

When the Face Reveals What Words Do Not: Facial Expressions of Emotion, Smiling, and the Willingness to Disclose Childhood Sexual Abuse

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For survivors of childhood sexual abuse (CSA), verbal disclosure is often complex and painful. The authors examined the voluntary disclosure–nondisclosure of CSA in relation to nonverbal expressions of emotion in the face. Consistent with hypotheses derived from recent theorizing about the moral nature of emotion, CSA survivors who did not voluntarily disclose CSA showed greater facial expressions of shame, whereas CSA survivors who voluntarily disclosed CSA expressed greater disgust. Expressions of disgust also signaled sexual abuse accompanied by violence. Consistent with recent theorizing about smiling behavior, CSA nondisclosers made more polite smiles, whereas nonabused participants expressed greater genuine positive emotion. Discussion addressed the implications of these findings for the study of disclosure of traumatic events, facial expression, and the links between morality and emotion.

Childhood sexual abuse (CSA) is an important social problem, one with potentially devastating consequences for the psychological adjustment of the survivor (Browne & Finkelhor, 1986; Rind & Tromovitch, 1997; Spaccarelli, 1994; Trickett & Putnam, 1993). Whether survivors of past CSA experiences are able or willing to disclose such experiences to others may have enormous implications for their health and well-being. The act of disclosing past traumatic experiences can exert a salubrious effect on health and well-being (Smyth, 1998). What is more, disclosure of such events

is often a prerequisite for access to mental health services. Unfortunately, however, the verbal disclosure of past CSA is complicated for a number of reasons, not the least of which are concerns about the stigmatized nature of the abuse and uncertainties about how others may respond to the disclosure (Femina, Yeager, & Lewis, 1990; Nagel, Putnam, Noll, & Trickett, 1997). In the current study, we examine facial expressions of emotion as possible nonverbal markers of past CSA experience and of CSA survivors' willingness to voluntarily disclose such experience when provided the opportunity to do so.

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When Words May Fail

For more than a century, researchers and theorists in psychology have promoted the view that verbally describing traumatic emotional experiences is essential for psychological and physiological well-being (Breuer & Freud, 1895/1955; Jourard, 1959; Rogers, 1961). The disclosure of traumatic emotional experiences is believed to foster adaptive social comparison processes (Clark, 1993) and to promote the reorganization and accommodation of such experiences into existing meaning structures (Horowitz, 1986; Janoff-Bulman, 1992; Pennebaker & Francis, 1996). Unfortunately, verbal disclosure of traumatic events can be exceedingly painful, and there are often clear limits as to how willing or able other people may be as listeners (Kelly & McKillop, 1996; Silver, Wortman, & Crofton, 1990). Thus, the verbal disclosure of trau-

matic emotional experiences offers something of a cruel paradox (Harber & Pennebaker, 1992), one that may be especially salient in the context of events that carry a negative social stigma, such as pediatric HIV/AIDS (Sherman, Bonanno, Wiener, & Battles, 2000) or CSA (Nagel et al., 1997).

In addition, the verbal disclosure of traumatic emotional events originating in childhood, such as CSA, carries with it the further complication that others may doubt the accuracy of the claim. It is often difficult to ascertain the legitimacy of retrospective reports of abuse on the basis of the putative survivor's statements alone (Pope, 1996; Reviere, 1996). Conversely, in cases when the occurrence of CSA is suspected by mental health professionals or close friends, the absence of verbal disclosure may evoke suspicions of repressed memories (Reviere, 1996). Indeed, there has been considerable controversy regarding the actual prevalence of CSA and whether failures to disclose prior abuse experiences are best explained as normal forgetting, defensive memory blockage, avoidance, or unwillingness to revisit the experience (Briere & Conte, 1993; Everson & Boat, 1989; Femina et al., 1990; Loftus, Garry, & Feldman, 1994; Reviere, 1996; Williams, 1994).

What the Face Can Reveal

Although the limitations of retrospective verbal disclosure of CSA are well documented, little is known about how aspects of CSA may be communicated through nonverbal channels (e.g., posture, gestures, facial displays). Clearly, many kinds of information, such as abstract knowledge or detailed propositional information, are communicated with great efficiency through language. However, many other aspects of experience, such as emotion, are readily and effectively conveyed in humans' extensive repertoire of nonverbal behaviors (Darwin, 1872; Ekman, 1992, 1993; Izard, 1977, 1993; Keltner & Ekman, 2000; Panksepp, 1992).

Facial expressions in particular provide a rich and powerful means of communication. Facial expressions of both positive and negative emotions, even when sampled from brief temporal intervals, have been associated with variations in long-term personal and social adjustment (e.g., Bonanno & Keltner, 1997; Gottman & Levenson, 1992; Keltner & Bonanno, 1997; Keltner, Moffitt, & Stouthamer-Loeber, 1995). Facial displays have also proved to be useful indices of an individual's response to particular life events. For instance, facial expressions of negative and positive emotions in the early months of bereavement have been found to predict long-term grief course (Bonanno & Keltner, 1997). In addition, facial expressions are a primary means by which emotion is communicated socially (Bowlby, 1980; Darwin, 1872; Ekman, 1993; Keltner & Kring, 1998). Facial expressions play a vital role in interpersonal processes and signal the nature of ongoing social interactions (Campos, Campos, & Barrett, 1989; Keltner et al., 1995; Lazarus, 1991). Facial expressions also evoke responses in others and play a role in the regulation of ongoing social interactions by encouraging or deterring specific behaviors in other people (Bonanno, 2001; Keltner & Bonanno, 1997; Keltner, Kring, & Bonanno, 1999). In all, this evidence suggests that facial expressions can potentially communicate information about the ways CSA survivors currently experience past abuse as well as how CSA survivors might respond to interpersonal situations in which they might potentially disclose the abuse.

CSA and the Moral Emotions

The sexual abuse of a child represents an unambiguous violation of the social-moral order. For this reason, the emotions whose facial expressions are of the utmost relevance to CSA should be those emotions associated with moral behavior. There is growing consensus for the emotional basis of moral judgments (Haidt, in press; Haidt, Koller, & Dias, 1993; Kagan, 1984; Shweder & Haidt, 1993). What is more, the ways that people care about violations of the moral order suggest two coherent clusters of emotions (Rozin, Lowery, Imada, & Haidt, 1999; Vasquez, Keltner, Ebenbach, & Banaszynski, 2001) with clear relevance to the willingness to disclose CSA. One class of moral emotions includes shame, embarrassment, and guilt and is focused inwardly toward one's own perceived role in a violation. These emotions, often referred to as self-conscious emotions (Keltner, 1995; Lewis, 1993; Tangney & Fischer, 1995), are linked to people's ongoing assessments of their own behavior and moral worth and how well they fit with standing cultural values (Borg, Staufenbiel, & Scherer, 1988; Izard, 1977; Lazarus, 1991; Lewis, 1993; Tangney, 1999). A second class of moral emotions includes disgust, anger, and contempt and is focused outwardly on the violations of others. These have been referred to as other-critical emotions (Rozin, Lowery, et al., 1999).

These two classes of moral emotions suggest straightforward predictions regarding the voluntary disclosure of past abuse experiences. As we elaborate below, the inwardly focused, self-conscious emotions suggest a propensity toward self-blame and concealment. In the context of CSA, this propensity holds particular relevance to the expression of shame. Thus, we hypothesized that CSA survivors who did not voluntarily disclose a past abuse experience when provided the opportunity to do so would show greater facial expressions of shame. In contrast, the outwardly focused, other-critical emotions suggest a willingness to openly acknowledge the abuse event and its perpetrator. In the context of CSA, this propensity is most relevant to the expression of disgust. Thus, we expected that CSA survivors who did disclose a past abuse experience when given the opportunity to do so would show greater facial expressions of disgust. In addition, we hypothesized that the expression of disgust would serve as a marker of abuse severity. We anticipated that a similar pattern of findings might also be evidenced for facial expressions of anger. However, because the evidence linking anger with the disclosure of CSA was less straightforward, we did not make formal predictions regarding this emotion.

Shame

Of the self-conscious emotions, shame is of particular relevance to CSA (Talbot, 1996; Zupancic & Kreidler, 1999). In addition to its links to appraisals of self-blame (Tangney, 1992), two other functions attributed to the expression of shame suggest a propensity to avoid disclosure of the abuse event. First, shame is associated with concealment (Darwin, 1872; Tangney, Miller, Flicker, & Barlow, 1996), which manifests behaviorally as downward head movements and gaze aversion. The association of shame with concealment in the specific context of abusive relationships is supported by the clinical literature. Using self-report data, Høglund and Nicholas (1995) found that the experience of shame

was associated with greater exposure to emotional abusiveness but also to covert hostility and unexpressed anger. Clinical observations have associated CSA with toxic shame and with a concomitant fear of experiencing emotion (Zupancic & Kreidler, 1999). Likewise, shame has been associated with the concealment of troubling issues within the family system (Madanes, 1997) and, in many cases, concealment of information about the abuse itself (Talbot, 1996).

