BRIEF REPORTS

Smile Intensity and Warm Touch as Thin Slices of Child and Family Affective Style

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The authors investigate the claim that thin slices of expressive behavior serve as reliable indicators of affective style in children and their families. Using photographs, the authors assessed smile intensity and tactile contact in kindergartners and their families. Consistent with claims that smiling and touch communicate positive emotion, measures of children's smile intensity and warm family touch were correlated across classroom and family contexts. Consistent with studies of parent–child personality associations, parents' warm smiles and negative facial displays resembled those of their children. Finally, consistent with observed relations between adult personality and positive display, children's smiling behavior in the classroom correlated with parent ratings of children's Extraversion/Surgency. These results highlight the utility of thin slices of smiling and touch as indicators of child and family affective style.

Keywords: affective style, thin slice, positive emotion, temperament

Artistic portrayals of human character presuppose that people reveal their dispositions in telling nonverbal acts—the idiosyncratic facial expression, tone of voice, gesture, posture, or gait. The "thin-slice" literature dovetails with this artistic assumption: Brief samples of behavior reveal valid information about personality, intelligence, sexual orientation, and teaching competency (e.g., Ambady, Bernieri, & Richeson, 2000). Guided by discoveries in the thin-slice literature, we examined smiling and tactile behavior observed in still pictures of kindergarten children at school and with their families. These data advance three lines of inquiry. First, with respect to the emotional signaling literature, we examine the relationship between two modalities of positive emotional communication—smiling and touch. Second, with respect to the literature on family affective style, we ascertain whether parents and children resemble one another in their facial displays of emotion in posed still pictures. Finally, with respect to the childhood temperament literature, we address whether children's Extraversion/

Surgency covaries with the intensity of their positive emotional displays.

Affective Style, Expressive Behavior, and Temperament

Stable individual differences in the tendency to experience and express different emotions are observable as early as infancy and are central to one's affective style (Davidson, 2001; Eisenberg, Fabes, Guthrie, & Reiser, 2000; Izard, Lawler, Haynes, Simons, & Porges, 2000; Malatesta, 1990; Rothbart & Derryberry, 1981). These coherent patterns of expressive behavior shape the responses the individual evokes in others (Caspi & Bem, 1990; Malatesta, 1990) and covary with specific physiological responses, such as lateralization asymmetries in baseline brain activity assessed with electroencephalography (e.g., Davidson, Ekman, Saron, Senulis, & Friesen, 1990). A child's affective style predicts social behavior across the life course; for example, behavioral undercontrol and inhibition at age 3 predict related patterns of behavior, personality, and psychopathology into adolescence and adulthood (e.g., Caspi, 2000).

Individual differences in emotional experience relate systematically to higher order personality traits. In adults, Extraversion, characterized by an energetic approach to the social world, is defined by positive emotionality (John & Srivastava, 1999). In children, Extraversion/Surgency is characterized by parent reports of a lack of shyness, increased frequency of smiling and laughter, and increased high-intensity pleasure (Rothbart, Ahadi, Hershey, & Fisher, 2001).

Within families, the personality traits of parents and their children tend to be moderately correlated (Loehlin, 1992; Plomin &

Caspi, 1999), as do their emotional expressions. Parents' and children's positive expressivity is positively correlated from infancy into the college years; negative expressivity is also positively correlated across childhood, albeit more modestly than positive expressivity (Halberstadt & Eaton, 2002). These positive correlations are evident during family conflict discussions, wherein the positive and hostile expressions of mothers and their adolescent children tend to mirror one another (Eisenberg et al., 2008). Taken together, these studies suggest that a child's personality covaries with emotion and that parents' and children's emotional styles tend to covary.

Positive Emotion in the Face and Touch

In adults, brief samples of expressive behavior reveal the individual's affective style and life trajectory. In one illustrative study, Harker and Keltner (2001) coded the smiles of college women in their yearbook photos. The magnitude of the smile, as coded in the actions of the orbicularis oculi muscle that surrounds the eyes and the zygomatic major muscle that pulls up the lip corners, predicted increased self-reports of the disposition to affiliate with others, reduced stress, and increased personal and marital satisfaction over the next 30 years.

