

## The Effects of Depression on the Emotional Responses of Spanish-Speaking Latinas

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*Emotional responses (physiology, self-report, and facial expression) of 12 depressed and 10 nondepressed Spanish-speaking Latinas during sad and amusing film clips of human and animal content were compared. Depressed Latinas demonstrated less electrodermal reactivity across all the film clips and displayed fewer social smiles during the amusing-human film clip than nondepressed Latinas. No differences emerged for cardiovascular measures, reports of emotion, or facial expressions of happiness and negative emotion. Observed differences in electrodermal reactivity are similar to results from*

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*previous studies of Anglo Americans, suggesting that reduced electrodermal activity may be linked to depression across cultures. The findings also suggest that, for Latinas, depression may selectively alter expressions that serve interpersonal functions.*

• depression • emotion • Latinas • physiology • facial expression

Individuals of Latino descent (from Mexico, Central America, Puerto Rico, and South America) are currently the second largest ethnic group in the United States, comprising 12% of the United States population (Therrien & Ramirez, 2000). By the year 2050, Latinos are expected to constitute 24.3% of the U.S. population (U.S. Bureau of the Census, 1998). Given their presence in the United States, it is not surprising that much research has focused on Latino mental health issues (Angel & Guarnaccia, 1989; Kessler et al., 1994; Munet-Vilaró, Folkman, & Gregorich, 1999; Stroup-Benham, Lawrence, & Treviño, 1992). Few studies, however, have examined how unipolar depression or other mental disorders affect basic aspects of psychological functioning in Latino groups. For instance, we know little about how depression affects Latinos' emotional responses (changes in physiology, subjective experience, and facial expression) to discrete events, despite a growing literature that is examining these processes in Anglo American groups (e.g., Berenbaum & Oltmanns, 1992; Rottenberg, Kasch, Gross, & Gotlib, 2002). Such studies promise to advance our understanding of how disordered mood states affect daily emotional functioning in Latinos and to pave the way for future interventions that target specific problems related to depression. In the present study, we begin to fill this gap in the literature by examining the effects of depression on the emotional responses of a sample of Spanish-speaking Latinas. We begin by describing emotion in Latino cultures.

#### **Emotion and Interpersonal Harmony in Latino Culture**

Members of Latino cultures have been described as being more collectivistic (i.e., as

valuing interpersonal connectedness and as striving to maintain social relationships) than Anglo Americans (Markus & Kitayama, 1991). Descriptions of emotion in collectivistic cultures suggest that emotions function to achieve this end. For example, Latino norms emphasize the importance of *simpatía*, or as described by Triandis, Marin, Lisankys, and Betancourt (1984, p. 1363), showing "certain levels of conformity and an ability to share in others' feelings (Real Academia Espanola, 1980)," behaving "with dignity and respect toward others," and seeking "to strive for harmony in interpersonal relations." Others (Burma, 1970; Madsen, 1972; Murillo, 1976) have also written about the emphasis placed on being polite, pleasant, agreeable, respectful, well-mannered, and courteous with nonfamily members in Latino cultures. Thus, Latino culture may place a greater emphasis on the aspects of emotional response that promote social relations than those thought to reflect internal emotional experience. For example, Ekman, Matsumoto, and Friesen (1997) distinguished between smiles that reflect the internal experience of happiness (i.e., Duchenne smiles) and smiles that function to maintain social propriety either by masking negative emotion or by demonstrating conversational engagement (i.e., non-Duchenne smiles). In cultures that promote interpersonal harmony, non-Duchenne smiles may assume a particularly important role in maintaining relationships with others.

In Latino contexts, the internal preoccupation and loss of energy that accompany depression may have a particularly deleterious effect on these social aspects of emotion. That is, in a culture that strongly values interpersonal relationships, deficits in the ability to engage in behaviors that promote so-

cial relationships may marginalize depressed individuals. Although the interpersonal consequences of depression have been examined in other cultural groups (Dow & Craighead, 1987; Hammen, 1992), the consequences of these deficits in socially facilitative behaviors may be particularly troublesome in cultures in which individuals are instantiated through their connections with others.

