EMOTIONAL EXPRESSIVENESS, EXTRAVERSION, AND NEUROTICISM: A META-ANALYSIS

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ABSTRACT: This meta-analytic investigation explored the relationship between measures of emotional expressiveness and the core personality constructs of Extraversion and Neuroticism. Measures of emotional expressiveness included both behavioral assessments of emotional encoding/expressiveness and self-report instruments. There were 34 effect sizes for the Extraversion-expressiveness relationship and 26 effect sizes for Neuroticism-expressiveness. The results revealed that self-report measures of emotional expressiveness yield Extraversion and Neuroticism effects that are not the same as effects provided by behavioral assessments of emotional expressiveness/encoding. However, there was a significant overall positive relationship between Extraversion and emotional expressiveness, regardless of type of expressiveness measure. Overall, Neuroticism was significantly negatively related to behavioral measures of emotional expressiveness, but unrelated to self-report measures. These results suggest that emotional expressiveness and extraversion are linked, but that self-report and behavioral measures of emotional expressiveness are not interchangeable. Nonverbal communication researchers should pay attention to both the type and scope of the instrument when selecting and using measures of emotional expressiveness.

KEY WORDS: emotional expressiveness; extraversion; neuroticism.

The nonverbal expression of emotion has been a major topic of interest for researchers of interpersonal communication. It has long been recognized that emotional states are associated with expressive nonverbal facial expressions and gestures, and that individual ability to accurately send and receive such nonverbal messages may be an important factor affecting individual ability to communicate with others (Buck, Savin, Miller, & Caul, 1972). "Emotional expressiveness" is used in two ways. First, it is often used to denote skill in sending messages nonverbally and facially. The "ex-

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pressive" person is the individual who is high in emotional encoding ability; that is, he or she can accurately nonverbally communicate what he or she is feeling. Emotional expressiveness has also been conceptualized as a general expressive style (Friedman, Prince, Riggio, & DiMatteo, 1980). It has been theorized that emotional expressiveness, in general, and emotional encoding ability, in particular, may represent a central component of individual personality because the communication of emotions plays such a crucial role in face-to-face interaction and in the development of interpersonal relationships (Friedman, 1979), and because emotional expressiveness as a personal style is relatively consistent across situations (Allport & Vernon, 1933), and across the course of development (Kagan et al., 1988). Moreover, the modulation and control of facial expressions of emotion facilitate impression management in social situations (Ekman, 1985; Snyder, 1987), and expressive people are seen as more attractive and are more well liked than unexpressive people (Friedman, Riggio, & Casella, 1988; Halberstadt, 1984; Larrance & Zuckerman, 1981). Because of the meaningfulness of these social consequences, individual differences in emotional expressiveness are of central interest to communication researchers, including how expressiveness is related to individual differences in larger personality traits.

Friedman (1979) suggested that there was a connection between ability to express emotions and specific personality characteristics such as extraversion, dominance, and affiliation, and later found some limited empirical support. Specifically, posed encoding of basic emotions was significantly positively correlated with dominance, but not significantly with extraversion or affiliation (Friedman, Riggio, & Segall, 1980). Yet, there is more to emotional expressiveness than simply posing emotions on cue. Friedman et al. (1980), suggested that the construct of emotional expressiveness involved both the posed and spontaneous expression of emotions and feelings, and that this construct of a "natural" emotionally expressive style is a key element of what people refer to as personal "charisma." Moreover, emotional expressiveness is conceptually distinct from extraversion, even when self-report methods are used to measure both constructs (Friedman, 1983).

In recent years, there has been renewed interest in the ability to express emotions because of the popularity of the construct of emotional intelligence (Goleman, 1995; Salovey & Mayer, 1990). According to the Ability Model of Emotional Intelligence (Caruso, Mayer, & Salovey, 2002; Mayer & Salovey, 1997), ability to express emotions accurately is an important component of emotional intelligence. Moreover, there has been growing interest in exploring the construct of emotional expressiveness,

with research looking at the structure of the construct of emotional expressiveness (e.g., Gross & John, 1995, 1998) and at gender differences in expressiveness (Kring & Gordon, 1998). In addition, there has now been a reasonable body of research looking at the personality correlates of emotional expressiveness—both in terms of expressiveness as encoding accuracy, and the more global notions of dispositional expressiveness.

The present study is a meta-analytic review of research examining the relation between both behavioral and self-report measures of emotional expressiveness and the core personality constructs of extraversion and neuroticism. Although there have been many explorations of the personality correlates of both behavioral and self-report measures of expressiveness, relatively few studies have used both types of measures of emotional expressiveness in the same study. This coupled with inconsistent results across studies motivated this meta-analytic investigation. Thus, the first purpose of this study was to examine the relationship between measures of expressiveness, both behavioral and dispositional, and extraversion and neuroticism. The second purpose was to explore how behavioral and dispositional (self-report) measures of expressiveness differentially relate to these two core personality constructs.

