All effect size estimates were significant. The audio-only studies yielded the largest estimate, $r = .27$. The remaining categories had smaller effects: photographs-only, $r = .21$, audio-and-video, $r = .18$; and mixed-other, $r = .14$. All *Q*-values were nonsignificant. A contrast comparing audio-only with photographs-only studies was not significant, $Z_{contrast} = 1.61$. A contrast comparing the audio-only estimate to the audio-and-video estimate was significant, $Z_{contrast} = 2.77$, $p < .01$. Finally, a contrast comparing picture-only judgments with audio-and-video judgments was not significant, $Z_{contrast} = 0.90$.

4.1.5. Gender

Participant gender was reported in 20 (53%) of the 38 independent samples, and even when reporting participant gender, most authors did not separately present results by participant gender. Thus, participant gender effects were not analyzed. However, enough information was reported on target gender to permit analysis. Results showed that the correlation between intelligence measures and IS measures was strongest when the targets appearing in the IS measure were all male, $r = .27$. The effect was somewhat smaller when the IS measure included both male-and-female targets, $r = .23$. The estimate was the smallest when the IS measure included only female targets, $r = .13$. All effect size estimates were significant and the *Q*-values were nonsignificant for the male-only and female-only categories. However, the *Q*-value for the male-and-female targets category was significant, indicating that samples were not drawn from a common population. A contrast comparing female-only target studies with male-and-female target studies revealed the male-and-female target studies effect size estimate was significantly higher than the estimate for female-only studies, $Z_{contrast} = 2.40$, $p < .05$. The relationship between intelligence and IS is stronger when participants are asked to judge both genders than female-only. (Comparisons with male-only studies were not conducted given the small number of male-only studies.)

5. Discussion

This meta-analysis investigated the relationship between intelligence and interpersonal sensitivity (IS). The findings showed a small-to-medium effect ($r = .19$) that was highly significant with no evidence of publication bias. The nonsignificant *Q*-value associated with the obtained effect suggests that there was only a small amount of between-studies variation. These findings support earlier reviews suggesting a positive association between intelligence and IS in both adults and children (Davis & Kraus, 1997; Halberstadt & Hall, 1980). The findings suggest that intelligent people tend to be socially skilled, specifically in regards to decoding nonverbal cues.

The present meta-analysis extended previous work in the area by testing potential moderators of the relationship between intelligence and IS. Contrast analyses showed that the effect size between IS and intelligence was significantly stronger when the participant was asked to judge an emotion in comparison to when the participant was asked to judge the intended meaning of a target's behavior. The channel of the IS measure was also a moderator; the audio-only effect was significantly larger than the effect size for IS measures employing audio-and-video channels. While Lippa and Dietz (2000) speculated that a stronger correlation would exist between intelligence and IS measures when the IS measure included "complex, extended information" (p. 39), the present findings suggest that information available through multiple channels weakened the relationship between IS and intelligence. Finally, target gender was a moderator between intelligence and IS; a contrast comparing IS measures with a mixture of male-and-female targets to IS measures with female-only targets showed a significantly stronger relationship when the IS measure had mixed gender targets. A large portion of studies analyzed employed the PONS, which is a female-only target measure. Furthermore, the PONS measures judgments of intended meaning, and it is a multi-channel test. Therefore, it likely that the moderator effects we found may all be indicators that the PONS test produces lower correlations than some other measures, and indeed that was the case when a contrast was performed (contrast $p = .01$; r for 12 PONS studies $= .10$, and r for 26 other studies $= .21$). Because moderator variables are often related to one another, focusing on any one moderator variable may therefore be misleading (Lipsey, 2003). The present meta-analysis suggests that the PONS test may be a desirable test if researchers are particularly concerned about a possible contribution of general intelligence to test scores.