### ***Effects of Depression on Emotional Functioning***

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The core symptoms of unipolar depression—sadness, lack of pleasure, lack of energy, loss of interest, inability to concentrate, and feelings of worthlessness—have been widely documented in Latino and other ethnic and cultural groups (Kemp, Staples, & Lopez-Aqueres, 1987; Mezzich & Raab, 1980; Sartorius, Jablensky, Gulbinat, & Ernberg, 1980; Weissman, Livingston Bruce, Leaf, Florio, & Holzer, 1991). The primary affective symptoms of depression—sadness and anhedonia—suggest that depressed mood intensifies individuals' experiences of sadness and other negative emotions (such as anger and contempt; Riley, Treiber, & Woods, 1989) and diminishes their experiences of happiness, amusement, and other positive emotions (such as excitement and contentment).

Although researchers have examined the effects of depression on emotional reactivity (Berenbaum, 1992; Berenbaum & Oltmanns, 1992; Donat & McCollough, 1983; Gehricke & Shapiro, 1998; McCarron, 1973; Schwartz, Fair, Salt, Mandel, & Klerman, 1976a, 1976b; Triosi & Moles, 1999), these studies have focused primarily on Anglo Americans. No studies have examined such processes in Latino or other cultural groups. Thus, in the present study, we compared the emotional responses (physiology, reports of subjective emotional experience, and facial expressions) of depressed and nonde-

pressed Latinas to discrete emotional events, that is, while they watched sad and amusing film clips. We used film clips to induce emotion because (a) they included content that resembled emotional situations in everyday life, and (b) they circumvented possible group differences in the ability to generate emotional episodes or in the intensity of emotional episodes generated (a potential problem with other tasks often used to elicit emotion, such as having participants relive past emotional episodes in their lives). We were also interested in whether the impact of depression on emotional reactivity would differ when emotions were elicited with human and nonhuman content, given the premium placed on interpersonal relationships in Latino culture.

### ***Hypotheses***

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We tested three hypotheses regarding the impact of depression on emotional reactivity. On the basis of the core symptoms of depression, we predicted that depressed Latinas would have less positive emotion (i.e., less physiological activation, less intense reports of positive emotion, and fewer expressions of happiness) than nondepressed Latinas during the amusing film clips. Second, we predicted that depressed Latinas would have more negative emotion (i.e., more physiological activation, more intense reports of negative emotion, and more negative facial expressions) than would nondepressed Latinas. Our third hypothesis was that depression would also impair Latinas' abilities to engage in the social aspects of emotional response; therefore, we predicted that compared with nondepressed Latinas, depressed Latinas would show fewer non-Duchenne smiles (i.e., smiles that maintain social propriety) during both film clips. We predicted that this difference would be especially pronounced during the human clips because non-Duchenne smiles are particularly relevant in human contexts.

### Method

#### Participants

Twelve depressed and 10 nondepressed Spanish-speaking Latinas (females of Latino descent) between the ages of 18 and 35 were recruited from community hospitals, health clinics, and churches in the San Francisco Bay Area to participate in a study of emotional responding and mood. We limited our study to women to increase the homogeneity of our sample. Although our sample size fell at the low end of the range of sample sizes of other studies of depression and emotion, it was comparable with those of studies conducted with members of other ethnic groups (e.g., Donat & McCollough, 1983; McCarron, 1973; Schwartz et al., 1976a, 1976b). Women were not included in the study if they were pregnant, taking any neuroleptic medication, or taking any non-neuroleptic medication that would alter their autonomic activity. Screening interviews were conducted to assess whether participants met specific mental health and cultural criteria (described below). Prior to participating in this screening process, participants completed consent forms. Regardless of whether or not they met study criteria, participants were given \$10 as compensation for being screened and a referral list of local mental health services. If the women met study criteria, they were invited to participate in the experimental session of the study.