It is somewhat paradoxical that the urge to conceal one's shame is countered by shame's competing function as a nonverbal signal of appeasement: the awareness of and regret for one's moral transgression (Keltner & Buswell, 1997; Miller, 1996; Tangney, 1999). An individual who violates a social norm threatens the validity of the norm and runs the risk of incurring unfavorable evaluations from others. Nonverbal displays of shame appease others by indirectly acknowledging a transgression and submissively apologizing for its occurrence. Hence, CSA survivors who experience self-blame and a sense of moral transgression may desire to conceal their intense emotional reactions but may at the same time express these feelings nonverbally. The expression of shame also allows one to express self-blame without actually verbally disclosing the occurrence or the details of the CSA event. On the basis of this reasoning, we expected that CSA survivors who did not voluntarily describe an abuse experience when given the opportunity to do so would be more likely to show facial expressions of shame than would both CSA survivors who did voluntarily disclose abuse and nonabused individuals.

Disgust

Recent theorizing about disgust suggests a clear association with CSA and with the willingness to voluntarily disclose past CSA experiences. Disgust is associated with deterioration and spoiling, with the violation of the integrity and purity of the body, and with the literal and metaphoric sense of being contaminated or poisoned, including the sense of being contaminated by another person (Goffman, 1967; Izard, 1977; Lazarus, 1991; Oatley & Jenkins, 1996; Rozin & Fallon, 1987; Rozin, Haidt, & McCauley, 1999). In particular, recent studies of the links between disgust and moral transgression find that sexual violations are a primary elicitor of disgust and that the primary emotion associated with sexual violations is disgust (Rozin, Haidt, & McCauley, 1999; Vasquez et al., 2001). This recent evidence suggests that of the other-critical moral emotions, disgust is associated most directly with responses to CSA (Haidt, Rozin, McCauley, & Imada, 1997; Rozin, Lowery, et al., 1999). Self-reports of disgust are common among both adult victims of sexual assault (Isac & Schneider, 1992; Petrak, Doyle, Williams, Buchan, & Forster, 1997) and adults recalling CSA (Long & Jackson, 1994). That disgust might be particularly likely during the verbal disclosure of CSA is suggested by evidence that disgust is often evoked in response to improper interpersonal behavior (Gehm & Scherer, 1988) and is a signifier of social rejection (Keltner & Haidt, 2001).

On the basis of this literature, we expected that the CSA survivors who voluntarily described an abuse experience would show facial expressions of disgust more frequently than would CSA survivors who did not voluntarily disclose abuse or nonabused participants. The design of the present study did not allow for causal inferences about the a priori experience of these emotions

leading to the disclosure of CSA. However, because the CSA participants included in this study had verified histories of sexual abuse, evidence for the unique association of disgust with the disclosure of CSA would document the usefulness of these facial displays as nonverbal markers of a genuine history of CSA. In addition, owing to its unique association with CSA among the other-critical emotions, we hypothesized that disgust would be associated with the severity of CSA, regardless of whether the CSA was disclosed. Support for this hypothesis would document the usefulness of these facial displays as nonverbal markers of abuse severity.

Anger

Like disgust, anger is elicited in response to appraisals of an offensive or blameworthy external object or idea (Lazarus, 1991; Ortony, Clore, & Collins, 1988; Rozin, Lowery, et al., 1999). There is also some evidence suggesting anger as a common response to CSA. Anger is associated with being compelled to do something against one's wishes (Izard, 1977) and with abusive relationships (Keltner & Haidt, 2001; Mannarino, Cohen, & Gregor, 1989; Spaccarelli, 1994). Survivors of CSA often report experiencing anger (Newman & Peterson, 1996; Scott & Day, 1996). Additionally, a factor analysis of retrospective self-reports of emotions among survivors of CSA has shown a high level of co-occurrence among anger and disgust (Long & Jackson, 1994).

Despite the relevance of anger to CSA, the links between the expression of anger and the verbal disclosure of CSA are less straightforward than for disgust. First, anger is relevant to a broader array of other-critical appraisals than is disgust. From a moral perspective, disgust is elicited primarily by violations of dignity and bodily integrity, of which CSA is a prime example. In contrast, anger is elicited by a range of actions that might violate an individual's freedom and autonomy, including lying, cheating, and stealing, and by actions that violate various rights and the expectation of fair treatment (Rozin, Lowery, et al., 1999; Vasquez et al., 2001). Thus, the disclosure of distressing events other than CSA may be equally likely to elicit anger.

Second, CSA survivors are often less willing to openly express anger relative to other emotions when describing a past abuse experience. For example, sexually abused girls report greater attempts to inhibit anger and report greater expectations of conflict when expressing anger relative to nonabused girls matched for age and socioeconomic status (Shipman, Zeman, Penza, & Champion, 2000). On the basis of these considerations, we explore but did not predict a specific association between facial expressions of anger and either the verbal disclosure of CSA or the severity of past CSA.

Duchenne and non-Duchenne Smiling

In the present study we also examine the relationships among disclosure, CSA, and smiling behavior. Although at first blush it is paradoxical to anticipate relations between smiling and something as traumatic as abuse, recent studies lend credence to this line of inquiry. Smiling is commonly observed in most human encounters (Lockard, Fahrenbruch, Smith, & Morgan, 1977), even in contexts pertaining to highly aversive events such as the recent death of a spouse (Bonanno & Keltner, 1997). An important distinction in

determining how smiling relates to CSA and its disclosure, however, is that between Duchenne and non-Duchenne smiles. Historically, emotion researchers have distinguished genuine or Duchenne smiles, which involve activity in the orbicularis oculi muscles surrounding the eye and are associated with genuine positive emotion, from non-Duchenne smiles, which are not associated with positive emotion (Duchenne de Bologne, 1862; Ekman & Friesen, 1982; Frank, Ekman, & Friesen, 1993; Keltner & Bonanno, 1997).

Whereas Duchenne smiles are associated with pleasure, non-Duchenne smiles tend to occur with other goals or motives. Most notably, non-Duchenne smiles tend to occur with concealment (e.g., hiding negative emotion), deception (e.g., convincing another person that one is experiencing positive emotion when one is not), and social politeness (e.g., indicating that one will behave in a cordial, socially appropriate manner; Ekman, 1985; Owren & Bachorowski, 2001). Generally, then, most forms of non-Duchenne smiling can be characterized as deliberate attempts to influence the behavior or judgment of another person in the absence of genuine positive emotion. This analysis led us to expect that non-Duchenne smiling would co-occur more often with expressions of shame and that they would be more prevalent among CSA survivors who did not voluntarily disclose a past CSA experience when provided the opportunity to do so.

It is perhaps more counterintuitive that recent theorizing about positive emotion and relevant evidence led us to make predictions concerning Duchenne smiles of pleasure. Theorists have argued that one primary function of certain positive emotions is to reduce or undo distress (Fredrickson, 1998), even the enduring distress associated with traumatic events such as bereavement (Folkman & Moskowitz, 2000; Keltner & Bonanno, 1997). In one relevant study, bereaved participants who showed Duchenne laughter and smiling while discussing the death of their spouse had reduced grief severity up to 2 years later, even when researchers controlled for initial grief (Bonanno & Keltner, 1997). In a similar spirit, women who showed strong Duchenne smiles in their college yearbook photos reported less distress on a daily basis in personality assessments taken up to 30 years later as well as greater overall emotional and physical well-being (Harker & Keltner, 2001).

In the present study, we ask, in effect, the question that complements the preceding studies: Does a particularly traumatic event, experienced early in life, predict a reduced capacity for positive emotion during discussion of that event? CSA, as we show, is especially traumatic, associated with high levels of dysfunction and symptomatology compared with other forms of trauma. On the basis of this fact and the preceding reasoning, we expected that CSA survivors would show at least some Duchenne smiling while discussing their past but also that nonabused girls in a comparison sample would show Duchenne smiling to a greater degree, even while discussing their own personal traumatic events.

The Current Investigation

The current study provides a rare opportunity to examine these hypotheses regarding facial expressions and the disclosure of CSA as part of an ongoing, longitudinal study of women's health and development. CSA participants were originally recruited during childhood by referral from social workers assigned to their CSA

case. In addition, a nonabused comparison sample was recruited and followed longitudinally. All participants were assessed at four different waves of data collection during the course of the longitudinal study. At the time of the most recent assessment (Time 4), an average of 7.1 years ($SD = 1.5$ years) had passed since the original (Time 1) assessment. It is important to note that, during the first three assessments, neither the CSA survivors nor the comparison group were directly questioned about sexual abuse (for more details regarding the original study, see Noll, Trickett, & Putnam, 2000; Putnam, & Trickett, 1997; Trickett & McBride-Chang, 1995).

Both facial expressions of emotion and the willingness to verbally disclose CSA were assessed at Time 4 using a semistructured interview in which participants were asked to describe the most distressing event or series of events they had ever experienced. This interview took place prior to any direct questioning about sexual abuse experiences. Using participants' responses to this task, we formed three unique groups: (a) CSA survivors who voluntarily disclosed a past abuse experience (CSA disclosure group), (b) CSA survivors who described a nonabuse event (CSA nondisclosure group), and (c) women who had never been abused (nonabused comparison group). Our primary interest lay in documenting unique patterns of facial expressions of emotion that could distinguish these groups. We advanced the following three sets of hypotheses. First, we expected the CSA nondisclosure group to show greater facial displays of shame and greater non-Duchenne smiles relative to the other two groups. Second, we expected that the voluntary act of disclosing a past CSA experience (CSA disclosure group) would be associated with greater facial expressions of disgust and that expressions of disgust would be associated with abuse severity regardless of whether the abuse was disclosed verbally. Third, we expected the nonabused sample to be better adjusted than the other two samples and, as a feature of this better adjustment, to show relatively greater displays of Duchenne smiling.

