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ORIGINAL PAPER

The Influence of Family Expressiveness, Individuals' Own Emotionality, and Self-Expressiveness on Perceptions of Others' Facial Expressions

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Abstract To examine individual differences in decoding facial expressions, college students judged type and emotional intensity of emotional faces at five intensity levels and completed questionnaires on family expressiveness, emotionality, and self-expressiveness. For decoding accuracy, family expressiveness was negatively related, with strongest effects for more prototypical faces, and self-expressiveness was positively related. For perceptions of emotional intensity, family expressiveness was positively related, emotionality tended to be positively related, and self-expressiveness tended to be negatively related; these findings were all qualified by level of ambiguity/clarity of the facial expressions. Decoding accuracy and perceived emotional intensity also related positively with each other. Results suggest that even simple facial judgments are made through an interpretive lens partially created by family expressiveness, individuals' own emotionality, and self-expressiveness.

Keywords Nonverbal decoding · Emotion intensity · Facial judgments · Family expressiveness · Self-expressiveness

Interpreting other people's feelings is an important aspect of everyday social interaction. One highly available source of information that is frequently used when interpreting others' feelings are facial expressions (Ekman et al. 1982; Elfenbein and Ambady 2002; Fridlund and Russell 2006; Hess et al. 1988; Noller 1985). Because of the importance of facial expressions in everyday communication, many studies assess causes, correlates, and consequences of individuals' accuracy in interpreting facial expressions. In these studies, accuracy when judging others' facial expressions is often very good when compared to chance. However, even in the best of circumstances (highly controlled laboratory settings with reasonable amounts of time to look at what are typically prototypical facial

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expressions), a nontrivial number of raters demonstrate some difficulty in determining the meaning of facial expressions. For example, in one classic study in which participants judged high-intensity, prototypical faces, error rates were 16% for fear faces, 14% for disgust faces, 9% for anger faces, 8% each for sad and surprise faces, and 5% for happy faces (Ekman et al. 1987). We contend that this lack of accuracy is itself interesting and may reflect consistent individual differences in the interpretive schemas that perceivers have developed over a lifetime of judging, experiencing, and expressing emotion in a wide array of contexts.

Specifically, individual characteristics related to emotional experience and expression can be expected to contribute to individuals' judging skill and interpretive frameworks. For example, a relationship between family socialization of emotion and individuals' judging skill has been identified (e.g., Halberstadt 1986; Halberstadt and Eaton 2002; Lanzetta and Kleck 1970), and further questions about how family socialization relates to individuals' interpretive schemas can now be explored. Few studies, however, have considered individuals' own emotion-related or expressive tendencies, such as emotionality (i.e., affect intensity[1]) or self-expressiveness as predictors of emotion understanding skill. Additionally, although much of the literature relies on prototypical faces, such faces are rare in real life situations (Carroll and Russell 1997). Thus, in addition to assessing judgments for prototypical faces, we included faces that ranged in intensity level by digitally combining actors' neutral and prototypical faces in varying amounts (see Hess et al. 1997). Finally, no studies that we know of have examined how individuals' family socialization, own emotionality, or self-expressiveness affect their interpretations of others' emotion intensity, although interpretations regarding how intensely someone is feeling are likely to have substantial impact on individuals' responses to others. Therefore, we considered not only decoding accuracy but also participants' perceptions of others' emotional intensity as dependent variables. In sum, the overarching goal of this study was to examine how individual characteristics related to emotional experience and expression might be associated with two kinds of interpretations of facial expressions, specifically, decoding accuracy and perceptions of emotional intensity. We first discuss hypotheses regarding decoding accuracy, and then turn to relationships with perceived emotional intensity.

Decoding Accuracy

Family Expressiveness

Family styles of emotional expression are known to be associated with a variety of emotional competencies, including the accurate decoding of vocal and facial expressions of emotion (Dunsmore and Smallen 2001; Halberstadt 1983, 1986; Halberstadt and Eaton 2002). A meta-analysis of studies with adolescents and college-aged adults indicates that participants from less expressive families are more accurate decoders than their peers from more expressive families (weighted mean $r = -.15$; Halberstadt and Eaton 2002), perhaps because young adults from low expressive families had to develop substantial skill in

[1] We use the term, *emotionality*, in this paper, to refer to the construct of affect intensity. Although we prefer to use given terms for constructs, we were concerned about the resulting confusion from the multiple constructs using "intensity" as a term. In addition to affect intensity, "intensity level" refers to increases of morphed emotional intensity in the facial expressions participants observed, and "perceived emotional intensity" refers to the judgments made by participants about others' facial intensity.

deciphering their family members' facial expressions. In contrast, their peers from high expressive families had emotion-related information delivered in high volume across a multiplicity of channels, so that they never had to work very hard at decoding what their family members were feeling and thinking (Dunsmore and Halberstadt 1997; Halberstadt 1983, 1986).