**MENTAL HEALTH CRITERIA.** To determine whether participants met criteria for inclusion in our depressed and nondepressed groups, interviewers administered the following assessment instruments.

1. *Primary Care Evaluation of Mental Disorders* (PRIME-MD; Spitzer et al., 1995). The PRIME-MD is a 15-item structured diagnostic interview based on the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., DSM-IV; American Psychiatric Asso-

ciation, 1994); it was modified for the purposes of the present study to screen for psychotic disorders, substance abuse disorders, and bipolar affective disorder.

2. *Mood Screener for Depression* (Muñoz, 1998). The Mood Screener is a nine-item questionnaire that inquires about the nine symptoms that constitute a major depressive episode, according to the DSM-IV. Participants who endorsed five or more symptoms (one of which was either "depressed mood" or "loss of interest or pleasure") met DSM-IV criteria for a major depressive episode.
3. *Center for Epidemiologic Studies—Depression Scale* (CES-D; Radloff, 1977). The CES-D is a 20-item questionnaire that provides a continuous measure of the intensity of depressive symptoms. The CES-D has been used widely in a number of epidemiological studies including studies with Spanish speakers (e.g., Cho et al., 1993; Soler et al., 1997). Each of the items is rated on a scale from 0 to 3, yielding a range of 0 to 60 for the entire scale. In the general population of the United States, the mean score is 8.7, and the standard deviation is 8.4 (Radloff, 1977). A score of 16 has conventionally been used as a cutoff score distinguishing depressed from nondepressed individuals.<sup>1</sup>

Depressed individuals were those who endorsed symptoms of depression but did not report symptoms associated with psychosis, bipolar depression, and substance abuse and dependence (according to the PRIME-MD), who endorsed five or more items on the Mood Screener (meeting DSM-IV criteria for a major depressive episode), and who

<sup>1</sup>Although the CES-D is not typically used as a diagnostic or categorizing tool, we used it to ensure that our groups differed in levels of depressive symptomatology.

scored above 16 on the CES-D. Nondepressed individuals were those who did not endorse any symptoms on the PRIME-MD, endorsed four or fewer symptoms on the Mood Screener, and had a CES-D score below 16. A one-way analysis of variance (ANOVA) revealed that the depressed and nondepressed groups differed significantly in their CES-D scores (nondepressed,  $M = 7.00$ ,  $SD = 4.57$ ; depressed,  $M = 29.33$ ,  $SD = 7.58$ ),  $F(1, 20) = 66.30$ ,  $p < .001$ ,  $d = 3.64$ . Thus, given the comprehensive nature of our assessments, we were confident that participants who were included in our depressed group were indeed depressed and that those who were included in our nondepressed group were not.

To ensure that any group differences were not due to variables other than mental health status, we conducted one-way ANOVAs by group on age, education, and years spent in the United States. These analyses revealed that depressed and nondepressed groups did not differ along any of these dimensions. Participants' mean age was 28.28 years ( $SD = 7.45$ ); mean years of education was 11.73 ( $SD = 3.64$ ); and mean years spent in the United States was 10.68 ( $SD = 6.30$ ). Fisher's exact tests also revealed that the two groups did not differ in marital status (45% single), employment status (38.1% employed), or country of origin (72.7% Mexico). Thus, differences in emotional reactivity between the two groups could not be attributed to group differences in any of these variables.

**CULTURAL CRITERIA.** To ensure that we sampled a group that was highly oriented to Latino culture, we asked participants to report on the following: (a) speaking, reading, and understanding Spanish fluently; (b) having parents who were born in Mexico, Central America, or South America; and (c) being born in the United States, Mexico, Central America, or South America. We also administered the General Ethnicity Questionnaire (see below) to assess whether there were group differences in self-reported orientation to Latino and Ameri-

can cultures. One-way ANOVAs revealed no group differences in orientation to American or Latino cultures; a pairwise  $t$  test revealed that participants reported being more oriented to Latino culture than to American culture (mean orientation to Latino culture = 3.71,  $SD = 0.57$ ; mean orientation to American culture = 2.53,  $SD = 0.70$ ),  $t(20) = 4.53$ ,  $p < .001$ ,  $d = 2.03$ .