The semistructured interview was followed by a structured interview in which participants were asked directly about previous sexual abuse experiences. Using these data, we explored the further hypothesis that facial expressions of shame and non-Duchenne smiles during the semistructured interview would be greatest among CSA participants who ultimately denied ever having been abused when questioned directly.

To further explore the factors assumed to underlie the hypothesized relationships between each type of moral emotion and disclosure condition, we examined several additional variables. One such variable was the attribution of perpetrator blame, coded from participants' narrative discourse. The association of expressions of disgust with the voluntary disclosure of CSA was predicated on the assumption that participants expressing disgust would readily and unambiguously assign blame to the perpetrator of the abuse. In an attempt to provide support for this assumption and, in doing so, add further support to the idea that disgust accompanies the disclosure of CSA because it is an other-critical emotion, we coded transcripts of the narrative interview for perpetrator blame. We expected that facial expressions of disgust would be more prevalent among individuals whose narratives provided clear evidence of perpetrator blame and explored whether this association might also hold true for expressions of anger.

Shame is linked to self-blame. However, although it is possible to code self-blame from participants' narratives, we did not expect self-blame in the narratives to correspond to expressions of shame, owing to the fact that, for these individuals, the content of the narrative by definition does not mention CSA or self-blame associated with CSA. The association of shame with self-blame and concealment suggests, however, that shame should be associated with past failures to disclose the abuse. Owing to the longitudinal nature of the larger, parent study, additional data were available from which to address this question. Specifically, we were able to divide the CSA sample into those who originally reported their abuse (purposeful disclosers) and those who had not originally disclosed CSA but rather were brought to the attention of the child protection services because a third party discovered their abuse (accidental disclosers). We expected that expressions of shame and non-Duchenne smiles during the current study would be more prevalent among participants who were originally accidental disclosers.

Method

Participants

Participants were part of an ongoing longitudinal study of the long-term effects of CSA that began in 1987. The sample for the current analyses consists of those who participated in the fourth wave of data collection ($N = 163$), roughly half of whom had experienced some form of CSA. Abused participants were referred by city or county protective service agencies in the greater Washington, DC, area. Eligibility criteria were (a) that the participant be a girl at least 6 years of age, (b) that disclosure of abuse occurred within 6 months of referral, (c) that abuse involved genital contact and/or penetration, and (d) that the perpetrator was a family member, defined as parent, stepparent, older sibling, mother's live-in boyfriend, uncle, or other relative. Comparison girls were recruited through community advertising and were similar to the abuse sample in terms of ethnic group, age, socioeconomic status, and family constellation. The families ranged from low to middle socioeconomic status, with mean Hollingshead (1976) scores of approximately 35 (defined as blue collar or working class). The sample has been reassessed approximately every 2 years after this initial assessment. During the first three waves of data collection, participants were not interviewed directly regarding sexual abuse.

The fourth wave of data collection, used in the current study, occurred an average of 7.1 years ($SD = 1.5$) after participants' original abuse-related assessment. Of the 163 participants, 8 did not provide information about trauma histories (2 were too young to receive the trauma history interview, 1 participated by mail, 2 refused to answer the questions, and 3 provided incomplete information). Twelve additional participants could not be classified as abused or comparison participants because they entered the study as comparison participants but later revealed that they had experienced some form of CSA or because they entered as abused participants with noncriterion abuse histories. Finally, data from 6 participants could not be coded for facial expressions of emotion because the video quality was poor, a portion of the face was obscured (by hair or turned head), or the participant moved out of visual range. Thus, the current analysis is based on 137 (67 abused, 70 comparison) of the original participants. The average age of these participants was 18.2 years ($SD = 3.4$ years). There were slightly more White ($n = 72$, 53%) than minority (Black or Hispanic) participants ($n = 65$, 47%) in the sample. The mean Hollingshead score for the sample was 35 ($SD = 13.03$). Abused and comparison groups did not differ with respect to these demographics (all $ps > .15$).

Procedure

Participants were seated in front of a computer screen, and physiological sensors were attached. Participants were instructed to sit quietly, relax, listen (through headphones) to a relaxing piece of music (i.e., Enya), and view a relaxing image (i.e., Afterdark™ fish screen saver) for a few minutes. This period lasted 4 min and served as a baseline for heart rate data, which are reported elsewhere (Bonanno, Noll, Putnam, O'Neill, & Trickett, 2001). After the baseline period, participants remained seated, and a female interviewer entered the room. The interviewer read a script adapted from procedures described by Bonanno, Keltner, Holen, and Horowitz (1995) for conducting open-ended, narrative interviews. The script informed participants that they would be asked to speak for several minutes about the most distressing event or series of events they had ever experienced. Participants were further informed that the interviewer would keep track of the time and indicate the beginning and end of the interview, that the best way to approach the task was to "try to relate as openly as possible whatever comes to your mind," and that the interviewer would seldom speak other than to ask clarifying questions. To encourage spontaneous discourse, the interviewer stated that "if at any time you go blank, or run out of things to say, just relax and give yourself time to think about something else related to the topic." Once participants identified their most distressing events, they were instructed to describe the events for approximately 6 min.

Following this task, participants were administered a second interview, in which they were asked whether they had experienced any number of possible traumas in their lifetime, including physical abuse, sexual abuse, neglect, natural disasters, witnessing violence, self-harm, or significant separations. This was the first time since their original recruitment that participants were directly asked about sexual abuse in this study. Thus, participants were given two chances to disclose CSA, once when prompted for the most distressing event (voluntary disclosure), and once when asked specifically about sexual abuse experiences (requested disclosure).

Disclosure Groups

Of the 67 CSA participants, two thirds ($n = 44$, 66%) described an abuse event (CSA disclosure group) as the most distressing event of their life. The remaining 23 participants in the abuse group described nonabuse topics as the most distressing event in their life (CSA nondisclosure group). The most frequent topics described by the CSA nondisclosure group were the death of a close friend or family member ($n = 8$), followed by family conflict or divorce ($n = 4$) and conflicts with friends or peers ($n = 4$). Seventy participants composed the nonabuse comparison sample. Similar to the CSA nondisclosure group, the most frequent topics described by the nonabused comparison sample were the death of a close family member or friend ($n = 19$), family conflict or divorce ($n = 15$), and conflicts with friends or peers ($n = 15$).

Facial Expressions of Emotion

Participants' facial behavior during the open-ended narrative interview was coded using the Emotion Facial Action Coding System (EMFACS; Ekman & Rosenberg, 1997), a version of the Facial Action Coding System (FACS; Ekman & Friesen, 1976). EMFACS concentrates on coding only the emotion-relevant facial muscle movements that have been derived from previous theory and research (reviewed in Ekman, 1984). EMFACS criteria were used to translate the coded facial muscle movements into facial expressions of anger, disgust, shame, embarrassment, enjoyment (Duchenne smiles), and amusement (defined as Duchenne smiles accompanied by audible laughter and an open mouth; Keltner & Bonanno, 1997; Ruch, 1993). Shame was identified when gaze down (Action Unit [AU] 64) co-occurred with head movement down (AU 54) for at least 1 s but not longer than 10 s. This temporal criterion was based on claims about the duration of facial expressions of emotion (Ekman, 1992) and on the fact

that longer lasting gaze and head movements are likely to occur with intentions or states unrelated to shame (e.g., concentration, boredom, sleep).

Coding was done by Dacher Keltner and three advanced graduate students. Each coder was unaware of participants' status and responses on other measures. We assessed intercoder reliability by calculating the pairwise agreement of two pairs of coders for 4 participants per pair. We calculated a ratio in which the number of facial action units on which the two coders agreed was multiplied by two and then divided by the total number of action units scored by the two persons. Pairwise agreement was above .75 in all cases, and the mean ratio of agreement was .80.

Self- and Perpetrator Blame

Participants' descriptions of the most distressing events of their life during the open-ended narrative interview were transcribed and then categorized as making attributions of self-blame or perpetrator blame or as making no attributions of blame. Blame was coded by Jenna LeJeune and an advanced graduate student. Interrater reliability was adequate ($\kappa = .79$). The majority of transcripts ($n = 83$, 61%) did not indicate blame, whereas 18 (14%) were categorized as indicating self-blame and 36 (26%) were categorized as indicating perpetrator blame.