Across cultures, touch is central to soothing, signaling safety, reward, and the formation of secure attachments (e.g., Eibl-Eibesfeldt, 1989; Field, 2001). In a recent study of touch and positive emotion, adult participants in two cultures reliably communicated gratitude, love, and sympathy to a stranger with 1-s touches to the stranger's arm (Hertenstein, Keltner, App, Bulleit, & Jaskolka, 2006). One aim of this study, thus, was to examine the coherence of two potential thin slices of positive affective style: smile and warm family touch.

Present Study

In this study, we coded photographs of kindergartners in both classroom and family settings for positive and negative facial displays and for warmth of touch in family photos. On the basis of thin-slice literature and studies of emotional expression and temperament, we predicted (a) that children's smile intensity and warm family touch would be positively correlated; (b) that positive correlations between the facial displays of parents and their children would be evident in posed, still photographs; and (c) that children's Extraversion/Surgency would correlate with their smile intensity.

Method

Participants and Procedure

Participants were 91 children (44 girls and 47 boys; mean age = 5.8 years; 45 White, 10 African American, 10 Asian American, 2 Latino, and 24 multiethnic; mean maternal education level = college graduation; mean household income range = $80,000 to $100,000) and their parents (70 of the children lived with two parents; 19, with single mothers; 1, with a single father; and 1, with a grandmother). The children were recruited from eight kindergarten classes in three San Francisco Bay area public schools as part of a larger study of social status, physiological responses to adversity, and child health, called the Peers and Wellness Study.

Assessment of Child Temperament

Parent ratings of each child's Extraversion/Surgency, negative affect, and effortful control were obtained during fall of the kindergarten year using the very short form of the Children's Behavior Questionnaire (CBQ–VSF; Putnam & Rothbart, 2006), which assesses context-specific child behaviors during the prior 2 weeks.

Coding of Facial Affect and Tactile Contact

Smiling behavior was coded in two photographs using the Facial Action Coding System (Ekman & Friesen, 1978), an anatomically based system that identifies facial muscle movements according to their changes to the appearance of the face. Two Facial Action Coding System–certified coders (certification requires 80 hr of study and passing a reliability test), unaware of the participants' identity, coded the intensity of two facial action units associated with displays of positive affect, the orbicularis oculi (Action Unit 6) and zygomatic major (Action Unit 12), each coded on a scale ranging from 0 (*not present*) to 5 (*maximum intensity*). The sum of these two facial actions was computed as smile intensity (Harker & Keltner, 2001). Negative facial affect, typically exhibited in facial actions evident of sadness (oblique eyebrows, downturned corners of mouth) and anger (furrowed eye brow, glare, compressed lips), was coded on a scale ranging from 1 (*not present*) to 7 (*maximum intensity*).

Our analysis focused on two photographs. A posed smiling "classroom photo" of the child was taken between February 26 and March 21 of the kindergarten year. After asking each child individually to "say cheese" in the classroom, a research staff member took one photo focusing on the face, including the shoulders and top of the head, and then instructed, "again, say cheese" before taking a second smiling photo. All of the children smiled when asked. These photos were printed in high resolution on 4-in. × 6-in. (10.2-cm × 15.2-cm) glossy photo paper for coding. The photo with the highest rated smile was used in this analysis to reflect the peak intensity of positive affect (the smile intensity intraclass correlation between the two photos was .51; Shrout & Fleiss, 1979). We report only positive facial affect for the classroom photos because negative facial affect was virtually absent.

Second, a "family photo" depicted the child posed with other family members at home. Each child was given a disposable camera in May of the kindergarten year, with instructions to take a roll of photos at home, including at least one family photo of the child with his or her family. Sixty-eight families returned a roll of film containing a family photo. In four cases for which more than one photo meeting the criteria of "family photo" was returned, the first such photo in the roll was coded. On return of the cameras, a digital copy of each family photo was printed onto 8-in. × 10 in. (20.3-cm × 25.4-cm) paper for coding. Parents and children were coded for positive and negative facial affect. In several photos, one or more family members' faces were obscured, in which case all other family members were coded. Coders independently overlapped on 36% of classroom photos and 29% of family photos, with intraclass correlations for absolute agreement between coders ranging from .83 to .89.