The Measurement of Emotional Expressiveness

There are two general strategies that represent most of the research on measuring emotional expressiveness. The first is to gather behavioral measures of encoding skill. The second method involves reliance on self-report instruments that assess either self-perceptions of expressive ability, or focus on self-reported behaviors that indicate possession of expressive ability.

Behavioral measures of emotional expressiveness/encoding typically involve videotaping a participant's face while he or she is expressing emotions. This method typically involves either posed or spontaneous expressions. When expressions are posed, the subject is asked to portray, on cue, the facial expression of certain emotions, most typically the six basic emotions of happiness, surprise, anger, sadness, fear, and disgust (Ekman & Friesen, 1975). When expressions are spontaneous, the subject is videotaped without his or her awareness while viewing some type of emotion-eliciting stimuli, such as pictures or film clips. Expressive ability is measured by having judges determine the degree to which the participant's facial expression accurately expresses the elicited emotion. The use of a specific type of behavioral measure of emotional facial expression should obviously be tied to the research question, with posed facial expressive

ability reflecting "social acting" ability and regulation of emotional expression, while spontaneous facial expressive ability may be more clearly related to a general individual tendency to display emotions—dispositional expressiveness. However, research indicates that ability to pose emotional expressions is strongly positively correlated with the ability to communicate emotions spontaneously, so the use of either of these methods appears to accurately measure the ability to express emotion (Zuckerman, Hall, DeFrank, & Rosenthal, 1976). All studies using behavioral measures examined in this meta-analysis utilized posed and spontaneous encoding measures with scores indicating expressive accuracy.

The second measurement strategy is to use self-report measures of emotional expressiveness. Self-report instruments of emotional expressiveness are easier to use, less costly, and less time-consuming than individualized behavioral measures (Riggio & Riggio, 2001; Riggio, Widaman, & Friedman, 1985). Several standardized self-report measures of emotional expressiveness have been developed and used extensively in research investigations, including the Emotional Expressivity subscale of the Social Skills Inventory (SSI; Riggio, 1989); the Affective Communication Test (ACT; Friedman, Prince, Riggio, & DiMatteo, 1980); the Emotional Expressivity Scale (EES; Kring, Smith, & Neale, 1994); and the Berkeley Expressivity Questionnaire (BEQ; Gross & John, 1995). These self-report scales purportedly measure pure emotional rather than verbal expressiveness (there are scales, such as the Social Expressivity subscale of the SSI, that measure verbal expressiveness). All four of these instruments have been used to study relations between emotional expressiveness and personality, and these studies are included in the meta-analysis.

Clearly of interest to researchers is the correspondence between self-report measures of emotional expressiveness, which reflect self-perceptions of emotional encoding ability, and actual emotional encoding behavior. A significant correlation between two different methods that apparently measure the same construct provides support for convergent validity. If two or more measures of the same construct agree, despite surface dissimilarity, the theoretical interpretation of that construct is supported (Campbell & Fiske, 1959; Cronbach, 1990). One study which directly addressed this issue found that actual and perceived emotional encoding were not significantly correlated with each other. The authors concluded that actual encoding ability and perceived encoding ability were distinct factors (Riggio, Widaman, & Friedman, 1985). Another study also found a lack of correlation between actual emotional encoding skills and self-perceptions of encoding ability (Zuckerman & Larrance, 1979). The lack of agreement between self-report and behavioral measures of emotional expressiveness not

only confuses interpretation of the construct, it clouds the research findings reflecting relationships between emotional expressiveness and personality, with any conclusions about the nature and strength of these relationships depending on the measure of emotional expressiveness that was used. Behavioral assessments tend to focus on the accuracy, frequency, and/or intensity of facial expressions, while self-report measures generally inquire as to typical types of nonverbal communication behaviors displayed, including facial, gestural, and postural cues. Indeed, the construct of expressiveness as measured by self-report measures may go beyond mere *emotional* expressiveness in that an individual can be expressive without being *emotionally* expressive, such as an individual who gestures animatedly while talking.[1] Despite these differences, the various methods are often considered interchangeable (e.g., Gross & John, 1997; Martin et al., 1999). Further, it seems that the relationship between individual differences in personality and emotional expressiveness would be most strongly established through the use of behavioral measures of encoding, as any method variance shared among self-report measures and personality which may serve to affect observed correlations could be avoided. On the other hand, self-report measures of emotional expressiveness have served as useful and cost-effective measurement tools and tend to be correlated with other measures of communication skill (Friedman et al., 1980; Riggio, 1986). Meta-analytic procedures may be used to determine the extent to which findings of relations between emotional expressiveness and personality disagree due to the use of different measures of expressiveness. Conclusions about the construct validity of self-report and behavioral measures may be drawn based on any significant disagreement of results. Addressing this issue is an important secondary focus of the current study.