#### *Apparatus*

**FILM CLIPS.** Dozens of films were viewed by Spanish-speaking Latino research assistants and Jeanne Tsai to search for film clips meeting the following criteria: (a) dialogue in Spanish, (b) contained content relevant to a Spanish-speaking Latino group that resembled emotional life events, and (c) elicited primarily sadness or amusement. To ensure that the film clips would elicit the intended emotion in our target sample, we asked members of a community task force on Latino issues ( $N = 7$ ) to view a subset of the film clips collected.<sup>2</sup> They rated how strongly they felt a variety of emotions (on a 9-point scale, from 0 = *not at all* to 8 = *extremely*) during the film clips. The final four film clips (two sad and two amusing) selected for the study achieved average ratings by the task force of 5 or greater for sadness and amusement, respectively. The sad film clips were of a man talking to his sister while she is dying (sad-human; film length = 3.6 min) and a baby lion trying to wake up his

<sup>2</sup>The Latino Task Force (LTF) is an advocacy group composed of Latino and non-Latino faculty, staff, and trainees of the University of California Department of Psychiatry at San Francisco General Hospital. The LTF was organized by Latino employees of the Department of Psychiatry in 1977 and has official advisory capacity to the departmental administration. Membership in the LTF is voluntary. Most members are Latinos, and they reflect the general distribution of San Francisco's Latino barrio; the predominant groups are of Mexican and Central American background. The members of the LTF who served as cultural informants for the study (i.e., volunteered to rate the clips and to assist in translation of instruments) were bilingual and bicultural.

dead father (sad-animal; film length = 1.92 min); the amusing film clips were of two men pretending to sneeze on naïve bystanders (amusing-human; film length = 4.12 min) and of three animals playing jokes on each other (amusing-animal; film length = 1.22 min). A neutral 1-min film clip of color sticks piling up on each other (Gross & Levenson, 1995) was shown to participants to assess whether there were group differences in their responses to a nonemotional film clip; as expected, this film did not elicit reports of any emotion.

**PHYSIOLOGICAL RECORDING.** Portable physiological recording equipment (polygraph) designed by Lafayette Instruments (Lafayette, IN) for a previous study (Levenson, Ekman, Heider, & Friesen, 1992) was used in this study. For specific information regarding physiological signal detection, see Levenson et al. (1992). Four measures of cardiovascular reactivity were obtained: (a) *cardiac interbeat interval* (the reciprocal of heart rate), or the time (in milliseconds) between successive R-waves of the electrocardiogram; (b) *pulse transmission time to the finger*, or the time (in milliseconds) between the R-wave of the electrocardiogram and the beginning of the upstroke of the pulse pressure wave of the finger; (c) *finger pulse amplitude*, or the peak-to-trough amplitude of the pulse pressure wave at the finger (in arbitrarily designated units); and (d) *finger temperature* (in degrees Fahrenheit). The electrodermal measure was *skin conductance level* (in micromhos).

**VIDEO RECORDING.** A partially hidden camcorder was positioned behind the monitor that displayed the film clips and faced the participant. The camcorder focused on participants' faces and upper body to record their facial expressions during the experimental session.