Original Disclosure of Abuse

The circumstances surrounding the original disclosure of CSA were parsed into two categories on the basis of a previous examination of these data (Nagel et al., 1997). Information on initial disclosure was obtained from both caseworker reports and mothers' reports of the initial disclosure process. Participants who had initiated their initial disclosure by reporting the sexual abuse themselves were categorized as purposeful disclosers. Participants who were not responsible for the initial disclosure of sexual abuse were categorized as accidental disclosers. Examples of accidental disclosure were that the abuse was discovered by medical exam, the perpetrator confessed, or another person discovered the abuse (Nagel et al., 1997). Categorization of initial disclosure was coded by two independent raters, who achieved an adequate level of reliability ($\kappa = .82$). For 7 CSA participants (10%), there were not sufficient data available to create this variable (e.g., neither the caseworker nor the mother reported how the abuse originally came to be known). Participants with missing data were distributed relatively evenly between CSA disclosure ($n = 3$) and CSA nondisclosure ($n = 4$) groups.

Other Measures

Posttraumatic stress disorder symptoms. A scale for posttraumatic stress disorder (PTSD) symptoms (Davidson, Kudler, & Smith, 1989) was completed by structured interview and concerns the worst lifetime trauma. Participants receive 1 point for every symptom endorsed. PTSD symptoms in addition to intrusive symptoms, avoidant symptoms, and hyperarousal were assessed.

Abuse characteristics. Details of the abuse experience were obtained from the Caseworker Abuse History Questionnaire developed for the present study to obtain information from the caseworker about the abuse that resulted in referral to the protective service agency. Among the variables obtained are (a) age at first abuse in years; (b) perpetrator identity—three dichotomous variables: biological father (1) versus others (0); father figure, including stepfather or mother's live-in boyfriend (1) versus others (0); and other relative, including grandfather, uncle, or older sibling (1) versus others (0); (c) duration of abuse, coded in months; (d) abuse severity, ranging from 1 to 6, with lower scores indicating less severe forms of abuse, such as genital fondling, and higher scores indicating more severe forms of abuse, including oral sex, digital penetration, vaginal or anal intercourse, or a combination of these types of abuse; (e) multiple

perpetrators, scored as 1 if the child experienced abuse from more than one perpetrator and 0 if from only one perpetrator; and (f) physical threats accompanying abuse, scored as 1 if the sexual abuse was accompanied by either actual or threatened physical violence and 0 if it was not.

Comprehensive Trauma Interview. The Comprehensive Trauma Interview developed for this study borrows constructs from several widely used trauma and PTSD interviews previously tested with adolescents (e.g., Krinsley et al., 1994). The first section of the interview asks participants to recall and to describe the most disturbing experiences they have had over their lifetime. The second section assesses lifetime PTSD symptoms on the basis of *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; American Psychiatric Association, 1994) criteria. In the third section, participants were questioned explicitly about the nature and extent of traumatic experiences across generally accepted domains of childhood trauma (e.g., physical abuse, sexual abuse, neglect, witnessing violence, natural disasters, self-harm, and significant separations), resulting in comprehensive trauma histories. Participants were asked to subjectively rate each traumatic incident from 1 (*not upsetting at all*) to 5 (*the most upset I have been*). The upward anchor (5) was explicitly compared with the participant's selection of the most distressing event of her life in the previous interview. To indicate significantly upsetting traumatic events, we gave participants 1 point for every event that was rated 4 or 5. We obtained the lifetime trauma count variable by adding up all traumatic events that were deemed significantly upsetting.

Internalizing and externalizing symptoms. Participants were administered the Youth Self Report (Song, Singh, & Singer, 1994), which is the self-report version of the Child Behavior Checklist (Achenbach & Edelbrock, 1983) and yields total scores for internalizing (withdrawn, somatic complaints, anxious/depressed behaviors) and externalizing behavior problems (delinquent and aggressive behavior).

Results

The mean frequency, intensity, and duration of the facial expressions of emotions coded from the 6-min narrative interview are displayed in Table 1. Non-Duchenne smiles were the most frequently observed facial expression overall. Of the negative emotions, expressions of other-critical emotions (anger and disgust) were most frequent. To test our hypotheses relating facial expressions of specific emotions to CSA, we created two mea-

Table 1
Mean Frequency, Intensity, and Duration for Each Facial Expression of Emotion

Emotion	Participants showing expression	Frequency		Intensity		Duration	
		M	SD	M	SD	M	SD
Self-conscious emotion							
Shame	66	1.81	3.59	1.56	1.67	2.16	2.98
Other-critical emotion							
Anger	96	3.77	5.31	1.70	1.45	1.34	1.51
Disgust	87	2.84	2.28	1.41	1.25	1.12	1.39
Smiling							
Duchenne	72	1.97	3.50	1.28	1.31	2.21	2.98
Non-Duchenne	104	4.44	5.71	1.63	1.07	2.93	3.72
Additional negative emotion							
Sad	73	2.86	5.62	1.28	1.16	1.85	3.52
Fear	61	1.79	3.41	1.07	1.26	0.85	1.37
Total expression	133	25.48	19.37	1.31	0.70	1.58	1.29

sures. First, to adjust for individual differences in expressive frequency, we created expression-ratio scores for each emotion by dividing the number of facial expressions of the emotion shown by a participant by the total number of facial expressions of similar valence shown by that participant. For example, the expression ratio for shame indicates the frequency with which shame was expressed relative to each participant's overall expression of negatively valenced emotions. Second, to adjust for individual differences in emotional intensity and duration, we calculated expression-magnitude scores representing the overall expressive magnitude of each emotion. We created the magnitude scores by standardizing the frequency, intensity, and duration scores and then adding the resulting z scores for each participant. These scores provide a more reliable measure of the overall magnitude of emotional expression (Bonanno & Keltner, 1997; Keltner et al., 1995).¹

Convergent Evidence for Assumptions About Facial Expressions

Perpetrator blame and other-critical emotions. The prediction that expressions of disgust would accompany CSA disclosure was based on the assumption that disgust in the context of CSA would be associated with blame of the perpetrator. Because these participants had verbally disclosed a CSA experience, we expected that they would also be more likely to make overt verbal statements of perpetrator blame. Statements of perpetrator blame appeared in approximately one quarter ($n = 36$, 26%) of the narratives and varied significantly across the three disclosure groups, $\chi^2(2, N = 137) = 5.59, p < .05$. Relative to the chance distribution, perpetrator-blame statements were evidenced in the narratives of a significantly greater proportion of CSA disclosure participants ($n = 16$, 36%; standardized adjusted residual = 2.1, $p < .05$) and a significantly smaller proportion of nonabused participants ($n = 13$, 19%; standardized adjusted residual = -2.2, $p < .05$). The proportion of perpetrator blame in the narratives of CSA nondisclosure participants did not differ from chance ($n = 7$, 30%). Analyses of the relations between perpetrator blame and facial expressions of emotion were consistent with the characterization of disgust and, to a lesser extent, anger as other-critical emotions (see Table 2). Participants making perpetrator-blame statements had greater disgust expression ratio, $t(136) = 2.15, p < .05$, disgust expression magnitude, $t(136) = 2.08, p < .05$, and anger expression magnitude, $t(136) = -1.98, p < .01$. Participants making perpetrator-blame statements also had a smaller non-Duchenne smile expression ratio, $t(136) = -3.05, p < .01$, and a marginally smaller non-Duchenne smile expression magnitude, $t(136) = -1.83, p < .10$.²

Accidental initial disclosure of CSA and shame. The prediction that shame expressions would be associated with the nondisclosure of CSA was based on the assumption that shame is related to self-blame and concealment. Thus, we expected that shame expressions would also be more prevalent during the current study for individuals for whom the initial discovery of CSA was accidental (i.e., the abuse was discovered and reported by a person other than the participant). On the basis of the available data ($n = 60$), 21 participants (32%) had accidental disclosure, and 39 participants (58%) had purposeful disclosure. Consistent with predictions, participants whose initial disclosure of CSA was accidental

had a greater shame expression ratio, $t(58) = 2.48, p < .05$, and shame expression magnitude, $t(58) = 3.11, p < .01$, compared with participants who initially disclosed their abuse. Accidental disclosers also had a greater non-Duchenne smile expression ratio, $t(58) = 2.46, p < .05$, and expression magnitude, $t(58) = 2.16, p < .05$, compared with purposeful disclosers. The distinction between accidental and purposeful original disclosure did not significantly differentiate the expression of any other emotion. Additionally, the proportion of CSA participants who were originally accidental disclosers was marginally greater among those who did not voluntarily disclose CSA in the current study (CSA nondisclosers: 52%) than for those who did voluntarily disclose CSA (CSA disclosers: 31%), $\chi^2(1, N = 60) = 2.70, p < .10$.

Hypothesized Group Differences in Facial Expressions of Emotion

To evaluate the hypothesized differences in expression-ratio and expression-magnitude scores across disclosure groups, we conducted a series of planned contrasts. Each planned contrast pitted the group hypothesized to display a specified emotion to a greater extent against the two other disclosure groups (see Table 3). The contrast weights for each hypothesis are presented above the relevant means in Table 3. To evaluate the explanatory power of each hypothesized contrast against the chance significance associated with any single degree of freedom from the overall effect (Rosenthal & Rosnow, 1989), we also conducted a series of alternative or nonhypothesized contrasts. The alternative contrasts weighed the group hypothesized to show greater emotion at zero and instead pitted the remaining two groups against each other.