Emotional Expressiveness and Personality

The majority of studies examining personality and emotional expressiveness focus on a few major dimensions of personality, particularly Extraversion (i.e., Surgency) and Neuroticism (i.e., Emotional Stability). Extraversion-Introversion is a continuum of a single trait, with extraverts being outgoing, talkative, impulsive and uninhibited, with many social contacts and being frequently involved in group activities. Introverts are described as quiet, retiring, introspective, and not very socially active (Eysenck & Eysenck, 1968). Compared to the introvert, the extravert is more likely to be excitable and active (Eysenck, 1975), and thus might be expected to be more emotionally expressive and a good nonverbal sender of emotion

(Buck, Savin, Miller, & Caul, 1972). A recent study suggested that the core of extraversion is the tendency to behave in ways that attract social attention (Ashton, Lee, & Paunonen, 2002). It is clear that emotional expressiveness is tied to the conceptual basis of Extraversion. People who are expressively animated describe themselves as extraverted on personality measures, and they are perceived and described as extraverted by others (Borkenau & Liebler, 1992; Kenny, Horner, Kashy, & Chu, 1992). Indeed, two-thirds of the studies included in this meta-analysis reported a significant positive correlation between Extraversion and emotional expressiveness. The relation between expressiveness and Neuroticism is less clear. Individuals low in Neuroticism are described as emotionally stable, confident, and nonanxious; individuals high in Neuroticism are described as emotionally labile, nervous, maladjusted, overemotional, and having difficulties in controlling emotions. The neurotic individual may have difficulty with emotional experience and may internalize negative emotions in the form of somatic symptoms (Eysenck & Eysenck, 1968). Thus, by holding back felt emotions, the neurotic may display deficiency in encoding skills (Cunningham, 1977). It might also be expected that emotional expressiveness—at least spontaneous emotional expressiveness—would be positively related to neuroticism. The results of studies examining Neuroticism and emotional expressiveness/encoding ability are mixed, with some indicating no relationship (e.g., Gross & John, 1995), and others reporting positive (e.g., Martin et al., 1999) or negative relationships (e.g., Goldstein et al., 1996).

The Present Study

Due to the inconsistency of research findings concerning the relationships between Extraversion, Neuroticism, and emotional expressiveness, the primary focus of this study was to explore differences in the relationships between these two core personality constructs and self-report and behavioral measures of emotional expressiveness. A second focus was to explore how different methods of measuring emotional expressiveness, may have different relationships with Extraversion and Neuroticism.

H1. Diffuse and focused comparison of studies will indicate that Extraversion and Neuroticism effects revealed by studies using self-report measures of emotional expressiveness are significantly different from effects revealed by studies using behavioral measures.

H2. Combined tests of significance will indicate a significant positive relationship between Extraversion and emotional expressiveness.
H3. Combined tests of significance will indicate a significant negative relationship between Neuroticism and emotional expressiveness

Although the studies used in the meta-analysis also differed in terms of participant population and personality measures, no hypotheses were formed concerning these other methodological differences. However, specific focused tests were planned based on methodological differences between the studies, participant differences, and their possible moderating effect.

Method

Selection of Studies for the Meta-Analysis

A thorough review of the literature, and direct contacts with researchers, yielded a total of 60 effect sizes (correlation coefficient, *r*) provided by 27 studies (with a total N of 4,014) that were selected for inclusion in the current study (see Tables 1 and 2). Sample sizes ranged from 14 to 1,392, with a mean sample size of 164.5. The total number of scores provided by participants was 4,819 because some participants completed multiple measures (e.g., both self-report and behavioral measures of expressiveness). Thus, there was some non-independence in the data, but it was a relatively small percentage. Most of the studies were published in social science journals or were dissertations. Researchers in the area of nonverbal communication and social psychologists were contacted via e-mail on listserves, and individually, to solicit unpublished manuscripts. Several papers were gathered from this search, but only one additional manuscript contained the desired information for inclusion (Gohm & Clore, 2000). A second unpublished paper included in the meta-analysis was conducted by the first author (Weller, 1996). Thirty-four effect sizes reflecting the relationship between Extraversion and emotional expressiveness were used in the meta-analysis (see Table 3). Of these 34, 13 were based on self-report measures of emotional expressiveness, eight were based on posed and 13 were based on spontaneous behavioral assessments of emotional expressiveness/encoding. Twenty-six effect sizes reflecting the relationship between Neuroticism and emotional expressiveness were used. Of these 26, 13 were based on self-report measures, five were based on posed and eight were based on spontaneous behavioral assessments of expressiveness. Self-report measures used included the SSI,

TABLE 1

Studies Used in the Meta-Analysis: Self-Report Assessment of Emotional Expressiveness