**QUESTIONNAIRES.** Questionnaires that have been used in our previous studies of culture and emotion were adapted for use with Spanish-speaking Latinas. Questionnaires were translated into Spanish by one team of

bilingual translators and back translated into English by another team of bilingual translators twice, following a subset of the guidelines provided by Butcher (1982), which are consistent with those described by Brislin (1981, p. 432) and Rogler (1999), to ensure that the meaning of the items were equivalent in the two languages. A committee of bilingual and bicultural informants (members of the task force described earlier and in Footnote 2) discussed items that were difficult to translate or that had multiple translations. A consensus was reached among committee members regarding the appropriate translation for these items. The committee included individuals from several Spanish-speaking countries, generally mirroring the distribution found in the community from which the participants were sampled. The back translation and committee approaches to translation are described elsewhere (Brislin, 1981, p. 431). The following are the questionnaires used.

1. The *Emotion Inventory* was used to examine whether depressed and nondepressed groups differed in their reported emotional states prior to watching the film clips and to assess participants' subjective emotional experiences during the film clips. Participants used a 9-point rating scale (ranging from 0 = *not at all* to 8 = *the most in my life*) to rate how strongly they felt a variety of specific emotions. On the basis of findings from previous studies, we were primarily interested in participants' reports of positive emotion (amusement, contentment, excitement, happiness, and satisfaction) and negative emotion (sadness, anger, and contempt) during the film clips.<sup>3</sup> Other emotions,

<sup>3</sup>However, because we wanted to ensure that group differences in emotional reactivity variables were due to levels of depression and not anxiety, which often co-occurs with depression, we also obtained a rating (using the 9-point rating scale described earlier) of participants' reported levels of state anxiety before watching

which were irrelevant to the purposes of this study, were also included as filler items on the Emotion Inventory so as not to bias participants' responses to the emotions of interest.

2. The *General Ethnicity Questionnaire* (American and Latino versions; GEQ-A and GEQ-L) was used to obtain a global, subjective assessment of how oriented participants reported being to Latino and American cultures. The GEQ allows independent assessment of orientation to American and Latino cultures. Participants used a 5-point Likert scale (ranging from 1 = *strongly disagree* to 5 = *strongly agree*) to rate 25 items pertaining to their social affiliation, activities, attitudes, exposure, and food. Jeanne Tsai and Robert Levenson originally designed this measure so that it could be used with various ethnic groups (e.g., Mexican Americans, African Americans, Chinese Americans, and European Americans) in their studies of emotional reactivity; therefore, the items were intentionally phrased in a general way.<sup>4</sup> For example, to assess cultural exposure, participants are asked to rate how strongly they agreed with statements such as, "I was raised in a way that was Latino" on the GEQ-L and "I was raised in a way that was American" on the GEQ-A. Cronbach's standardized item alpha for our Latina sample was .97 for the GEQ-A and .94 for the GEQ-L. To assess the convergent validity of the GEQ-A and GEQ-L for our sample, we examined the relationship between years spent in the United States

and average cultural orientation scores. As one would predict, the longer Latinas spent in the United States, the more oriented they were to American culture ( $r = .55, p .01$ ) and the less oriented they were to Latino culture ( $r = -.49, p < .05$ ).

3. The *Postexperimental Questionnaire* was administered to assess whether group differences in emotional reactivity were due to variation in participants' levels of attention and concentration. Participants used a 5-point scale (ranging from 1 = *not at all* to 5 = *extremely difficult*) to rate the difficulty they experienced concentrating on the film clips; no group differences in reported ability to concentrate on the film clips were found.

#### *Laboratory Setting*

We had initially planned to collect our data at one hospital site located in a section of the San Francisco Bay Area where a large Latino community resided. However, participants consistently canceled sessions or did not attend sessions, citing transportation and unexpected commitments as reasons for cancellation or lack of attendance. Therefore, in accordance with the tenets of community psychology (Levene & Perkins, 1987), we brought our study into the Latino community. With the support of community

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the film clips. One-way ANOVAs revealed that there were no group differences in reported levels of anxiety (or of the positive and negative emotions listed earlier) prior to the film presentation. Therefore, we thought it likely that any differences between the groups in reported emotion during the film clips would be due to their differences in depressive symptoms.