Our first hypothesis was that women who did not voluntarily disclose a past CSA experience (CSA nondisclosure group) would show greater facial displays of the self-conscious emotion of shame relative to other participants. Planned contrasts reflecting

¹ The expression ratios for the different emotions showed only mild intercorrelation. Shame expressions were inversely correlated with anger, $r = -.20, p < .05$, sadness, $r = -.20, p < .05$, and Duchenne smiling, $r = -.32, p < .001$, but unrelated to other emotions. Anger showed no other significant correlations. Disgust expressions were inversely correlated with sadness, $r = -.23, p < .01$, and unrelated to other emotions. Finally, non-Duchenne smiles were inversely correlated with Duchenne smiles, $r = -.27, p < .01$, but unrelated to other expressions. Generally, the expression-magnitude scores showed greater intercorrelation.

² The higher prevalence of shame expressions hypothesized for CSA survivors who did not disclose an abuse experience is assumed to result from an underlying experience of self-blame. However, because CSA nondisclosure participants by definition did not verbally describe an abuse experience, we expected this self-blame to manifest nonverbally rather than in the verbal narratives. Self-blame statements were evidenced in 18 (13.7%) of the narratives across the entire sample. Only 1 CSA nondisclosure participant (4%) made statements indicative of self-blame, compared with 7 CSA disclosure participants (15.9%) and 10 nonabused participants (14.3%). Thus, it appears that CSA nondisclosers actually made fewer self-blame statements than did other participants. Although these findings suggest that the facial expression of shame was inversely related to the verbal description of self-blame, participants who made or did not make self-blame statements did not differ in shame expression ratio, $t(135) = .31, p = .75$, or shame expression magnitude, $t(135) = .03, p = .98$.

Table 2
Expression Ratio and Expression Magnitude in Relation to Narrative Self- and Perpetrator Blame and Previous Nondisclosure

Emotion	Perpetrator blame					Accidental original disclosure of CSA				
	Yes (n = 36)		No (n = 95)		t(136)	Yes (n = 21)		No (n = 39)		t(58)
	M	SD	M	SD		M	SD	M	SD	
Self-conscious										
Shame										
Mag.	0.37	2.61	0.05	2.50	0.67	1.98	3.01	-0.09	2.12	3.11**
Ratio	0.10	0.16	0.10	0.15	0.37	0.18	0.16	0.08	0.14	2.48*
Other-critical										
Anger										
Mag.	0.61	2.57	-0.21	1.93	1.98*	-0.28	2.44	-0.03	2.60	0.37
Ratio	0.14	0.15	0.12	0.12	0.80	0.09	0.10	0.15	0.18	1.40
Disgust										
Mag.	0.80	2.86	-0.28	2.58	2.08*	0.30	2.58	0.23	3.20	0.09
Ratio	0.13	0.16	0.08	0.10	2.15*	0.09	0.11	0.12	0.15	0.67
Smiling										
D smile										
Mag.	0.06	2.91	-0.04	2.42	0.19	-0.95	2.28	-0.58	2.40	0.58
Ratio	0.26	0.31	0.25	0.28	0.07	0.12	0.21	0.21	0.30	1.24
N-D smile										
Mag.	-0.42	1.83	0.30	2.08	-1.83†	0.60	1.59	-0.42	1.81	2.16*
Ratio	0.43	0.41	0.64	0.34	-3.05**	0.78	0.34	0.52	0.40	2.46*
Addit. negative										
Sadness										
Mag.	0.25	2.40	-0.15	2.10	0.93	0.75	3.12	-0.14	1.67	1.44
Ratio	0.12	0.15	0.11	0.17	0.43	0.12	0.13	0.11	0.13	0.32
Fear										
Mag.	0.01	2.73	-0.15	2.20	0.35	0.59	2.58	-0.17	2.54	1.10
Ratio	0.07	0.13	0.07	0.14	0.29	0.09	0.12	0.06	0.12	0.63

Note. Predicted mean differences are indicated by boldface. CSA = childhood sexual abuse; Mag. = magnitude; D = Duchenne; N-D = non-Duchenne; Addit. = additional.
 † $p < .10$. * $p < .05$. ** $p < .01$.

this hypothesis were significant for shame expression ratio, $t(134) = 3.99, p < .001$, and shame expression magnitude, $t(134) = 4.27, p < .001$. The alternative contrast for this hypothesis weighted the CSA nondisclosure group at zero and instead compared the CSA disclosure group with the nonabused group. This contrast was nonsignificant for shame expression ratio, $t(134) = 1.29, p < .21$, and shame expression magnitude, $t(134) = 1.58, p = .12$. Our second hypothesis was that women who voluntarily disclosed a past CSA experience (CSA disclosure group) would show greater facial expressions of the other-critical emotion of disgust relative to the other groups. Planned contrasts reflecting this hypothesis were significant for disgust expression magnitude, $t(134) = 2.82, p < .01$, and marginally significant for disgust expression ratio, $t(134) = 1.67, p < .10$. The alternative contrast weighted the CSA disclosure group at zero and instead compared the CSA nondisclosure and nonabused groups. This contrast was nonsignificant for disgust expression ratio, $t(134) = 1.01, p < .49$, and disgust expression magnitude, $t(134) = 0.69, p = .31$.

We also explored the possibility that facial expressions of another other-critical emotion, anger, would show a pattern similar to disgust's. However, planned comparisons reflecting this exploratory hypothesis did not approach significance for either anger expression ratio, $t(134) = -0.49, p = .68$, or anger expression magnitude, $t(134) = -0.39, p = .68$.

Our third set of hypotheses held that women in the CSA nondisclosure group would show more non-Duchenne smiles than would the other groups, whereas genuine or Duchenne smiles would be more prevalent among the nonabused comparison group relative to either CSA group. Planned comparisons reflecting these hypotheses were significant for the non-Duchenne smile expression ratio, $t(134) = 2.85, p < .01$, and expression magnitude, $t(134) = 3.43, p < .01$, and for the Duchenne smile expression ratio, $t(134) = 2.89, p < .01$, and expression magnitude, $t(134) = 2.35, p < .05$. The alternative contrast for non-Duchenne smiles weighted the CSA nondisclosure group at zero and instead distinguished between the CSA disclosure and nonabused groups. This contrast was nonsignificant for the non-Duchenne smile expression ratio, $t(134) = 0.62, p < .20$, and expression magnitude, $t(134) = 1.19, p = .23$. The alternative contrast for Duchenne smiles weighted the nonabused group at zero and distinguished between the CSA disclosure and nondisclosure groups. This contrast was nonsignificant for the Duchenne smile expression ratio, $t(134) = 0.33, p < .75$, and expression magnitude, $t(134) = 1.43, p = .13$.

Finally, as an extension of our hypotheses, we examined the total amount of facial behavior and facial expressions of two additional negative emotions, sadness and fear, that were not directly associated with moral concerns or with self- or other blame. We did not expect these emotions to show differences

Table 3
Planned Comparisons to Test Predicted Group Differences in Expression Ratio and Expression Magnitude for Each Emotion

Emotion	CSA nondisclosure (<i>n</i> = 23)	CSA disclosure (<i>n</i> = 44)	Nonabuse group (<i>n</i> = 70)	<i>t</i> (134)
Self-conscious				
Weight	2	-1	-1	
Shame				
Ratio	.21 (.18)	.08 (.15)	.06 (.15)	3.99***
Magnitude	1.96 (0.82)	0.03 (2.41)	0.68 (2.11)	4.27***
Other-critical				
Weight:	-1	2	-1	
Anger				
Ratio	.18 (.23)	.25 (.23)	.32 (.27)	-0.49
Magnitude	-0.24 (2.07)	-0.13 (2.61)	0.33 (2.17)	-0.39
Disgust				
Ratio	.14 (.22)	.31 (.28)	.19 (.22)	2.82**
Magnitude	-0.49 (2.63)	0.59 (2.89)	-0.04 (2.48)	1.67†
Smile				
Weight	-1	-1	2	
Duchenne				
Ratio	.15 (.25)	.09 (.14)	.22 (.27)	2.89**
Magnitude	-0.38 (2.59)	-0.59 (2.49)	0.58 (2.54)	2.35*
Non-Duchenne				
Weight	2	-1	-1	
Ratio	.72 (.36)	.45 (.39)	.48 (.35)	2.85**
Magnitude	1.22 (3.11)	-0.55 (2.16)	-0.11 (1.65)	3.43***

Note. Contrast weights are listed above each category of emotion. Standard deviations are in parentheses. Predicted effects are indicated by boldface.
 † $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

across the groups defined in this study. Consistent with this expectation, neither the mean number of total facial expressions of emotion nor the expression ratio or expression magnitude of sadness and fear showed meaningful group differences (all $F_s < 1.00$).