As the next step in understanding this relationship, we explored whether facial expression intensity was relevant in the relationship between decoding accuracy and individuals' emotion-related socialization experiences. We considered two hypotheses: Individuals from low expressive families may be most skilled when facial expressions are subtle and possibly not even noticed by individuals from high expressive families. If so, then individuals from low and high expressive families would be more similar in their ability to accurately decode as facial expressions become prototypical. Alternatively, individuals from both low and high expressive families may be similarly challenged by subtle expressions, with everyone performing poorly for low-intensity expressions. If so, individuals from less expressive families may show their skill relative to individuals from high expressive families when moderate levels of information are provided. Given that family expressiveness—decoding effects have emerged with prototypical faces (Halberstadt and Eaton 2002), and as noted above, people sometimes have trouble correctly identifying even prototypical faces, we were inclined to predict the latter.

Emotionality

We did not consider it likely that emotionality would relate directly to decoding accuracy, although see below for predictions regarding relationships with perceived emotional intensity. However, because individuals' styles of experiencing and expressing emotions are sometimes intertwined, and because family expressiveness is sometimes related to individuals' emotionality (Burrowes and Halberstadt 1987), we wanted to control for variance due to emotionality in the relationships between family expressiveness and self-expressiveness with decoding accuracy. Thus, we entered emotionality into our models of decoding accuracy.

Self-Expressiveness

Like family expressiveness, one's own expressiveness style, independent of family style, may also be positively related to decoding accuracy, in that individuals' own facial expressiveness in the form of mimicry might provide self-cues for judging others' emotion expressions (Lipps 1907). Although two studies found little support (Blairy et al. 1999; Hess and Blairy 2001), other studies suggest that blocking mimicry reduces the speed with which one becomes aware of others' shifting emotional states, decreases recognition of emotions most reflected in facial movements (e.g., happiness and disgust); and reduces women's (but not men's) speed in processing affect (Niedenthal et al. 2001; Oberman et al. 2007; Stel and van Knippenberg 2008; respectively). These studies experimentally constrained participants' expressiveness, which might have had ancillary distraction effects and diverted cognitive resources from the task at hand. In contrast, the present study considered expressiveness at the individual difference level. This has the disadvantage of less experimental control, but also the advantage of assessing participants' natural behaviors. In addition to the positive effects from immediate mimicry, individuals' long-term expressive styles might impact decoding accuracy by providing guidance from years of mimicry.

Additionally, because family expressiveness is predictive of self-expressiveness, even when measured using different methods or reporters (Burrowes and Halberstadt 1987; Halberstadt and Eaton 2002), we wanted to separate variance due to self-expressiveness (current or acquired knowledge over time due to mimicry) versus family expressiveness (judging skill from past family experience) when predicting decoding accuracy.

Perceptions of Emotional Intensity

Identifying how much emotion another person is experiencing is an important but understudied domain in the emotion recognition literature. In extreme cases, the perception of another's emotional intensity can have life-or-death consequences (e.g., Spackman et al. 2002, on how jurors' perceptions of emotional intensity in the accused influence their decisions in murder cases). In more common situations, however, perception of emotional intensity also weighs heavily in individuals' responses to others (e.g., Hoffman 1982, and Strayer 1993, regarding children's empathic responses toward others).

Family Expressiveness

Family members in low expressive homes likely mask some of the intensity that they feel, given the norms in their households to be low expressive. In so doing, these individuals may produce expressions that belie their actual intensity, and require other family members to fill in the amount of emotion that is really underlying the expression. Consequently, people from low expressive families may interpret facial expressions of emotions as reflecting greater levels of emotionality than revealed, compared to people from high expressive families. Thus, we predicted that participants from low expressive families would perceive more intensity in facial expressions than participants from more expressive families.

Emotionality

Individuals' own styles of emotional experience may also guide their interpretations of how strongly others feel emotions, specifically in a way similar to the false consensus effect (Ross et al. 1977). For instance, someone who tends to experience powerful emotions may likewise perceive others to be experiencing strong emotions. Thus, we predicted a positive effect for emotionality on perceived emotional intensity. This is not necessarily a proximal effect, in that individuals are not in an emotional situation when judging faces. However, they might draw on their tendencies in emotion-eliciting experiences and thus interpret others' emotionality in light of their own, particularly for low intensity expressions.

Self-Expressiveness

Similarly to family expressiveness, we predicted that self-expressiveness would be negatively associated with perceived emotional intensity, thinking that when people are not very expressive, they might infer that others are masking emotional experiences as well. Further, other research has shown that although highly expressive individuals perceived

greater *expressive* intensity in others than less expressive individuals, they inferred lower *experiential* intensity (Matsumoto et al. 1999, 2002).

To summarize, we examined the role of three characteristics in the perceiver—family expressiveness, self-expressiveness, and emotionality—on individuals' facial decoding accuracy and perceptions of emotional intensity. Specifically, we predicted that family expressiveness would be negatively related to decoding accuracy and increasingly so, as level of facial expression intensity increased, and that self-expressiveness but not emotionality would also be related to decoding accuracy. We further predicted that family and self-expressiveness would be negatively related to perceived emotional intensity, but that emotionality would be positively related to perceived emotional intensity.