Each family photo was also coded for tactile contact. Treating the family as the unit of analysis, each instance of contact between two family members was analyzed. Touches involving siblings,

who were present in 52 photos, were included in this analysis. A separate team of two coders first classified each touch as a restraint, aggression, arm around the shoulder, arm link, hand hold, hug, or other (see Hertenstein et al., 2006, for full coding scheme for classifying touches). Each touch was then rated for its warmth, or positive nature, on a scale ranging from 1 (*very cold*) to 7 (*very warm*), with coders independently overlapping on 38% of the photographs (intraclass correlation for absolute agreement = .87). Warm family touch was operationalized as the average warmth of touches in each family photo. The total number of touches per family was also retained for analysis.

Results

Table 1 presents the means for smile intensity and negative facial affect displayed by children and parents. Here we find that children's smiles were marginally stronger at home than at school, $F(1, 61) = 3.72$, $p = .06$, $\eta_p^2 = .06$. Consistent with previous studies, no sex differences were observed in the smiling of boys and girls in the classroom or family (both ps > .64; Dodd, Russell, & Jenkins, 1999; Hall, 1984). Mothers' smiles were marginally more intense than fathers', $F(1, 87) = .03$, $p = .08$, $\eta_p^2 = .06$, consistent with a recent meta-analysis indicating that women smile more than men (LaFrance, Hecht, & Paluck, 2003).

Covariation of Smile and Touch

We predicted that smile intensity and warm family touch would correlate positively. This hypothesis received some support. Warm family touch ($M = 4.81$, $SD = 0.78$) significantly correlated with child's smile intensity in the same family context, $r(64) = .29$, $p < .05$; for boys, $r(31) = .27$, $p = .14$; for girls, $r(33) = .30$, $p = .09$, and more impressively, with child's smile intensity in the classroom, $r(65) = .28$, $p < .05$; for boys, $r(33) = .37$, $p < .05$; for girls, $r(32) = .18$, $p = .33$. In contrast, total family touches ($M = 2.98$, $SD = 1.44$) were not significantly correlated with child's smile intensity in the family, $r(65) = -.06$, $p = .64$; for boys, $r(31) = .00$, $p = .64$; for girls, $r(33) = -.11$, $p = .56$, or in the classroom, $r(64) = -.05$, $p = .67$; for boys, $r(33) = -.01$, $p = $

Table 1

Mean Positive and Negative Affect Displayed by Children and Parents

	n	Smile intensity	Negative affect
Child in classroom			
All	88	3.50 (2.06)	—
Girls	43	3.40 (1.80)	—
Boys	45	3.60 (2.29)	—
Child in family			
All	65	4.09 (2.54)	1.46 (1.00)
Girls	34	4.09 (2.63)	1.47 (1.08)
Boys	31	4.10 (2.47)	1.45 (0.93)
Parent in family			
Mother	63	4.29 (2.37)	1.49 (0.74)
Father	46	3.30 (2.23)	1.39 (0.86)

Note. Smile intensity is reported on a scale ranging from 0 to 10. Negative facial affect was coded on a scale ranging from 1 to 7 scale. No negative affect was present in the posed smile photos in the classroom. Standard deviations are in parentheses.

.96; for girls, $r(32) = -.09$, $p = .64$. Whereas warm family touch correlated with increased smile intensity across contexts, child's smile intensity in the family and classroom was not significantly associated, $r(62) = .14$, *ns*. Total family touches were not significantly correlated with child's smile in the family context or classroom or with either parent's positive or negative affect (all ps > .18).

Similarities in Expressivity Between Parents and Children

The literatures on family expressive style (Halberstadt & Eaton, 2002) and transmission of temperament from parent to child (Plomin & Caspi, 1999) would lead to the prediction that the positive and negative emotional displays of parents and children should be positively correlated. Table 2 portrays findings that are in keeping with these expectations. The magnitude of the child's smile was significantly correlated with reduced negative affect in mothers, $r(59) = -.34$, $p < .01$, and fathers, $r(45) = -.30$, $p < .05$. This correlational finding is consistent with research showing that positive emotions attenuate negative emotions (Fredrickson & Levenson, 1998). Child's negative affect was significantly correlated with father's negative affect, $r(45) = .48$, $p = .001$, and mother's negative affect, $r(59) = .27$, $p < .05$. A similar pattern was found for girls, whose negative affect in the family photograph was marginally correlated with their father's negative affect, $r(23) = .40$, $p = .06$, and mother's negative affect, $r(31) = .34$, $p = .06$. For boys, however, negative affect in the family photograph was significantly correlated with their father's negative affect, $r(22) = .78$, $p < .001$, but not with their mother's negative affect, $r(28) = .18$, $p = .43$.