Abuse Severity

We had hypothesized that the facial expression of disgust would be associated with more severe past abuse experiences. There are a number of different ways to conceptualize abuse severity, including the number and identity of the perpetrators (e.g., biological father, stepfather, or other relative), the duration of the abuse, the characteristics of the abusive actions (e.g., genital fondling, penetration, or both), and whether the sexual abuse was accompanied by actual or threatened violence. The disclosure groups did not differ with respect to the number and identity of the perpetrator, the duration of abuse, or overall abuse severity. However, actual or threatened violence showed significant differences across disclosure groups. Twenty-five (37%) of the CSA survivors in the current sample experienced sexual abuse accompanied by actual or threatened violence. Of these participants, 88% ($n = 22$) were in the CSA disclosure group, whereas only 12% ($n = 3$) were in the CSA nondisclosure group, $\chi^2(1, N = 77) = 8.82, p < .01$. In a previous study we were able to demonstrate that actual or threatened violence was a crucial determinant of abuse severity and of subsequent psychological maladjustment (Bonanno et al., 2001).³

We next examined whether actual or threatened violence during CSA was reflected in participants' facial expressions of emotion.

Significant differences were observed only for facial expressions of disgust. Consistent with predictions, participants who experienced sexual abuse accompanied by actual or threatened violence had higher disgust expression ratios ($M = 0.33, SD = 0.29$) than did CSA participants who did not ($M = 0.18, SD = 0.26$), $t(60) = 2.00, p < .05$, and showed greater disgust expression magnitude ($M = 1.20, SD = 3.03$) than did CSA participants who did not ($M = -0.37, SD = 2.58$), $t(60) = 2.25, p < .05$.

Together, these findings indicate that CSA accompanied by actual or threatened violence is a primary source of the expression of disgust while one is speaking about such experiences. Consistent with this observation, when we reexamined differences between the CSA disclosure group and other participants and controlled for actual or threatened violence by entering it as a covariate, the previously observed group difference in the disgust expression ratio was only marginally significant, $t(126) = 1.75, p < .10$, and the previously observed group differences for disgust

³ Conceptually, CSA accompanied by either the threat of violence or actual physical violence is distinct from CSA that was not accompanied by any form of violence. Of the 25 participants in this group, 8 experienced CSA with threats of violence, and 17 experienced CSA with actual physical violence. Although the relatively small size of these subgroups limits statistical power to detect group differences, facial expressions of disgust were relatively similar for both the threat of violence and the actual violence subgroups and in each case appeared to be greater than in the CSA without violence group.

expression magnitude did not approach significance, $t(126) = 0.28$, $p = .46$.

Possible Moderator Variables

The following analyses examine whether the observed group differences in facial expressions of emotion may have been moderated by characteristics of the topic event or the participant.

Event remoteness. An analysis of variance (ANOVA) for group differences in the temporal interval between the occurrence of topic event and the interview proved significant, $F(2, 133) = 15.93$, $p < .001$. The CSA events described by participants in the CSA disclosure group occurred, on average, 7.39 years ($SD = 2.88$) prior to the interview, whereas the nonabuse events described by the CSA nondisclosure group occurred more recently ($M = 4.48$ years, $SD = 4.39$). Nonabuse distressing events described by the comparison group also occurred more recently ($M = 3.74$ years, $SD = 3.30$). Follow-up analyses confirmed that CSA events were, on average, chronologically more remote than were the nonabuse events discussed by the other two groups ($p < .05$). The remoteness of the topic event for the two groups describing nonabuse events did not differ ($p = .34$).

To explore whether group differences in the chronological remoteness of the topic event influenced group differences in facial emotion displays, we recalculated the planned group contrasts with event remoteness as a covariate. These analyses produced the same pattern of results as reported above. Similar to the original analyses, contrasts weighing the CSA disclosure group against the other two groups were significant for disgust expression ratio, $t(133) = 3.79$, $p < .01$, and expression magnitude, $t(133) = 2.10$, $p < .05$, but not for the anger variables. Also similar to the original analyses, contrasts weighing the CSA nondisclosure group against the other two groups were significant for shame expression ratio, $t(133) = 12.66$, $p < .001$, and expression magnitude, $t(133) = 10.31$, $p < .001$, and for non-Duchenne smile expression ratio, $t(133) = 2.78$, $p < .01$, and expression magnitude, $t(133) = 3.22$, $p < .01$. Finally, similar to the original analyses, contrasts weighing the nonabused comparison group against the other two groups were significant for Duchenne smile expression ratio, $t(133) = 2.61$, $p = .05$, and marginally significant for Duchenne smile expression magnitude, $t(133) = 1.92$, $p < .10$. Together, these results clearly indicate that event remoteness could

not explain the previously observed group differences in facial displays.

Type of nonabuse event disclosed. CSA survivors who disclosed nonabuse events when asked to describe the most distressing event of their life (CSA nondisclosure group) displayed different facial expressions of emotion than did a comparison group responding to the same question. One possible source of these different facial displays may be that the two groups disclosed different types of nonabuse events. To examine this possibility, we assigned each nonabuse event to one of six categories: general negative events (e.g., illness, accident, natural disaster, abortion/miscarriage; $n = 12$), death of a close friend or relative ($n = 27$), family conflict or divorce ($n = 19$), nonfamilial relationship conflict ($n = 19$), personal problems ($n = 7$), and other ($n = 9$). A contingency analysis comparing the distribution of these different nonabuse topics between the CSA nondisclosure group and the comparison group did not approach significance, $\chi^2(1, N = 93) = 1.46$, $p = .91$. Because of the low frequency for the last two categories of nonabuse events, we collapsed these categories and repeated the contingency analysis. Again, however, there were no meaningful differences in the distribution of topics between the two groups, $\chi^2(1, N = 93) = 1.41$, $p = .84$.

The relatively similar distribution of topics across the CSA nondisclosure and comparison groups suggests that topic of disclosure cannot explain the different facial displays of these two groups. We conducted a more stringent test of this possibility by matching 23 comparison group participants with the 23 CSA nondisclosure participants by topic. Matching was done by a research assistant who was unaware of our hypotheses and of participants' scores on all other variables. Comparisons of the facial displays from these matched groups showed that the CSA nondisclosure group had a significantly greater shame expression ratio, $t(44) = 2.93$, $p < .01$, and expression magnitude, $t(44) = 3.70$, $p < .001$, and a marginally significantly greater non-Duchenne smile expression ratio, $t(44) = 1.76$, $p < .10$, and expression magnitude, $t(44) = 1.94$, $p < .10$. Thus, despite the reduced power afforded by this analysis, a similar pattern of differences in facial displays is still evidenced when the groups are matched for topic.

Psychological adjustment. Another potential source of the differences in facial displays of emotion produced by the CSA nondisclosure group and the comparison group is level of adjust-

Table 4
Psychological Adjustment by Disclosure Group

Adjustment variable	CSA nondisc ($n = 23$)		CSA disc ($n = 44$)		Nonabuse group ($n = 70$)		CSA disc vs. CSA nondisc	CSA nondisc vs. nonabuse
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
PTSD symptoms	7.95	4.72	11.58	4.02	6.19	4.42	$t(63) = 3.24^{**}$	$t(85) = 1.59$
Lifetime trauma count	7.26	6.17	8.55	4.32	4.47	3.16	$t(65) = 0.99$	$t(91) = 2.83^{**}$
Externalizing symptoms	18.27	8.22	18.08	8.17	15.32	9.22	$t(57) = 0.07$	$t(85) = 1.33$
Internalizing symptoms	18.00	7.86	17.25	7.94	14.40	7.47	$t(57) = 0.36$	$t(86) = 1.96^*$

Note. CSA = childhood sexual abuse; nondisc = nondisclosure; disc = disclosure; PTSD = posttraumatic stress disorder.
* $p < .05$. ** $p < .01$.

ment. We compared the groups across several dimensions: lifetime PTSD symptoms, lifetime trauma count, and internalizing and externalizing symptoms (see Table 4). Compared with the non-abuse group, CSA nondisclosure participants had more internalizing symptoms, $t(86) = 1.96, p < .05$, and a greater number of lifetime traumatic events, $t(91) = 2.83, p < .01$, and showed trends toward greater externalizing symptoms, $t(85) = 1.33, p = .10$, and greater lifetime PTSD symptoms, $t(85) = 1.60, p = .11$. In contrast, the CSA disclosure and CSA nondisclosure groups did not differ in adjustment, with the sole exception that the CSA disclosure group had greater lifetime PTSD symptoms, $t(63) = 3.24, p < .01$.

We next examined whether these adjustment variables were associated with facial displays of emotions. Internalizing symptoms were significantly correlated with shame expressions (expression ratio, $r = .26, p < .01$; expression magnitude, $r = .18, p < .05$), as they have been in previous studies (Keltner et al., 1995). Lifetime trauma count was significantly inversely correlated with Duchenne smiles (expression ratio, $r = -.19, p < .05$; expression magnitude, $r = -.25, p < .01$), and, as expected, non-Duchenne smiling was not meaningfully correlated with any adjustment variable.

The possibility that internalizing symptoms may have mediated group differences in displays of shame and non-Duchenne smiles is countered by the competing fact that the CSA disclosure and CSA nondisclosure groups did not differ on these adjustment variables. It is not surprising that when we repeated the contrast for group differences in shame expression, weighing the CSA nondisclosure group against the other two groups but also including internalizing symptoms as a covariate, these analyses remained significant; shame expression ratio, $t(133) = 4.05, p < .001$; shame expression magnitude, $t(133) = 3.17, p < .001$.