Methods

Participants

Participants were 24 female and 24 male college students at a large southeastern university who received credit toward the laboratory portion of their introductory psychology course. Ethnic representation in the course was 6% African-American, 1% Asian-American, 92% European-American, and 1% other ethnicity.

Questionnaires

The 40-item Family Expressiveness Questionnaire (FEQ) assesses emotional expressiveness in one's family of origin (Halberstadt 1986). The FEQ has demonstrated strong internal reliability, reliability over time, and construct validity (e.g., Burrowes and Halberstadt 1987; Cooley 1992; Dunsmore et al. 2009; Eisenberg et al. 1991; Halberstadt 1986; King and Emmons 1990; Perlman et al. 2008). The scale includes a 20-item subscale on positive family expressiveness (e.g., "Telling family members how happy you are") and a 20-item subscale on negative expressiveness (e.g., "Blaming one another for family troubles"). Respondents answer each question in terms of frequency of occurrence in their family, relative to other families, on a scale of 1 (*not at all frequently in my family*) to 9 (*very frequently in my family*).

The Affect Intensity Measure (AIM) assesses intensity of emotional experience. Developed as a 40-item scale (Larsen et al. 1986), it was simplified and shortened to a 20-item set that was more balanced between positive and negative items (Weed et al. 1985). The AIM has demonstrated strong internal reliability and construct validity in various forms and subscales (e.g., Flett et al. 1986; Fulford et al. 2008; Gross and John 1998; Larsen and Diener 1987; Larsen et al. 1986). We used 18 items, omitting two items that failed to load on either a positive or a negative factor (Gross and John 1998). This version includes eight positive items (e.g., "When I am happy, I feel like I am bursting with joy"), four negative items (e.g., "When something bad happens, others tend to be more unhappy than I"), and six general emotionality items (e.g., "Others tend to get more excited about things than I do", which is a reverse-scored item). Respondents answer each question in terms of *never* to *always* on a scale of 1–6.

The Berkeley Expressiveness Questionnaire (BEQ) assesses emotional expressiveness and strength of emotional experience (Gross and John 1995). The BEQ has demonstrated strong internal reliability, reliability over time, and construct validity (e.g., Barr et al. 2008; Gross and John 1995, 1997, 1998). This 16-item scale includes four positive expressivity

items (e.g., "Whenever I feel positive emotions, people can easily see exactly what I am feeling"), six negative expressivity items (e.g., "It is difficult for me to hide my fear"), and six impulse strength items (e.g., "I have strong emotions"). We used only the 10 expressivity items in order to completely differentiate emotional expressiveness from intensity of emotional experience. Respondents answer each question in terms of *strongly disagree* to *strongly agree* on a scale of 1–7.

Procedure

The study was conducted with groups of 5–10 students. Half of the participants completed the questionnaires first, had a 5-min refreshment break, and then completed the face rating portion of the study. The other half viewed the faces first, had the refreshment break, and then completed the questionnaires. Questionnaires were filled out in counterbalanced order.

Facial expressions of anger, sadness, disgust, and happiness for two female and two male European-American actors were selected from the JACFEE stimuli created by Matsumoto and Ekman (1988). Morphing was used to create intermediate expressions between the neutral and the full emotional display as described in Hess et al. (1997). Each of the intermediate expressions represented 20% incremental intensity steps of the pattern of relevant muscle movements away from the neutral toward the intense emotional expression. The resulting set of 80 stimuli (5 intensity levels $\times$ 4 emotions $\times$ 4 actors) was presented to each participant in random order on a 15-inch computer screen.

After participants completed two practice trials, they began the rating task. Each participant viewed each face for 3-s. Each face was then immediately replaced by a set of seven scales labeled "anger", "contempt", "disgust", "fear", "happiness", "sadness", and "surprise" and the prompt, "How intensely did the person feel the emotion?". Participant indicated for each emotion the intensity with which the shown face reflected the emotion. The scales that the participants used to rate the faces were represented by a 200-pixel long, bounded rectangle on the screen, the first 30 pixels of which were white and indicate a judgment of 0. The other 170 pixels were graded in color from light gray to dark gray. The darker the end of the scale, the greater the rating of intensity of the shown emotion. Each scale was labeled by an emotion, and they were anchored with the labels "*not at all*" and "*very intensely*" (Hess et al. 1997). Participants repeated all of the above steps until all 80 faces were rated.