When considering smiling behavior, another gender-specific pattern emerged. For girls, smile intensity in the family photograph correlated significantly with father's smile intensity, $r(23) = .44$, $p < .05$, and marginally with mother's smile intensity, $r(31) = .30$, $p = .10$. Boys' smile intensity significantly correlated with father's smile intensity, $r(22) = .44$, $p < .05$, but not with mother's smile intensity, $r(28) = .03$, $p = .03$. Thus, for boys, positive emotional displays resembled those of the same-sex parent, but not the opposite-sex parent. It is also interesting to note that for mothers and fathers, smile intensity was positively correlated, $r(43) = .49$, $p = .001$, and negative affect was marginally correlated, $r(43) = .27$, $p = .09$.

Extraversion/Surgency, Smiling, and Warm Family Touch

Our final interest was to determine whether measures of smiling and touch correlate with parents' reports of their children's temperament. Following studies of the positive emotional core of Extraversion (Watson & Clark, 1997) and smiling behavior and adult personality (Harker & Keltner, 2001), we predicted that measures of the spontaneous display of pleasurable smiles and warm touches would correlate with ratings on the Extraversion/Surgency scale of the CBQ–VSF. In partial support of this prediction, we found that children's smile intensity in the classroom correlated with parents' reports of child's Extraversion/Surgency, $r(87) = .31$, $p < .01$; for boys, $r(44) = .33$, $p < .05$; for girls, $r(43) = .27$, $p = .08$. However, child's smile intensity in the family photo was not significantly associated with Extraversion/Surgency ratings, $r(64) = -.04$, $p = .75$. With regard to touch,

Table 2
Within-Family Coherence of Emotion in the Face

	Mother's smile intensity	Mother's negative affect	Father's smile intensity	Father's negative affect
Child's smile intensity				
All	.18	−.34**	.44**	−.30*
Girls	.30†	−.48**	.44*	−.37†
Boys	.03	−.14	.44*	−.20
Child's negative affect				
All	−.01	.27*	−.16	.48**
Girls	.00	.34†	−.11	.40†
Boys	−.03	.18	−.23	.78***
Mother's smile intensity			.49**	−.08
Mother's negative affect			−.28†	.27†

† $p < .10.$ * $p < .05.$ ** $p < .01.$ *** $p < .001.$

gender-specific findings emerged: Parents' ratings of girls' Extraversion/Surgency marginally correlated with warm family touch, $r(33) = .30, p < .10$. Boys did not display a similar effect, $r(34) = .07, p = .69$, nor did all children considered together, $r(67) = .17, p = .18$. Nor did Extraversion/Surgency correlate significantly with total family touches, overall $r(67) = −.10, p = .43$; for boys, $r(34) = .12, p = .51$; for girls, $r(33) = −.15, p = .40$.

The Effortful Control (EC) and Negative Affect (NA) scales of the CBQ–VSF did not correlate significantly with child's classroom smile intensity, EC, $r(87) = .06, p = .60$, and NA, $r(87) = .07, p = .53$; child's smile intensity in the family photo, EC, $r(64) = −.03, p = .81$, and NA, $r(64) = .16, p = .20$; child's negative affect in the family photo, EC, $r(64) = −.04, p = .75$, and NA, $r(64) = −.10, p = .43$; warm family touch, EC, $r(67) = .07, p = .60$, and NA, $r(67) = .17, p = .18$; nor total family touches, EC, $r(67) = .06, p = .63$, and NA, $r(67) = −.12, p = .34$; nor did we obtain any significant correlations for either gender.

Discussion

This study united two theoretical traditions—the thin-slice literature and the study of family expressivity—to ask whether brief samples of facial behavior and tactile contact can capture childhood and family affective style. With respect to three components of family affective style—child–parent expressive similarity, cross-modality emotional communication, and child temperament—brief measures of smile intensity and negative facial affect, as well as warm family touch, provided revealing insights into affective style.