On the other hand, a possible mediating role of lifetime trauma count in relation to the increased smiling expressions in the comparison group seemed more plausible. In this case, smiling was displayed more readily in the comparison group relative to both CSA groups, and lifetime trauma count was lower in the comparison group. We recomputed the contrast for Duchenne smiling, weighting the nonabused group against the two CSA groups, and included lifetime trauma as a covariate. In this case, the expression ratio for Duchenne smiling remained significant, $t(133) = 2.19, p < .05$, whereas the expression magnitude for Duchenne smiling was no longer significant, $t(133) = 1.02, p = .31$. Thus, controlling for lifetime trauma prevalence did appear to reduce the group differences in Duchenne smiling.

Participant age and minority status. Participant age did not correlate significantly ($p .10$) with any of the facial expression variables. Further, the group differences in participants' age did not approach significance, $F(2, 134) = 1.40, p = .25$. Thus, age was not considered further. Differences between White and minority (African American or Hispanic American) participants emerged for only two facial expression variables. Compared with White participants, minority participants showed lower anger expression ratios (minority $M = 0.09, SD = 0.12$; white $M = 0.15, SD = 0.11$), $t(135) = 3.03, p < .01$, and anger expression magnitudes (minority $M = -0.65, SD = 1.92$; White $M = 0.75, SD = 2.42$), $t(135) = 3.70, p < .001$, and a smaller Duchenne smiling expression ratio (minority $M = 0.18, SD = 0.26$; White $M = 0.33, SD = 0.30$), $t(135) = 3.39, p < .01$, and expression

magnitude, (minority $M = -0.79, SD = 2.11$; White $M = 0.86, SD = 2.77$), $t(135) = 3.01, p < .001$. It seemed possible that the difference in smiling between White and minority participants may have informed the differences in smiling across disclosure groups. However, the distribution of White versus minority participants did not differ significantly across disclosure groups, $\chi^2(2, N = 137) = 3.59, p = .17$, indicating that a moderating effect was not likely.

Disclosure Following Direct Questions About Past Sexual Abuse

The semistructured interview in which participants described the most distressing event or series of events in their life was followed by a structured interview that included direct questions about previous sexual abuse experiences. We predicted that CSA participants who did not disclose an abuse experience during the semistructured interview (CSA nondisclosure group) and who showed greater shame and embarrassment would be more likely to explicitly deny CSA experiences in the structured interview. Twenty-one of the 23 CSA nondisclosure participants (91.3%) did acknowledge a prior abuse experience when questioned directly during the structured interview. Thus, only 2 CSA participants (8.7%) who had not previously disclosed an abuse experience explicitly denied having experienced any previous sexual abuse when directly questioned. The small number of participants explicitly denying CSA limits the usefulness of statistical comparisons. However, it is worth noting that, consistent with our predictions, the 2 participants who explicitly denied CSA had expressed more than twice as much shame when asked about the most distressing events of their life (expression ratio: $M = 0.49, SD = 0.13$; expression magnitude: $M = 3.64, SD = 2.41$) compared with other CSA nondisclosing participants who eventually did describe CSA when questioned directly (expression ratio: $M = 0.18, SD = 0.17$; expression magnitude: $M = 1.80, SD = 2.65$).

Discussion

The design of the current investigation provides a rare opportunity to examine hypotheses about the relationship of nonverbal facial behavior to the voluntary disclosure of CSA and to aspects of previous CSA experiences. Specifically, we examined expressions of two types of moral emotions and two types of smiles in the context of an interview task in which individuals with or without documented histories of CSA were asked to talk about the most distressing events of their life.

Our predictions were based in recent studies linking disgust and shame to moral transgression (e.g., Rozin, Lowery, et al., 1999) and studies documenting the distinctions between Duchenne and non-Duchenne smiles (e.g., Frank et al., 1993; Keltner & Bonanno, 1997). Consistent with our predictions, CSA survivors who did not voluntarily disclose prior sexual abuse (CSA nondisclosure group) showed the greatest facial shame and non-Duchenne smiles. Also consistent with the association of shame with concealment and of non-Duchenne smiles with deceptive or polite signaling, both shame expressions and non-Duchenne smiles were more prevalent among CSA survivors for whom the original abuse event was accidentally discovered by a third party. It is important to note that

the group differences in shame and non-Duchenne expressions could not be accounted for by the content of nonabuse events, the chronological remoteness of the topic event, or the participant's level of adjustment, age, or minority status.

Also as predicted, CSA survivors who disclosed prior sexual abuse when asked to describe the most distressing event in their life (CSA disclosure group) showed the greatest facial disgust. Consistent with disgust's characterization as an other-critical emotion, facial expressions of disgust were more prevalent among individuals whose narratives indicated blame toward a perpetrator and among CSA individuals who had experienced sexual abuse accompanied by actual or threatened violence. As was the case for shame and smiling, the association of disgust with the verbal disclosure of CSA was not explained by any of the possible moderators we examined. We explored whether similar results might be observed for anger, another other-critical emotion. Anger was expressed almost as frequently among CSA participants as was disgust. However, as anticipated, significant group differences did not emerge because anger was also expressed with considerable frequency among the nonabused participants describing their most distressing personal experiences. In further contrast to disgust, expressions of anger were not uniquely related to perpetrator blame in the narrative content. Thus, anger appeared to be associated with the disclosure of distressing events more generally rather than with the specific characteristics of CSA.

Finally, as in previous research on stressful life events (Bonanno & Keltner, 1997), genuine or Duchenne smiling was readily observed during the interviews even among individuals describing past CSA. As predicted, however, Duchenne smiling was most prevalent among participants who did not have a history of CSA, although the difference was only statistically significant between the nonabuse group and the CSA nondisclosure group. This finding may reflect the more benign trauma history of the nonabused group. Indeed, when lifetime trauma count was statistically controlled, the group difference in smiling was less pronounced.

Limitations of the Evidence

Several methodological considerations must be noted. One consideration is that too few CSA participants were available for us to fully examine our hypotheses about facial expressions of emotion as markers of the explicit denial of abuse. In accord with our predictions, the 2 CSA participants who denied all previous sexual abuse even when explicitly questioned had shown greater shame when given the opportunity to voluntarily disclose abuse during the semistructured interview. As compelling and as potentially useful as these results may seem, they can at best be considered preliminary until further evidence with additional CSA participants can be made available.

One way further research in this area might be improved is with the use of a more elaborate experimental manipulation. The data presented in the current investigation represent a preliminary examination of the usefulness of facial expressions of emotion as markers of CSA. The advantage of the open-ended interview task used in this study is that we could compare the facial displays of CSA survivors who disclosed their abuse experiences with those of CSA survivors who did not and those of nonabused individuals from a comparison group. The limitation of this procedure, however, is that we could not compare facial behavior in these same

participants when they discussed other events. It would be informative, for example, to follow the open-ended disclosure task by asking participants in the CSA nondisclosure group to also describe an abuse experience and by asking participants in the CSA disclosure group to also describe a nonabuse distressing event, and then to examine the facial expression data for the main effects of group or task as well as for Group \times Task interactions.

Another consideration is that the increased expression of shame and non-Duchenne smiles in the CSA nondisclosure group may have resulted in part because these participants were aware (at some level) that the interviewer was attempting to conjure disclosure of sexual abuse. Because the CSA participants were originally recruited into the longitudinal study through caseworkers assigned by local child protective service agencies, it might be argued that participants had an intuitive understanding that our intent was to elicit disclosure of the referring, substantiated sexual abuse. Thus, the shame and non-Duchenne smiles displayed by the CSA nondisclosure group may have been an implicit apology or appeasement for their failure or unwillingness to meet an assumed demand characteristic of the study. Although we cannot entirely rule out this possibility, several points argue against such an interpretation. First, it must be stressed that participants were never asked about sexual abuse prior to the fourth assessment, approximately 7 years after the initial recruitment. Second, interviewers were unaware of the abuse status of the participants, and participants were never told that any of the research staff knew of their CSA history. Indeed, so that the stigma of sexual abuse would have as little impact as possible, sexual abuse was never discussed during previous waves of data collection. Rather, we made efforts to make the participants feel as if they were part of a study focused on female development, and sexual abuse was never discussed.

A potentially more serious limitation of the current study is related to the fact that the facial data resulted from the use of a relatively sophisticated coding system. To accurately code facial muscle movements using this system, coders must first participate in hundreds of hours of training. Further, the coding is accomplished using videotape that can be slowed or stopped as needed to determine the presence of specific muscle movements. There is evidence that a person's facial expressions of emotion do influence how other people interpret and judge his or her behavior (e.g., Keltner & Bonanno, 1997). However, it is not yet clear to what extent facial expressions of the specific emotions coded in the current study are perceptible in real time or by untrained observers, as is necessary in actual clinical encounters. One solution to this problem is to compare clinical judgments of facial behavior based on only a relatively brief training regarding the emotions in question with the more elaborate coding used in the current investigation. Another approach is to examine whether psychotherapists or other trained mental health professionals might be able to distinguish between CSA nondisclosure and nonabuse participants on the basis of their own intuitive judgments. We are currently exploring these options.