Study	*N*	*Personality measure*	*Encoding measure*	*Extraversion effect size r*	*Neuroticism effect size r*
Friedman et al. (1980a)	68	EPI	ACT	.52**	−.26*
Gilbert & Reynolds (1984)[a]	89	EPQ	TAIS	.18*	.16, $p = .06$
Gohm & Clore (2000)	257	composite	composite	.46**	−.04, $p = .29$
Gross & John (1995)	1392	BFI	berkeley	.21**	−.03, $p = .17$
Gross & John (1998)[a]	95	composite	facets	.44**	.27**
Gross & John (1998)[b]	65	composite	facets	.28*	.19, $p = .06$
Kring et al. (1994)	373	15-item	EES	.31**	−.21**
Martin et al. (1999)[a]	457[a]	BFI	EES	.42**	−.02, $p = .33$
Martin et al. (1999)[b]	457[a]	BFI	EEQ	.33**	.08*
Riggio (1986)	149	16PF	SSI	.33**	−.07, $p = .20$
Riggio et al. (1985)[a]	69	EPI	6-item	.11, $p = .19$	−.26*
Tucker & Friedman (1993)[a]	82	composite	ACT	.81**	−.04, $p = .37$
Weller (1996)	197	EPQ	SSI	.46**	.04, $p = .29$

Note. EPI = Eysenck Personality Inventory; EPQ = Eysenck Personality Questionnaire; BFI = Big Five Inventory; 16PF = 16 Personality Factor; ACT = Affective Communication Test; TAIS = Test of Attentional and Interpersonal Style; EES = Emotional Expressivity Scale; EEQ = Emotional Expressivity Questionnaire; SSI = Social Skills Inventory.

*$p < .05$; **$p < .01$.

[a,b]Indicates that the same participants responded to multiple measures in effect sizes reported in both Tables 1 and 2.

ACT, EES, and BEQ, as well as the Emotional Expressivity Questionnaire (King & Emmons, 1990) and the positive and negative affect expression subscales of the Test of Attentional and Interpersonal Style (TAIS; Nideffer, 1976). Other studies relied on composite scales of items taken from a variety of these self-report instruments. Posed behavioral methods used included posing of the six basic emotions, posing of elation and depression (Cunningham, 1977), and posing of complex emotions (Friedman & Riggio, 1999). Spontaneous encoding methods included observations of facial expressions to film clips and slides, as well as observations of encoding during group and other types of interactions. Several studies provided more than one effect size concerning each relationship (e.g., four effect sizes were provided by Gohm & Clore, 2000). It is important to note that there was some non-independence in the chosen effect sizes because some studies had the same participants complete both self-report and behavioral measures of expressiveness. All studies but one used self-report measures of Extraversion and/or Neuroticism, including the Eysenck Personality Inventory (EPI; Eysenck & Eysenck, 1968); Eysenck Personality Questionnaire (EPQ; Eysenck & Eysenck, 1975); the Big Five Inventory (BFI; John, Donahue, & Kentle, 1991); the 16 Personality Factors test (16PF; Cattell, Eber, & Tatsuoka, 1970); the Extraversion scale of the Self-Monitoring Scale (SMS; Snyder, 1974); and others.

Results

Overview of Analyses

Effect sizes for relationships between Extraversion and emotional expressiveness and Neuroticism and emotional expressiveness were examined separately. Effect sizes for Extraversion and Neuroticism were first examined for overall heterogeneity, followed by focused tests of heterogeneity examining differences in effect sizes based on the methods used to measure emotional expressiveness (i.e., self-report vs. behavioral)—Hypothesis 1. Finally, combined effect sizes for overall relations between the personality variables and emotional expressiveness were examined to test Hypotheses 2 and 3. Heterogeneity of effect sizes is typically examined first in meta-analyses before effect sizes are combined because combinations of effect sizes should partly be determined by heterogeneity among the effect sizes (Rosenthal, 1991). All comparison calculations involved weighting of individual effect sizes by degrees of freedom (i.e., N_j-3; all Ns are presented in Table 1).

TABLE 2

Studies Used in the Meta-Analysis: Behavioral Assessment of Emotional Expressiveness/Encoding

Study	*N*	*Personality measure*	*Method*	*Encoding measure*	*Extraversion effect size r*	*Neuroticism effect size r*
Browne (1994)	62	EPI	posed	6 basic	.00, $p = .50$	.00, $p = .50$
Buck (1975)	14	1 item	posed	6 basic	.41, $p = .09$	n/a
Cunningham (1977)	36	EPI	posed	2 (elat/depr)	.33*	−.17, $p = .16$
Friedman & Riggio (1999)[b]	62[a]	SMS Extra	posed	complex	.18, $p = .08$	n/a
Friedman et al. (1980b)		65	EPI cell posed	6 basic	.10, $p = .21$	−.08, $p = .28$
Riggio & Friedman (1986)	62[a]	EPI	posed	6 basic	.23*	−.15, $p = .12$
Riggio et al. (1985)[b]	69	EPI	posed	6 basic	.29**	−.27*
Berenbaum & Williams (1995)	74	EPQ	spon	film clips	−.22, $p = .97$	−.13, $p = .13$
Buck (1977)	24	AERS	spon	slides	.10, $p = .32$	n/a