First, with respect to parent–child relations, we observed significant correlations between the smiling behavior and negative facial displays of parents and their children. The magnitude of the correlations between parent and child expressive behavior was similar to those observed in self-report studies of parent–child personality associations (e.g., Plomin & Caspi, 1999). That these correlations were obtained using observations of the thinnest slices of child and family behavior—still photographs—indicates the utility of the thin-slice approach in research on family expressivity, which typically relies on much longer samples of behavior and questionnaire assessments. The deeper origins of these associations between parent and child affective style, such as early attachment processes, as well as genetics, represent fruitful lines of

study. Moreover, given recent studies linking emotional similarity or convergence to enhanced commitment in friends (e.g., Anderson, Keltner, & John, 2003), it would be fascinating to explore how similarity (and dissimilarity) in emotional facial behavior predicts levels of emotional closeness within the family.

Second, with respect to cross-modality emotional communication, this study provided evidence linking the intensity, or warmth, of a child's smile to the warmth of touching in the family. Instances of warm touch coded in family photos—embraces, hand holding, arms around shoulders—covaried with the increased intensity of warm smiles and the reduced intensity of negative affect in the face. It is important that this relationship was observed across context such that warm touching in the family setting correlated with the child's increased smile intensity not only in the family setting, but also in the classroom. This across-modality covariation suggests that warm tactile contact and Duchenne smiles share an underlying state, which we assume to be positive emotion and the intent to affiliate with others. More important, the warmth of touch proved to be a critical variable in this equation; total family touches, irrespective of their warmth, did not correlate with any assessment of smile intensity or negative facial affect. Thus, these data lend credence to the claim that touch is an important medium of the communication of positive emotion and that different forms of touch are distinguishable on the basis of their emotional content (Hertenstein et al., 2006).

Third, our study asked whether a child's temperament is manifest in emotional behavior. Much as affiliative adults show warmer, and stronger, Duchenne smiles (Harker & Keltner, 2001), kindergartners rated by their parents as higher in Extraversion/Surgency showed warmer, more intense smiles in the classroom setting. This finding did not replicate in the family setting, perhaps reflecting differences in how children express themselves around family members and peers. Thus, our data suggest that children may reveal their temperament through expressive behavior in more coherent fashion around peers than around families.

It is interesting to note that our results diverge slightly from previous studies of temperament in that smiling behavior was associated with Extraversion/Surgency but not effortful control; previous studies have found that parent reports of children's smiling map onto both dimensions (Rothbart et al., 2001). These divergent findings may indicate that smile intensity more closely

aligns with the construct of high-intensity pleasure, which loads onto Extraversion/Surgency. Thus, it will be interesting for future studies to assess both smile intensity and frequency and distinguish between their associations with dimensions of child temperament.

Although it is interesting to speculate about the directionality of the observed relationships, it is important to note that this study is entirely correlational. For example, although it is tantalizing to suggest that warm touching in families may produce more outgoing children, it may also be that happy kids elicit warm responses from their parents or that an unmeasured third variable is driving the relationship.

It is also important to note that the photos in this study were posed, which raises the question of whether self-presentational issues influenced emotional expressions, especially with regard to our gender-based findings. Hall, LeBeau, Reinoso, and Thayer (2001) found that in a status-based interaction, women smiled more than men in posed but not in candid photos. Thus, one may wonder whether posed photos convey similar affective information as spontaneous displays of emotion. We hasten to note that emotional expressions in posed photos have predicted personality and life outcomes in other studies (Harker & Keltner, 2001). Moreover, the fact that the photos were posed does not preclude the possibility of felt emotion. In fact, 69% of our participants displayed Duchenne smiles in the classroom, supporting the notion that the photos captured authentic aspects of the participants' affective style.

Taken together, this study's results suggest that family affective style can be captured with the thinnest slices of behavior, in the fleeting movements of muscles in the face, and in patterns of warm touch. These findings lay the foundation for several areas of inquiry. How does family affective style change over time? Can one discern a family affective style across multiple generations? Answers to questions such as these are enabled by thin slices of family affective style.

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