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<sup>4</sup>The GEQ was originally designed with two purposes in mind: (a) for general use with different ethnic groups to assess self-reported orientation to the particular culture of interest (e.g., Latino, American, Mexican, Chinese cultures) and (b) to allow separate assessment of orientation to different cultures (American culture and Latino culture). At the time that the study was conducted, there were no published measures of cultural orientation that met these two purposes; however, such measures now exist (Cuellar, Arnold, & Maldonado, 1995). The domains included in the GEQ were derived from domains represented in various acculturation instruments, including two that were designed for specific use with Mexican Americans (Cuellar, Harris, & Jasso, 1980; Mendoza, 1989; Szapocznik, Scopetta, Kurtines, & de los Angeles Aranade, 1978).

leaders, we recruited and set up our laboratory (in a similar configuration) at community sites such as churches and clinics, in addition to the original hospital site, to make it easier for Latinas to participate in the study. Thus, participants were recruited and screened at community hospitals, clinics, and churches and completed experimental procedures at one of four sites, depending on which site they preferred: hospital, community clinic, psychology department, or church. Data from both depressed and nondepressed participants were collected at each of these sites. Fisher's exact tests revealed no significant differences in the number of depressed and nondepressed participants whose data were collected at each site.

#### *Procedure*

Participants were greeted by a trained Spanish-speaking Latina research assistant.<sup>5</sup> The entire experimental session was conducted in Spanish. Prior to their participation in the study, participants were given consent forms that described the experimental procedures (including the fact that they would be videotaped). After informed consent was obtained, the research assistant attached physiological sensors to the participant. The polygraph and video monitors were hidden from the participant's view by a large folding screen. Following physiological hookup, participants completed an emotion inventory to indicate how they were feeling before watching the film clips.

Prior to each film clip presentation, we instructed participants to relax and empty their minds of all thoughts, feelings, and memories in order to obtain measures of participants' physiological responding during baseline. This prefilm baseline period lasted 3 min. Participants were then shown the neutral film clip. After the film clip period, participants completed another emotion inventory. Participants were then asked to rest for several minutes before beginning the next film presentation. The second film clip, either a sad or amusing film clip (presented in a counterbalanced order), was

shown after a prefilm baseline period. After the film clip, participants completed another emotion inventory. The remaining three film clips were presented in a similar fashion and in a counterbalanced order. While participants watched the film clips, their physiological and behavioral responses were recorded.

After all of the films were presented, participants completed the GEQ and the Post-experimental Questionnaire. Participants were paid \$25 for their participation in the experimental session of the study. They were also given a video consent form on which they could indicate whether they permitted the videotape of their experimental session to be used for nonresearch purposes (e.g., presentations at scientific meetings).

#### *Dependent Variables*

**PHYSIOLOGICAL MEASURES.** Continuous measures of participants' physiological responses were converted into second-by-second averages. For each of the film clips, mean levels of responding during the prefilm baseline period and during the film period were calculated for each of the physiological measures. The mean change from baseline was calculated for each measure by subtracting the mean levels of responding during the prefilm period from the mean levels of responding during the film period. To reduce the number of statistical tests, we created an aggregate of the cardiovascular measures by standardizing the change scores, calculating the mean, and then changing the sign so that higher values indicated increases in emotional arousal. To ensure that the measures could be aggregated on empirical grounds, we conducted a principal-components factor analysis. The magnitude of the loadings of each of the cardiovascular variables on the general cardiovascular factor ranged from .61 to .89

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<sup>5</sup>The majority of research assistants were fluent in Spanish and of Mexican descent.

during each of the four film clips.<sup>6</sup> We have used similar aggregation procedures in previous studies (Tsai, Levenson, & Carstensen, 2000).