Decoding accuracy was determined by which emotion was assigned the highest intensity rating for the displayed face. Thus, if a participant assigned the highest intensity value to the anger scale after viewing an angry face, an accuracy score of '1' was assigned to that case. If that participant had assigned the highest intensity value to the disgust scale instead, an accuracy score of '0' would have been assigned. Perceived emotional intensity was operationalized as the maximum intensity score assigned to a given face. The family expressiveness, self-expressiveness, and emotionality variables were each standardized. To avoid unnecessary collinearity in models featuring interactions involving morphed intensity level, this variable was centered at 60. However, to facilitate interpretation of our results, we refer to the original, non-centered intensity level values—20, 40, 60, 80, and 100—throughout the remainder of the article.

Results

Overview

Given multiple cases of data for each participant, we used multi-level modeling (MLM) to test the hypotheses. MLM accounts for shared variance within subjects while modeling between-subject differences. With 4 displayed emotions, 4 actors, and 5 intensity levels, the dataset featured 80 stacked cases per participant. These 80 cases correspond to Level 1, or intraindividual, sources of variance, whereas interindividual sources of variance are modeled at Level 2 of the MLM analyses.[2]

Preliminary Analyses

Sample means (and standard deviations) were 5.35 (.95) for family expressiveness, 3.76 (.57) for emotionality, and 2.75 (.68) for self-expressiveness. Family expressiveness was moderately related to self-expressiveness and emotionality, $r = .42$ and .31, $p = .003$ and .04, respectively. As in Gross and John (1997), emotionality and self-expressiveness were more strongly related, $r = .60$, $p < .001$, even after the removal of questions pertaining to emotional intensity from the latter scale.

Initial analyses were conducted to test the influence of participants' gender on decoding accuracy and perceived emotional intensity. The two models (one for decoding accuracy and one for perceived emotional intensity) each included the morphed intensity level of the displayed faces, facial expression (angry, disgust, happy, or sad), and participant gender and their interactions as predictors. Neither model produced a significant main effect or interaction involving participant gender; thus, gender was dropped from all subsequent analyses.

Decoding Accuracy: Effects of Family Expressiveness, Emotionality, and Self-Expressiveness

Given two levels of the decoding accuracy variable ('0', indicating decoding inaccuracy for a particular face, and '1', indicating decoding accuracy), we conducted multi-level logistic regression using the GLIMMIX macro available from SAS. To test the hypotheses concerning decoding accuracy, we ran a model which included the morphed intensity level of the displayed faces (Intensity) and scores on the family expressiveness scale (FE), the emotionality scale (Emot), and the self-expressiveness scale (SE) as predictors. We also included perceived emotional intensity (PEI) as a predictor in order to capture the effects of the expressiveness and emotionality variables on decoding accuracy, independent of variation in PEI. Finally, we included interaction terms for intensity level and each of the scales (see Eq. 1).

[2] Models were also run separately by valence, that is, for positive family expressiveness, emotionality, and self-expressiveness, and then again for negative family expressiveness, emotionality, and self-expressiveness. Results were so similar that we combined them for ease in presentation to the reader. These separate models are available by contacting the first author.

Table 1 Fixed effects for model predicting decoding accuracy

Parameter	
Intercept, γ_{00}	−0.6611** (0.1285)
Level 1 (trial-specific)	
Intensity, γ_{10}	0.0233** (0.0015)
Perception of Emotional Intensity, γ_{20}	0.0110** (0.0009)
Level 2 (participant-specific)	
Family Expressiveness, γ_{01}	−0.2246** (0.0992)
Emotionality, γ_{02}	−0.1864 (0.1174)
Self-Expressiveness, γ_{03}	0.3380** (0.1118)
Cross-level interaction	
Intensity × Family Expressiveness, γ_{11}	−0.0031† (0.0016)
Intensity × Emotionality, γ_{12}	0.0033† (0.0018)
Intensity × Self-Expressiveness, γ_{13}	−0.0012 (0.0017)

Note. Estimates and standard errors (in parentheses). The fixed effects must first be exponentiated in order to yield interpretable odds ratios

† $p < .10$, * $p < .05$, ** $p < .01$

$$\begin{aligned}
\text{Level 1:}\quad & \text{Accuracy}_{it} = \beta_{0it} + \beta_{1it}(\text{Intensity}) + \beta_{2it}(\text{PEI}) + r_{it} \\
\text{Level 2:}\quad & \beta_{0i} = \gamma_{00} + \gamma_{01}(\text{FE}) + \gamma_{02}(\text{Emot}) + \gamma_{03}(\text{SE}) + u_{0i} \\
& \beta_{1i} = \gamma_{10} + \gamma_{11}(\text{Intensity} \times \text{FE}) + \gamma_{12}(\text{Intensity} \times \text{Emot}) + \gamma_{13}(\text{Intensity} \times \text{SE}) \\
& \beta_{2i} = \gamma_{20}
\end{aligned} \tag{1}$$

The results from the above model are displayed in Table 1. Replicating Hess et al. (1997), highly intense faces were more accurately decoded than less intense faces. Independent of morphed intensity level, perceived emotional intensity was also positively related to decoding accuracy.