Buck et al. (1974)	64	MPI	spon	slides	.27*	n/a
Buck et al. (1972)	21	EPI	spon	slides	.62**	n/a
Campbell & Rushton (1978)[a]	46[b]	EPI	spon	smiling	.10, $p = .25$	−.09, $p = .27$
Campbell & Rushton (1978)[b]	46[b]	16PF	spon	smiling	.09, $p = .28$	−.33**
Gallaher (1992)	428	EASI-III	spon	rater OT	.23*	n/a
Gilbert (1991)	40	(J)EPQ	spon	pos exp	.44**	−.08, $p = .30$
Gilbert & Reynolds (1984)[b]	89	EPQ	spon	facial	.23*	.06, $p = .28$
Goldstein et al. (1996)	70	MPQ	spon	interactions	n/a	−.26*
Riggio et al. (1990)[a]	28[a]	16PF	spon	reactions	−.17, $p = .18$	.18, $p = .17$
Riggio et al. (1990)[b]		28[b]	SMS Extra	spon cell reactions	−.15, $p = .21$	n/a
Ruch (1994)	54	EPQ-R	spon	grp interact	.37**	n/a
Tucker & Friedman (1993)[b]	82	composite	spon	encounter	.31**	−.10, $p = .18$

Note. EPI = Eysenck Personality Inventory; SMS Extra = Self-Monitoring Scale; EPQ = Eysenck Personality Questionnaire; AERS = Affect Expression Rating Scale; MPI = Maudsley Personality Inventory; 16PF = 16 Personality Factor; EASI-III = Emotionality, Activity, Sociability, Impulsivity; (J) EPQ = Junior EPQ; MPQ = Multidimensional Personality Questionnaire.

*$p < .05$; **$p < .01$.

[a,b]Indicates that the same participants responded to multiple measures in effect sizes reported in both Tables 1 and 2.

TABLE 3

Summary Statistics for Effect Sizes of Emotional Encoding Ability and Personality

Correlations (r's)		*Summary statistics*	
Stem	*Leaf*		
Extraversion			
.8	1*	Maximum	.81
.6	2	Quartile 3 (Q3)	.41
.5	2	Median (Q2)	.275
.4	1 2 4 4* 6 6*	Quartile 1 (Q1)	.11
.3	1 1* 3 3 3* 7	Minimum	−.22
.2	1* 2* 3 3* 3* 7 8* 9	Q3–Q1	.30
.1	0 0* 0* 1 8* 8*	SD	.22
.0	0 9	Mean	.26
−.1	5 7	N	34
−.2	2*	Proportion with positive sign	.92
		Proportion significant	.68
Neuroticism			
.2	7*	Maximum	.27
.1	6* 8 9*	Quartile 3 (Q3)	.04
.0	0 4 6* 8*	Median (Q2)	−.055
−.0	2 3* 4* 4* 7 8 8* 9	Quartile 1 (Q1)	−.17
−.1	0* 3* 5* 7	Minimum	−.33
−.2	1 6 6 6 7	Q3–Q1	.21
−.3	3	SD	.15
		Mean	−.06
		N	.26
		Proportion with negative sign	.69
		Proportion significant	.31

*Statistic is a pooled average effect size.

Diffuse Comparison of Effects

In order to determine if the 34 effect sizes for Extraversion and emotional expressiveness were significantly different from each other, overall tests of heterogeneity were conducted (see Table 4).[2] Diffuse testing resulted in χ^2 (33) = 155.5, p = .000, indicating that the effects found in the studies examining Extraversion and expressiveness were significantly different from each other. Diffuse testing for the 26 effect sizes for Neuroticism and expressiveness resulted in χ^2 (25) = 57.70, p = .000, indicating that these effect sizes were also significantly different from each other.

Self-reports of emotional expressiveness. Diffuse testing of the 13 effect sizes reflecting the relation between Extraversion and self-reports of emotional expressiveness resulted in χ^2 (12) = 99.35, p = .000, indicating that the effects found in these studies were significantly different from each other. A diffuse comparison of the 13 effect sizes reflecting the relation between Neuroticism and self-reports of expressiveness also indicated significant heterogeneity, with χ^2 (12) = 40.96, p = .000.

Posed behavioral measures of emotional expressiveness. Diffuse testing on the eight effect sizes reflecting the relation between Extraversion and posed emotional encoding resulted in χ^2 (7) = 4.98, $p > .50$. Diffuse testing of the five effect sizes reflecting Neuroticism and posed encoding yielded χ^2 (4) = 2.68, ns. Thus, the effects yielded by studies using posed emotional encoding methodology did not differ significantly.

Spontaneous behavioral measures of emotional expressiveness. Diffuse tests among the 13 effect sizes reflecting the relation between Extraversion and spontaneous behavioral measures of emotional expressiveness resulted in χ^2 (12) = 31.73, p = .000, indicating that the effects found in these studies were significantly different from each other. However, the eight involving Neuroticism did not differ significantly, with χ^2 (7) = 8.67, ns. Based on these results, focused tests of homogeneity were planned for studies providing effects concerning Extraversion and spontaneous assessments of expressiveness/encoding ability.