Implications for the Disclosure of CSA

Researchers have acknowledged that the circumstances surrounding the disclosure of abuse can have a significant impact

on the later psychological adjustment of CSA survivors. The reaction of the perpetrator and the family, the extent to which the victim is believed by the family and the police, familial and professional support following disclosure, and the individual coping style of the victim have all been shown to significantly effect long-term outcome (Beitchman, et al., 1992; Finkelhor, 1990; Nagel et al., 1997; Sauzier, 1989; Spaccarelli, 1994). Hence, the way the disclosure of sexual abuse is handled is extremely important to the psychological health of a survivor. As reviewed earlier, questions about the legitimacy of verbal reports of abuse as well as possible issues of repressed memory have seriously plagued our understanding of this issue and dramatically impeded attempts to provide help to CSA survivors (Femina et al., 1990; Loftus et al., 1994; Pope, 1996; Reviere, 1996; Williams, 1994).

The findings from the present study provide the first evidence that it is possible to empirically distinguish women who had been sexually abused during childhood from other, similar women who had not been abused solely on the basis of their nonverbal behavior. As we suggested earlier, however, it is important to underscore that our data do not demonstrate that facial expressions of emotion can be used in real-time encounters to determine whether a person had previously experienced sexual abuse. A conclusion of this sort would require a more elaborate research design that included both false positives (i.e., women who claimed sexual abuse but had not actually experienced abuse) and false negatives (i.e., women who had been abused but denied the abuse) as well as a more exacting test of the hit rate associated with the expression of shame. Even in the case that this type of accuracy could be demonstrated, there would still remain the thorny ethical issue of whether the knowledge gained in detecting CSA would be worth the risk of even a small number of detection errors (i.e., falsely dismissing CSA because a survivor had not evidenced shame or falsely assuming CSA simply because shame had been expressed).

We are more confident in suggesting that the findings of the current study show that facial displays of emotion can indirectly communicate aspects of CSA survivors' contemporary experience of past abuse as well as how survivors negotiate interpersonal situations that pull for verbal disclosure. Additional research in this area might help illuminate how others in the survivor's social support network should best approach the disclosure process, whether and when questions about possible past sexual abuse might be pursued, and what direction therapeutic interventions, if deemed appropriate, should take. It is also important to underscore that the data from the present study do not in any way indicate that disclosure of past abuse is always a desired or necessary outcome. Indeed, in the present study and in our other work, CSA survivors who chose not to voluntarily disclose sexual abuse showed relatively better psychological adjustment (Bonanno et al., 2001).

In contrast to the findings for shame, our data suggest that facial expressions of disgust, when they occur in the context of open verbal disclosure of past abuse, are promising as heuristics to guide inquiry into perpetrator blame and to indicate the possibility that these experiences may have been accompanied by actual or threatened violence. Again, however, we stress that the preliminary nature of the present findings as well as the limitations of the study clearly caution against generalizing too boldly from these data. At

minimum, the potential usefulness of facial displays in this arena underscores the importance of further investigation of these possibilities.

Implications for Theories About Facial Expressions of Emotion

For the field of emotion, the current study's findings are germane to three important issues. The first issue pertains to an abiding concern of students of emotion regarding the kind of information facial expressions convey (e.g., Bonanno & Mayne, 2001; Ekman, 1992; Keltner & Ekman, 2000; Russell, 1994). This question is, essentially, to what extent do facial expressions reliably relate to concomitant experience, appraisal, and physiology and to preceding events and experiences? Or are expressions perhaps not reliable indicators of individual experience?

Our findings make two points of contact with this longstanding question. First, they reveal that the face is connected to the individual's experience. This is evident in several findings. Facial disgust related to the reference to perpetrator blame in spontaneous discourse and to abuse severity. Duchenne and non-Duchenne smiles related to different approaches to the disclosure of CSA, with non-Duchenne smiles, as expected, related to a style more closely associated with concealment.

Second, our findings provide some of the first validation evidence for the facial display of shame (for a review, see Keltner & Harker, 1998). Shame has become a central focus for researchers interested not only in basic questions about emotion but, in particular, in questions of how emotion functions during trauma (Tangney, 1999). Theorists diverge in their claims about whether shame has a distinct display. Some argue that it exists (e.g., Izard, 1977; Keltner & Buswell, 1997); others are skeptical (e.g., Ekman, 1992). Relevant evidence is limited and not terribly conclusive (e.g., Keltner & Harker, 1998). For example, judgment studies find that people can differentiate shame from embarrassment (e.g., Keltner, 1995) across different cultures (Haidt & Keltner, 1999). No study, however, has tried to validate the actual behavior associated with the shame display. The present study's findings suggest that the downward gaze and head movements may indeed signal shame. This display was associated with the nondisclosure of CSA, with the accidental original discovery of the CSA, and with internalizing symptoms.

A second general contribution of our findings pertains to recent claims about the moral nature of emotion. This interest stems from recent reconceptualizations of morality, which itself is based on two new views. The first is that the moral realm of Kohlbergian rights, justice, and harm should be expanded to include issues of purity and community (e.g., Haidt, in press; Rozin, Lowery, et al., 1999; Shweder, Much, Mahapatra & Park, 1997). The second is that morality is more than an application of highly deliberative, judgmental processes—that it involves emotion (Haidt, in press).

One implication of this more recent view of morality is that the categories of social-moral transgression should be associated with relatively distinct emotional responses by which it is presumed that people infer what is wrong and what can be done about it (Rozin, Lowery, et al., 1999). The evidence regarding these claims has exclusively derived from studies of people's knowledge of social transgressions and their associations, in the abstract, with different emotions. When given different transgressions, for example, that

relate to one's own impure or unjust action or that of another, participants have tended to associate those different transgressions with different emotions (Rozin, Lowery, et al., 1999; Vasquez et al., 2001).

This new line of inquiry is greatly enhanced by research, such as the present study, that relates on-line moral events with on-line emotional behaviors. We found, consistent with theorizing about disgust (Haidt, in press; Haidt et al., 1997; Rozin, Haidt, & McCauley, 1999), that the facial display of disgust is associated with the disclosure of impure, sexually immoral acts, particularly those of a violent nature. In contrast, the concealment of that transgression as well as the original failure to disclose the transgression was associated with facial displays of the self-directed moral emotion of shame. These are the first findings to clearly demonstrate links between shame and disgust and on-line moral transgression.

A third contribution of our findings pertains to the distinction between genuine or Duchenne smiling and non-Duchenne smiling. That distinctive findings emerged in the present study for Duchenne smiles and non-Duchenne smiles is consonant with other recent empirical findings distinguishing these two types of expression (Ekman & Friesen, 1982; Frank et al., 1993; Keltner & Bonanno, 1997). Our hypotheses regarding non-Duchenne smiles were based on evidence that non-Duchenne smiles do not involve genuine positive emotion (e.g., Ekman & Friesen, 1982) and, in particular, from the theoretical arguments advanced by Owren and Bachorowski (2001). These authors contended that genuine, Duchenne smiles first emerged in humans as a means of fostering cooperative social behavior. Once genuine smiling had become part of humanity's inherited repertoire of nonverbal signals, the authors further argued, a competing selection pressure had emerged to foster the development of nongenuine (non-Duchenne) smiles as a means of cheating on what had up until that point been an honest signal. Although alternative uses of non-Duchenne smiles may have followed (e.g., as polite gestures to mark social interactions), these still share this same function of communicating positive emotion when positive emotion is not necessarily felt. Consistent with this theorizing, non-Duchenne smiling in the present study was more prevalent in CSA survivors who did not disclose a past abuse experience and more prevalent among individuals who had not originally disclosed their abuse (i.e., the abuse was discovered).

Our findings for genuine or Duchenne smiles were relatively straightforward and speak to two seemingly contradictory claims in the literature. On the one hand, there is the well-established link between positive emotion and adjustment. In this vein, Fredrickson (1998; Fredrickson & Branigan, 2001) had argued persuasively that positive emotions function to broaden and build resources and therefore tend to occur in relatively safe contexts, when survival needs are minimal. On the other hand, several authors have noted that positive emotions can reduce or undo distress (Fredrickson & Levenson, 1998) and facilitate coping (Lazarus, Kanner, & Folkman, 1980) and that positive emotions are not uncommon even in contexts pertaining to highly aversive events (e.g., the recent death of a spouse; Bonanno & Keltner, 1997). The findings of the current study are concordant with both of these views. Duchenne smiling was observed in each group of participants, including survivors of CSA who were overtly disclosing past

abuse. However, Duchenne smiling was most prevalent among the nonabused comparison sample and was inversely correlated with lifetime trauma history.

Conclusion

The results of the current study are in accord with several theory-driven predictions regarding the relationship between facial expressions of emotion and the voluntary disclosure of prior CSA. Within the constraints of the study's limitations, we have suggested a number of potentially important implications of these findings for work with survivors of CSA and for broader theoretical questions about emotion. Perhaps the most important implication of the present study, however, is that it demonstrates the usefulness of examining facial displays of emotion in relation to a complex social problem—one for which previous investigators have relied almost solely on verbal self-report. It is our hope that this research will inspire further investigations of the ways non-verbal emotion behavior might illuminate novel aspects of social problems.

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