The model also yielded main effects for family expressiveness and self-expressiveness in the predicted direction; each standard deviation increase in family expressiveness resulted in a 20% decrease in the likelihood of decoding accuracy, and each standard deviation increase in self-expressiveness resulted in a 40% increase in the likelihood of decoding accuracy. The main effect for family expressiveness was qualified by an interaction at the .05 level. Decomposition of the interaction revealed that differences in decoding accuracy between individuals from more versus less expressive families were most pronounced for the moderate- to high-intensity faces: for intensity level of 60, $t(3786) = 2.26$, $p = .02$; 80, $t(3786) = 2.69$, $p = .007$; 100, $t(3786) = 2.85$, $p = .004$ (see Fig. 1). There was also an unpredicted and marginally significant Intensity Level × Emotionality interaction, $p = .07$. Decomposition of this interaction revealed that individuals who experienced relatively intense emotions were less accurate at decoding faces than participants who experienced less intense emotions, but only for the low intensity faces (see Fig. 2): at intensity level of 20, $t(3786) = 2.36$, $p = .02$; 40, $t(3786) = 2.09$, $p = .04$).

Perceptions of Emotional Intensity: Effects of Family Expressiveness, Emotionality, and Self-Expressiveness

Perceptions of emotional intensity was modeled as a function of the intensity level of the displayed faces, scores on the family expressiveness scale, emotionality scale, and self-

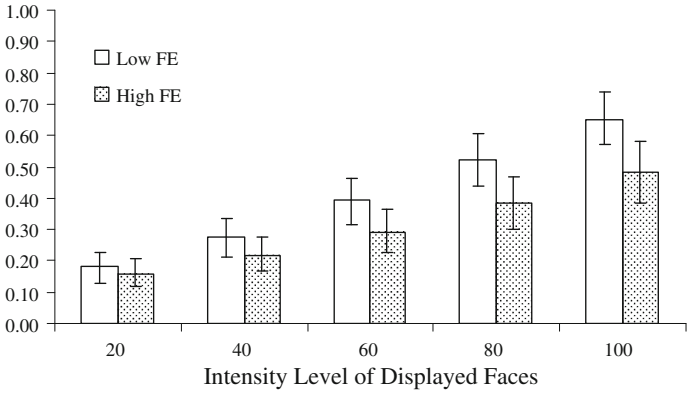

Fig. 1 Percent decoding accuracy by morphed intensity level and family expressiveness. Low FE corresponds to one standard deviation below the sample mean. High FE corresponds to one standard deviation above the sample mean. *Error bars* represent 95% confidence intervals

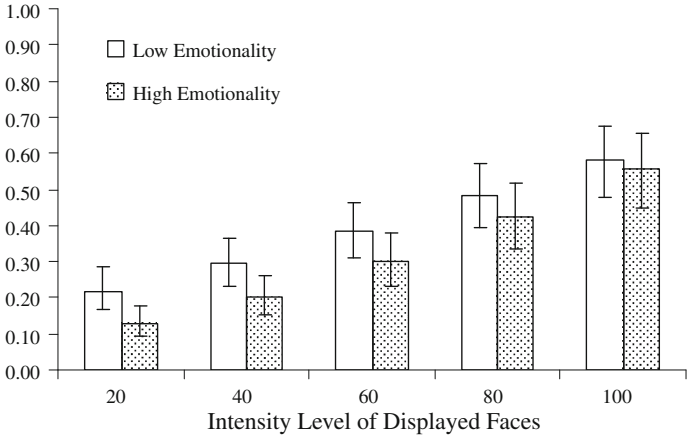

Fig. 2 Percent decoding accuracy by morphed intensity level and emotionality. Low Emotionality corresponds to one standard deviation below the sample mean. High Emotionality corresponds to one standard deviation above the sample mean. *Error bars* represent 95% confidence intervals

expressiveness scale, as well as their interactions (see Eq. 2). We also included a term for decoding accuracy (Accuracy) in order to assess the influence of the expressiveness and emotionality variables on perceived emotional intensity, independent of whether or not participants accurately decoded the faces.

$$\begin{aligned} \text{Level1:}\ PEI_{it} &= \beta_{0it} + \beta_{1it}(\text{Intensity}) + \beta_{2it}(\text{Accuracy}) + r_{it} \\ \text{Level2:}\ \beta_{0i} &= \gamma_{00} + \gamma_{01}(\text{FE}) + \gamma_{02}(\text{Emot}) + \gamma_{03}(\text{SE}) + u_{0i} \\ \beta_{1i} &= \gamma_{10} + \gamma_{11}(\text{Intensity} \times \text{FE}) + \gamma_{12}(\text{Intensity} \times \text{Emot}) + \gamma_{13}(\text{Intensity} \times \text{SE}) \\ \beta_{2i} &= \gamma_{20} \end{aligned} \quad (2)$$

First, we ran a fully unconditional model, which allowed us to estimate inter- and intraindividual variance in perceived emotional intensity. This revealed that interindividual