Focused Comparison of Effects

Extraversion and emotional expressiveness. To determine whether the effects of studies differed based on the type of method used to assess emotional expressiveness, four focused comparisons of the effect sizes concerning Extraversion yielded by the three different methods were conducted

TABLE 4

Results of the Meta-analysis: Comparison of Effect Sizes†

Exraversion: Diffuse tests	*Neuroticism: Diffuse tests*
1. All effect sizes χ^2 (33) = 155.5, p = .000.	χ^2 (25) = 57.70, p = .000.
2. Self-report effect sizes χ^2 (12) = 99.35, p = .000.	χ^2 (12) = 40.96, p = .000.
3. Posed effect sizes χ^2 12 (7) = 4.98, $p > .50$.	χ^2 (4) = 2.68, $p > .50$.
4. Spontaneous effect sizes χ^2 (12) = 31.73, p = .000.	χ^2 (7) = 8.67, $p > .25$.
Extraversion: Focused tests	*Neuroticism: Focused tests*
1. Self-report vs. behavioral effect sizes Z = 4.98, p = .000.	Z = 2.09, p = .018.
2. Self-report vs. posed effect sizes Z = 2.98, p = .001.	Z = 1.81, p = .04.
3. Self-report vs. spontaneous effect sizes Z = 4.55, p = .000.	Z = 1.45, p = .07.
4. Posed vs. spontaneous effect sizes Z = .575, p = .25.	Z = .477, p = .25.

†All calculations are based on Rosenthal (1991).

(see Table 4).[3] First, the 13 Extraversion effects yielded by self-report studies were found to be significantly different from the 21 effects of studies using either type of behavioral assessment of emotional encoding ability/expressiveness, with Z = 4.98, p = .000 (combined effect sizes and their significance follows). Second, Extraversion effects yielded by self-report studies were found to be significantly different from the eight effects of studies using a posed behavioral measure of expressiveness, Z = 2.98, p = .001. Third, Extraversion effects yielded by self-report studies were found to be significantly different from effects of studies using a spontaneous behavioral measure of encoding ability, Z = 4.55, p = .000. Finally, Extraversion effects yielded by studies using a posed behavioral assessment did not differ significantly from effects yielded by studies using a spontaneous be-

havioral assessment, $Z = .575$, ns. Thus, Extraversion effects from studies using self-report measures of emotional expressiveness were found to differ from effects yielded through behavioral assessments of emotional expressiveness/encoding ability, whether posed or spontaneous, while effects yielded by the two types of behavioral assessments did not differ from each other.

Neuroticism and emotional expressiveness. Four focused comparisons of the effect sizes involving Neuroticism were also conducted. First, the 13 Neuroticism effects yielded by self-report studies were found to be significantly different from the 13 effects of studies using either type of behavioral assessment of emotional expressiveness, with $Z = 2.09$, $p = .018$. Second, Neuroticism effects yielded by self-report studies were found to be significantly different from the five effects of studies using a posed behavioral measure, $Z = 1.81$, $p = .04$. Third, Neuroticism effects yielded by self-report studies were found to be marginally significantly different from effects of studies using a spontaneous behavioral measure, $Z = 1.45$, $p = .07$. Finally, Neuroticism effects yielded by studies using a posed behavioral assessment did not differ significantly from effects yielded by studies using a spontaneous behavioral assessment, $Z = .477$, ns. As was found in examinations of the Extraversion effect sizes, Neuroticism effects from studies using self-report measures of emotional expressiveness were found to differ from effects yielded through behavioral assessments, whether posed or spontaneous, while effects yielded by the two types of behavioral assessments of expressiveness did not differ from each other.

Focused Comparison of Effects by Sample Size

Self-report studies. To determine if diffuse heterogeneity among effect sizes from studies using self-report methodology resulted from differences in sample size, four focused tests comparing larger sample sizes to smaller sizes were conducted, two for Extraversion and two for Neuroticism. First, Extraversion effects sizes from six studies with larger sample sizes (with $N > 190$, up to 1,392) were compared to effect sizes from seven studies with smaller sample sizes ($N \leq 149$), with $Z = 2.01$, $p < .05$, indicating a significant difference between these studies. A second focused comparison compared five of the larger studies to studies with smaller sample sizes, with Gross and John (1995; N = 1,392) eliminated. Results indicated that the Extraversion effect sizes were still different from each other, with $Z = 3.11$, $p < .01$, even with more comparably sized samples. Neither of these tests was significant for Neuroticism effect sizes, with $Z = .61$ and

.45, respectively, suggesting that variations in sample size were not a significant factor affecting heterogeneity among self-report studies. These results perhaps suggest that Extraversion is a more complex construct that is more likely to vary across measurement instruments, while Neuroticism is less variable in its conceptualization and measurement.

Behavioral studies. Because effect sizes for Extraversion and Neuroticism were not heterogeneous for studies using a posed behavioral method, no focused comparisons based on sample size were conducted. Because diffuse testing indicated that Extraversion effect sizes from studies using spontaneous methods were significantly different, one focused test comparing 12 smaller studies (all with $N < 100$) to one larger study (Gallaher, 1992; $N = 428$) was conducted. Results indicated that effect sizes for Extraversion did not vary significantly based on sample size, with $Z = -.79$, suggesting that variations in sample size were not responsible for diffuse heterogeneity among effect sizes in these studies.