Earlier theories hypothesized that personality and intelligence were independent constructs (e.g., Eysenck, 1971). However, research shows that intelligence is significantly correlated with a variety of personality characteristics including empathy (Ford & Tisak, 1983), stability (Furnham, Forde, & Cotter, 1998), openness and extraversion (Ackerman & Heggestad, 1997), and flexibility, self-esteem, and political concern (Schaie, 2005). Furthermore, according to a recent meta-analysis, IS is related to many of these traits as well as others that may be related to intelligence, such as conscientiousness and workplace success (Hall, Andrzejewski, & Yopchick, 2009). Thus, intelligence may play a common role in these correlations. Although the magnitude of the intelligence-IS relation is relatively small, researchers would be wise to demonstrate that intelligence is not a confounding factor when IS is related to other variables of interest.

Given the significant relationship between intelligence and IS, interpersonal sensitivity researchers would be mistaken to completely discount the role of intelligence in decoding accuracy. Instead, by acknowledging the role of intelligence, researchers could control for such effects to discern the true skills associated with interpersonal sensitivity. However, the small magnitude of the effect between intelligence and IS suggests that the two constructs are far from synonymous. Of course, if the correlations were corrected for unreliability in the measuring instruments (Hunter & Schmidt, 1990), the effects would be stronger, as would all other effects pertaining to correlates of IS (e.g., Hall et al., 2009).

It will also be useful to theorize about why IS and intelligence are related. Possibly, the two constructs share some common variable; perhaps intelligence and interpersonal sensitivity are related because both draw upon a similar set of skills. Because higher intelligence reflects better performance on a variety of skill-based tasks (such as test-taking), and IS is a skill-based task, then intelligence and interpersonal sensitivity could be related for this reason.

Relatedly, another overlapping skill may be attention. Attention is required to accurately answer questions on an IQ test or academic measure and attention towards stimuli is necessary to accurately assess an IS item. Yet another overlapping skill could be inspection time; intelligence is associated with quicker inspection time (Kranzler & Jensen, 1989). Perhaps accurate IS judgments are also associated with quicker inspection time and it is this common variable (inspection time) that accounts for the relationship between intelligence and IS.

On the other hand, it is also possible that there is a causal relation between intelligence and IS, such that the former actually contributes to the latter. This could be a short-term process, for example if higher intelligence leads to better choice of decision strategies when taking the IS test. Or, it could reflect the impact of intelligence on how much one gains from one's accumulated daily experiences, for example if higher intelligence enables one to better learn the meanings of different kinds of nonverbal cues. However, given the correlational nature of the research, determining whether a third variable or a causal mechanism exists between intelligence and IS requires future research.

Other limitations in the current research should be acknowledged. One is the adopted definition of intelligence. This research employed an intelligence definition whereby intelligence was assessed via some test measure (viz., IQ scores, scores on standardized tests or cognitive-abilities tests, etc.). Theories abound regarding the definition and nature of intelligence; many authors question whether intelligence tests actually assess general competence or reflect a number of competencies (e.g., "multiple intelligences"; Gardner, 1993; McClelland, 1973). Some argue for a distinction between academic intelligence, which may be measured via IQ tests or scholastic assessments, and practical intelligence (skills used in everyday problem-solving) (Sternberg, Wagner, Williams, & Horvath, 1995). The present research was not designed to address other conceptual definitions of intelligence, and indeed to our knowledge studies relevant to other definitions have not been published. Therefore, conclusions drawn from the findings only speak to intelligence as measured by a standardized test or conventional, systematic assessment. Another limitation is the inability to conduct meaningful moderator analyses in categories with small numbers of studies.

In sum, results of this meta-analysis demonstrated a significant small-to-medium relationship between intelligence and IS. Interpersonal sensitivity requires some level of social sophistication in being able to accurately assess a person or situation. The results suggest that part of that social sophistication involves the cognitive abilities comprising general intelligence. Those with higher intelligence may be more interpersonally sensitive, better at assessing social situations, and generally more skilled in social interactions.

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