Table 2 Fixed effects for model predicting perception of emotional intensity

Parameter		
Fixed effects		
Intercept, γ_{00}	92.85**	(4.28)
Level 1 (trial-specific)		
Intensity, γ_{10}	0.58**	(0.02)
Decoding Accuracy, γ_{20}	18.46**	(1.38)
Level 2 (participant-specific)		
Family Expressiveness, γ_{01}	9.76*	(4.68)
Emotionality, γ_{02}	9.73†	(5.57)
Self-Expressiveness, γ_{03}	−9.74†	(5.31)
Cross-level interaction		
Intensity × Family Expressiveness, γ_{11}	0.08**	(0.02)
Intensity × Emotionality, γ_{12}	−0.13**	(0.03)
Intensity × Self-Expressiveness, γ_{13}	0.09**	(0.03)
Random effects		
Perception of Emotional Intensity level (τ_{00})	826.64**	(180.14)
Within-person variability (σ^2)	1462.88**	(33.62)

Note. Estimates and standard errors (in parentheses)
† $p < .10$, * $p < .05$, ** $p < .01$

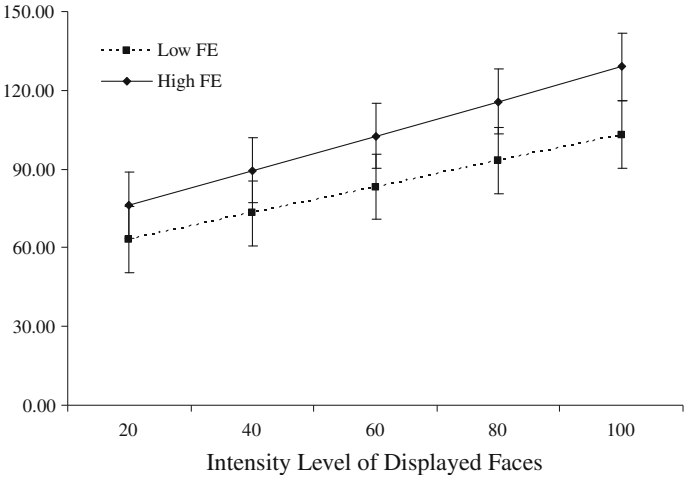

Fig. 3 Perceived emotional intensity by morphed intensity and family expressiveness. Low FE corresponds to one standard deviation below the sample mean. High FE corresponds to one standard deviation above the sample mean. *Error bars* represent 95% confidence intervals

differences accounted for 32% of the variance in perceptions of negative emotional expressiveness, and intraindividual variance accounted for 68% of the variance. We expected this level of imbalance, given the fact that the varying facial expressions and facial expression intensities contributed to intraindividual variance. Nevertheless, both sources of variance were significant, $p < .001$, further justifying our decision to use MLM.

Results of the full model, with predictors, are displayed in Table 2. As expected, participants perceived higher levels of emotional intensity as the morphed intensity level increased. The significant main effect for decoding accuracy again indicates a positive

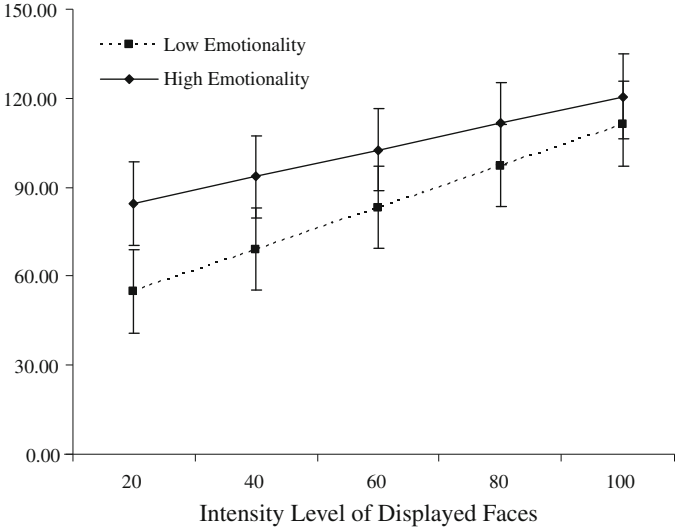

Fig. 4 Perceived emotional intensity by morphed intensity level and emotionality. Low Emotionality corresponds to one standard deviation below the sample mean. High Emotionality corresponds to one standard deviation above the sample mean. *Error bars* represent 95% confidence intervals