Significance of Combined Effect Sizes

Because of the significant heterogeneity between Extraversion and Neuroticism effects based on type of methodology used to measure emotional expressiveness, effect sizes were combined for each personality dimension for each type of expressiveness measurement (see Table 5).[4] The combined effect sizes of the relation between emotional expressiveness and Extraversion were positive and significant for self-report studies, $r = .39$, $p < .01$, and for studies using either posed, $r = .22$, $p < .01$, or spontaneous behavioral encoding assessment, $r = .18$, $p < .01$. The combined effect sizes of the relation between emotional expressiveness and Neuroticism were negative and significant for studies using a posed, $r = -.13$, $p < .05$, or spontaneous behavioral encoding assessment, $r = -.10$, $p < .05$. However, the overall relationship between Neuroticism and emotional expressiveness as assessed through self-report was not significant, with $r = -.01$, ns.

Discussion

The results of comparisons among effect sizes suggested several particular questions concerning different types of measures used to assess emotional expressiveness. There was significant heterogeneity among all Extraversion and Neuroticism effect sizes, and effect sizes provided by self-report

TABLE 5

Results of the Meta-Analysis: Combination of Effect Sizes†

	Emotional Encoding Measure	k	r
Extraversion	Self-report	13	.39**
	Posed	8	.22**
	Spontaneous	13	.18**
Neuroticism	Self-report	13	−.01
	Posed	5	−.13*
	Spontaneous	8	−.10*

Note: Significance of *r* was tested using the Stouffer method ($\Sigma Z_I/n$), distributed as standard normal Z.

*$p < .05$, **$p < .01$, k = number of effect sizes

†All calculations are based on Rosenthal (1991).

studies, were significantly different from those provided by studies using behavioral methods. In contrast, effect sizes provided by studies using posed behavioral measures of expressiveness/encoding did not differ from those provided by studies using spontaneous measures. Therefore, it is clear that self-report measures of emotional expressiveness yield Extraversion and Neuroticism effects that are not the same as effects provided by behavioral assessments of emotional encoding; thus, the first hypothesis of the present study was confirmed.

There are several possible explanations for this difference. First, it seems likely that the Extraversion effects yielded by self-report studies were indeed stronger than those effects provided by behavioral studies. Twelve of 13 effect sizes for Extraversion from self-report studies were significant, compared to 11 significant of 21 effect sizes from studies using behavioral assessments. A second possible explanation is that self-report assessments of emotional expressiveness share method variance with self-report assessments of personality, unlike behavioral assessments of emotional encoding. Finally, it seems possible that the difference lies in the fact that both behavioral methods focus on observed facial expressiveness, including accuracy of sending particular emotions, while self-report measures assess different types of a larger repertoire of expressive behavior, including facial expressions and gestures, as well as the degree to which the individual is "emotionally charged" or animated. For example, the SSI Emotional Expressivity

(EE) scale is described as assessing "general skill in nonverbal sending" (Riggio, 1986, p. 651), with individuals high in EE described as energetic and as emotionally arousing to others. Further, the ACT assesses such behaviors as touching others during communication and being able to communicate in pantomime (Friedman et al., 1980). These types of behaviors may involve facial expressiveness to a varying degree, but they are clearly more complex and more indicative of a general communication skill, and also more indicative of sociability. Perhaps it may be concluded that behavioral assessments of facial expressiveness, with posed and spontaneous methods yielding similar results, provide a purer measure of facial emotional encoding, while self-report measures provide a broader measure of overall emotional expressivity, or the degree to which the individual accurately communicates emotions nonverbally and the tendency to communicate nonverbally.

Diffuse comparisons between each type of emotional encoding measure indicate that the Extraversion and Neuroticism effect sizes provided by self-report studies differed from each other, as did the Extraversion effect sizes provided by studies using spontaneous behavioral methods. This heterogeneity is likely explained by the wide variety of specific self-report instruments and spontaneous behavioral methods used by the different studies. For instance, six different standardized self-report instruments measuring emotional expressiveness were used by the studies, as well as different combinations or particular items from these scales. Further, some studies using spontaneous encoding measures used film clips or slides, while others videotaped participants in group or other social interactions designed to elicit specific spontaneous emotional expressions. This result and the clear difference between results provided by self-report and behavioral studies suggest that selecting a measure of emotional expressiveness for any study is not a simple matter. Emotional expressiveness may be seen as including facial expressiveness, as well as general beliefs about the self and past and present nonverbal communication with others. Thus, depending on one's interest and research question, the chosen definition of emotional expressivity will differ, as will its measure. If self-perceptions about emotional expressivity, including the frequency with which the individual communicates nonverbally, are of interest, self-report measures may be more informative. In contrast, when emotional encoding through facial expression is of interest, behavioral assessments, either posed or spontaneous, are more accurate. It seems that a conclusion that the different methods are assessing different constructs, and thus should be used for different purposes, is warranted.

Additional conclusions may be drawn from the results of combining

effect sizes. It is clear from the results of combined significance tests that there is a significant overall positive relationship between Extraversion and expressiveness, confirming the second hypothesis and indicating that more extraverted individuals, who are more sociable, talkative, impulsive, and sensation-seeking, tend to more accurately encode and communicate emotions through facial displays, and are more likely to endorse items that reflect typical behaviors involving nonverbal emotional communication skill. These results are intuitively sensible, as one would expect very extraverted individuals relative to others to communicate to a greater extent than introverted individuals through a variety of channels, including verbal and nonverbal channels. Conversely, introverted individuals communicate emotions through facial expressions significantly less accurately and less frequently than do more extraverted individuals and they also report engaging in significantly fewer emotional communication behaviors. Introverts, who are socially shy, withdrawn, reserved, and introspective, do not seem to communicate to a great extent through any communication channel, including facial displays.

The findings concerning Neuroticism and its relation to emotional expressiveness are less clear. Results for effect sizes from studies using behavioral measures of expressiveness indicated that Neuroticism is significantly negatively related to facial expressiveness during posed and spontaneous encoding. Individuals high in Neuroticism are anxious, moody, and emotionally inappropriate, such that their emotional displays, verbal and nonverbal, may not accurately communicate basic emotions. Emotionally stable individuals, in contrast, seem to accurately communicate emotions, including through facial displays, and may be more likely to engage in a variety of emotional communication behaviors. This result supports the third hypothesis of the present study.

In contrast, analysis of Neuroticism effect sizes from studies using self-report measures indicated that Neuroticism was not significantly related to emotional expressiveness. There are two possible explanations for this result. First, it is possible that while emotionally stable individuals engage in more frequent and more accurate facial displays of emotion than less emotionally stable individuals, less emotionally stable individuals describe themselves as being as frequently and accurately emotionally expressive as emotionally stable individuals. In other words, they are being dishonest or perhaps responding in a socially desirable manner. This possibility is not surprising considering the old and common view that self-report methods describe beliefs about behavior more than they describe actual behavior (cf. Oskamp, 1991). Second, as suggested above, it is possible that behavioral and self-report measures of emotional expressiveness are measuring

different things, that is, facial expressiveness versus overall expressivity. If this were accurate, we would expect the two different constructs to possibly correlate with different things, including Neuroticism. It may be the case here that self-reports of expressiveness do not correlate with emotional stability, while measures of facial expressiveness do. Finally, it may be the case that the self-report measures of expressiveness examined here are simply not as sensitive in showing the negative relationship with Neuroticism as behavioral measures. This conclusion again challenges the contention that self-reports and behavioral measures of emotional expressiveness are measuring the same construct.

An important potential moderator of the relationship between these personality constructs and emotional expressiveness is sex. Many researchers have noted significant sex differences, with women typically, but not always, being more emotionally expressive than men (see Hall, 1990, for an overview). An attempt was made to examine the moderating role of sex; however, very few studies had the necessary information to conduct this analysis. Only five effect sizes for the Extraversion-expressiveness relationship and only four effect sizes for Neuroticism-expressiveness could be calculated separately for males and females. The results showed no significant impact of participant sex.

In conclusion, it seems clear that self-report and behavioral measures of emotional expressiveness are not interchangeable, and that a particular method should be selected for use based on a clear distinction between what each type of method is in fact measuring. Further, small-to-moderate positive relationships between facial expressiveness and Extraversion, and overall emotional expressiveness and Extraversion, are firmly established by prior research and by the current study. In addition, the trait of Neuroticism is clearly negatively related to facial expressiveness. Although findings concerning these relationships are somewhat mixed in the available literature, the meta-analysis presents what may be viewed as the true relationships between these variables.

Studies Used in the Meta-Analysis

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Notes

1. The authors would like to thank an anonymous reviewer for contributing this point.
2. For diffuse comparison of studies the test statistic was χ^2 (k − 1) = $\Sigma(N_i - 3)$ $(Z_{ri} - Z)^2$, where k is the number of studies, Z_r is the Fisher transformation of effect size *r*, and $Z_r = \Sigma(N_i - 3)$ $(Z_{ri})/\Sigma(N_i - 3)$. This procedure tests the null hypothesis that the effect sizes do not differ.
3. For focused comparison of studies the test statistic was $Z = \Sigma(c_i)$ $(Z_{ri})/\Sigma c_i^2/N_i - 3$. The statistic is distributed as a standard normal Z, and is used to test the null hypothesis that the contrast (c_l) applied to the effect sizes is zero (0).
4. Combination of effect sizes was based on $Z_r = \Sigma(Z_{ri}/k$, where k equals the number of studies and Z_r reflects the average Fisher transform value from the k studies. This average Fisher value is converted back to a correlation coefficient using a standard Fisher transformation table.

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