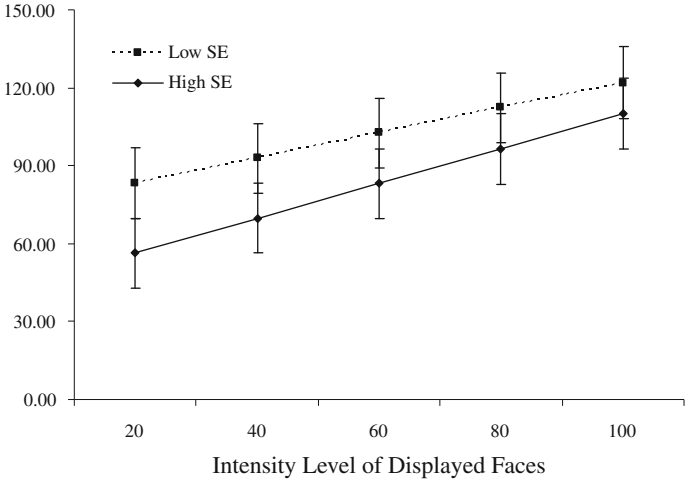

Fig. 5 Perceived emotional intensity by morphed intensity level and self-expressiveness. Low SE corresponds to one standard deviation below the sample mean. High SE corresponds to one standard deviation above the sample mean. *Error bars* represent 95% confidence intervals

relationship between decoding accuracy and perceived emotional intensity. The significant main effect for family expressiveness indicates that, contrary to our prediction, individuals from highly expressive families perceived more emotional intensity than did individuals from less expressive families. Further, the significant effect for family expressiveness and the marginally significant effects for emotionality and self-expressiveness were all qualified by significant interactions with intensity level. Decomposition of the Intensity Level × Family Expressiveness interaction revealed that the differences in how

participants from low versus high expressive families perceived emotional intensity increased as the morphed intensity level increased (see Fig. 3). At an intensity level of 60, $t(3787) = 2.08$, $p = .04$; 80, $t(3787) = 2.41$, $p = .02$; 100, $t(3787) = 2.71$, $p = .007$. The Intensity Level × Emotionality interaction indicated that the marginal main effect showing that participants who experience emotions weakly perceived less emotional intensity in others, compared to participants who experience emotions strongly, was significant for the least intense faces (see Fig. 4): at an intensity level of 20, $t(3787) = 2.61$, $p = .009$; 40, $t(3787) = 2.19$, $p = .03$. Finally, decomposition of the Intensity Level × Self-Expressiveness interaction revealed that the marginal main effect showing that less self-expressive individuals perceived more emotional intensity than did more self-expressive individuals was significant for the least intense faces (see Fig. 5): at an intensity level of 20, $t(3787) = -2.48$, $p = .01$; 40, $t(3787) = -2.17$, $p = .03$. Overall, the model accounted for 11% of the interindividual variance in perceptions of emotional intensity and 24% of the intraindividual variance.

Discussion

In addition to replicating previous findings relating family expressiveness and college students' emotion decoding accuracy (Halberstadt 1983, 1986; Halberstadt and Eaton 2002), the results of this study introduce evidence for a number of intriguing relationships between individual and family characteristics of experiencing and expressing emotion and the perceptual processes involved in interpreting others' emotional expressions. Moreover, by including facial expressions that vary systematically in intensity level, we were able to generate a more nuanced depiction of the effects of family expressiveness, emotionality, and self-expressiveness on decoding accuracy and perceptions of others' emotional intensity. Finally, our findings relating decoding accuracy and perceived intensity illustrate a set of inter-related processes that may provide a more comprehensive understanding of the interpretation of emotional expressions.

Decoding Accuracy

Replicating previous findings (Halberstadt 1983, 1986; Halberstadt and Eaton 2002), participants from less expressive families were more accurate at decoding prototypical faces than participants from more expressive families. Our study additionally contributes the finding that the difference between individuals from low versus high expressive families becomes more apparent as more emotion-related information becomes available. Specifically, at very low levels of intensity the expressions were difficult to decode and accuracy was just barely above chance levels. In this case, family background may matter little. However, as more information becomes available, individuals from less expressive families were able to utilize the expressive information more effectively in the service of identifying emotional expressions.

Further, in line with research that experimentally manipulated expressive mimicry, the present study identified that self-expressiveness as an individual difference variable predicted decoding accuracy. Thus, these results suggest that people who are naturally self-expressive, rather than directed to be expressive by experimenters, have some advantage in understanding others' emotions. Also, the direction of the effect is different from that of family expressiveness, in that *more* expressive individuals have the advantage in judging others' facial expressions. We find these findings particularly interesting because they

suggest multiple pathways to emotion understanding: family expressiveness likely creates a socialization context over a long period of time in which decoding skill is fostered (or not), whereas self-expressiveness may provide a useful but more immediate guide to understanding emotions within the current situation.

Perceptions of Emotional Intensity

Despite the importance of knowing more about how people interpret others' emotional intensity, the present study is one of only a few that considers what leads people to differentially weight others' emotional intensity. We found that family expressiveness was positively related to perceptions of emotional intensity, and that the difference between participants from high and low expressive families increased as the intensity level of the faces increased as well. Thus, in contrast to our hypothesis, participants from more expressive homes perceived *greater* emotional intensity than did participants from less expressive homes, and particularly at higher levels of morphed intensity. A possible explanation for this is that participants from more expressive families have less nuanced ideas about emotional intensity and the expression of it. That is, given expressive family members' possible tendency to escalate from no emotion to relatively dramatic displays of emotion, someone raised in such a household may view emotional expressions in extremes. Thus, individuals from high expressive homes may go from perceiving very minimal amounts of emotional intensity to perceiving a lot of emotional intensity over a small interval of expressive intensity. Future research might include measurement of individual differences in the threshold for perceiving emotion as well as perceived intensity of emotions.

Our prediction that individuals' own emotionality would be positively associated with their perceptions of others' emotional intensity was marginally supported, with significant differences at the lowest morphed intensity levels. Thus, for ambiguous faces, individuals might project their own emotional intensity onto others.

Our prediction that self-expressiveness would be negatively related to perceptions of emotional intensity was marginally supported, with significant differences at the lowest morphed intensity levels. Thus, for the most ambiguous faces, high expressive participants perceived less emotional intensity than did low expressive participants, perhaps referencing their own norms for emotional expression when making judgments about others' emotional expressions.

Relationship Between Decoding Accuracy and Perceived Emotional Intensity

An interesting finding was the strong relationship between decoding accuracy and perceived emotional intensity. These results suggest that either: (a) perceiving emotional intensity in a given face increases participants' likelihood of accurately decoding that face, or (b) accurate decoding results in participants' perceptions of greater emotional intensity for that face. The first explanation may suggest a motivational component to decoding accuracy, such that perceiving greater intensity increases an individual's focus to understand and respond to another person's emotional experience. This fits well with the positive relationship found in studies of children between perceived emotional intensity and empathy (Hoffman 1982; Strayer 1993). The second explanation seems to suggest that when people know what someone else is feeling, they imbue those feelings with greater significance or intensity. Perhaps confidence is a mediator in that process, such that clarity in the mind of the perceiver intensifies the quantity of the emotion that they perceive.

Determining the directionality of this effect, perhaps with a method that captures participants' confidence in their ratings, could be the focus of future research.

Limitations

Although we included four types of facial expressions and seven emotion labels for participants' answers, as with most studies of facial recognition, only one emotion (happiness) was definitively positive. It would be ideal to include more positive emotions in future research, but the fact that happiness is the only universally recognized positive facial emotional expression makes this a challenging task.

A second limitation is our reliance on self-report measures. Although emotionality would be virtually impossible to measure by any other method, family expressiveness and self-expressiveness can be measured via behavioral observation or accounts from various sources. However, the FEQ and BEQ have strong construct validity and high reliability over time, as noted above, making them sufficient, if not ideal, measures.

Strengths

Given these limitations, it is reassuring that substantial and persistent effects emerged for these individual difference variables, and perhaps especially for family expressiveness, which is a variable somewhat distal in its impact. That is, we made no attempt to activate family expressiveness styles in the laboratory setting, nor did we make any attempt to activate participants' self-expressiveness or emotionality with any kind of activity or mood induction. Thus, these findings suggest more deep-seated, intra-psychic mechanisms associated with judgments of accuracy and interpretation.

Of particular importance here is the cumulative effect of these individual differences. These judgment differences emerged with just 80 facial expressions, yet many of us observe at least this many facial expressions daily. Facial expressions in social interaction are also more likely to be ambiguous rather than prototypical, further increasing the challenge of assessing emotion type and intensity, and leaving these judgments prey to interpretive mechanisms. In addition, because interpretations of emotions are so often unspoken, there are few opportunities for correction when one errs in type or intensity of judgment. Because behavior often follows interpretation, the consequences of errors in the original interpretation may be exacerbated. In addition, the attributional process can itself decrease accuracy by leading to perceptual assimilation of the expressions as evidence for emotions being attributed—a circular inference that is not easily testable, and so eventually solidified in error (Halberstadt 2003; Halberstadt and Niedenthal 2001). Likewise, for perceived intensity, interpretations are likely to become somewhat solidified, and individuals then proceed in their social interactions to behave based on their perceptions.

Secondly, the link between decoding accuracy and perceived emotional intensity suggests a novel and more comprehensive view of the emotion-recognition process. Future research may be directed at identifying within-person factors that underlie accurate and inaccurate decoding and determining whether and how they operate in conjunction with perceived emotional intensity.

In conclusion, we replicated the negative relationship between family expressiveness and decoding accuracy, showing that the effect increases as more emotion-related information becomes available, and demonstrated for the first time, that self-expressiveness as an individual difference variable is positively associated with decoding accuracy. Family expressiveness also positively influenced individuals' perceptions of others' emotional

intensity, particularly when faces were more prototypical. Individuals' own emotionality tended to relate positively and expressiveness to relate negatively to their perceptions of others' emotional intensity, particularly for more ambiguous facial expressions. In sum, even simple facial judgments seem to be made through an interpretive lens partially created by family expressiveness, emotionality, and self-expressiveness.

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