**REPORTS OF SUBJECTIVE EMOTIONAL EXPERIENCE.** Participants' reported levels of amusement, contentment, excitement, happiness, satisfaction, sadness, anger, and contempt during the film clips were examined. To reduce the number of statistical tests, we created an aggregate measure of negative emotion by calculating the mean of reports of sadness, anger, and contempt experienced by participants. We also created an aggregate measure of positive emotion by calculating the mean of reports of amusement, contentment, excitement, happiness, and satisfaction. Again, to ensure that these variables could be aggregated on empirical grounds, we conducted principal-components factor analysis. The magnitude of the loadings of each of the positive emotions on the general positive emotion factor ranged from .75 to .93 for both amusing clips. The magnitude of the loadings of each of the negative emotions on the general negative emotion factor ranged from .79 to .89.<sup>7</sup> As with the cardiovascular aggregate, we have used similar aggregates of reports of emotional experience in previous studies (Tsai et al., 2000).

**EXPRESSIVE FACIAL BEHAVIOR.** Two assistants certified in the Facial Action Coding System (Ekman & Friesen, 1978) coded participants' expressive facial behavior during the baseline and film periods for each film clip. The Facial Action Coding System is a comprehensive assessment of facial muscle movement. After identifying which facial muscles moved during each film clip, coders tallied the number of emotional facial expressions (indicated by specific configurations of facial muscle movements) made by each participant. Coders identified expressions of anger, contempt, sadness, fear, disgust, shame, surprise, and happiness. In addition, coders tallied the number of Du-

chenne and non-Duchenne smiles displayed by participants. Duchenne smiles include both movement of the lips (zygomatic major) and movement of the muscles at the outer corners of the eye (orbicularis oculi). Non-Duchenne smiles do not include eye muscle movement (Ekman et al., 1997). Because no expressions of fear, disgust, shame, and surprise occurred, these emotions were omitted from subsequent analyses. To determine intercoder reliability, both assistants coded the behavior of 20% of the sample. Intercoder reliability was .89. To reduce the number of statistical tests, we created an aggregate of the negative emotional expressions by calculating the mean number of expressions of sadness, anger, and contempt. As before, we conducted principal-components factor analysis to ensure that the variables could be aggregated along empirical grounds. The loadings of each expression on the general negative emotional expression factor ranged from .69 to .72.<sup>8</sup> Duchenne and non-Duchenne smiles are the main expressions of positive emotion that have been characterized in the literature (Ekman & Friesen, 1978), and because we had specific hypotheses for each type of smile, we did not aggregate them.

<sup>6</sup>The only exception was finger temperature during the amusing-human clip, which had a factor loading of  $-.33$ . We examined whether the findings changed when we took finger temperature out of the cardiovascular composite; they did not. There were also no significant main effects or interactions involving group for finger temperature.

<sup>7</sup>The only exception was reports of contempt during the sad-animals clip, which had a factor loading of  $.19$ . We examined whether the findings changed when we took reports of contempt out of the negative emotional experience composite; they did not. There were also no significant main effects or interactions involving group for reports of contempt.

<sup>8</sup>The only exception was expressions of sadness during the sad-human clip, which had a factor loading of  $-.36$ . We examined whether the findings changed when we took expressions of sadness out of the negative emotional behavior composite; they did not. There were also no significant main effects or interactions involving group for this measure.

### Results

To balance the need to control for the number of statistical tests we conducted and the limited power we had to detect significant effects and interactions given our small sample size, we decided to use a Bonferroni-corrected rejection level within each set of analyses conducted for each component of emotional response. For example, because there were two analyses of physiological measures (one for the cardiovascular aggregate and the other for skin conductance activity), we used a Bonferroni-corrected rejection level of .025 ( $p = .05/2 = \text{original rejection level/number of statistical tests conducted for physiological measures}$ ). Prior to testing our hypotheses, we examined whether the films were effective in eliciting the targeted emotions; because of space constraints, we do not report these results here, although they are available on request. In summary, the films elicited significantly different reports of emotion and facial behavior compared with baseline.

#### *Responses to Neutral Film Clip*

To examine whether depressed and nondepressed groups differed in their responses to a nonemotional film clip, we compared their physiological, subjective, and behavioral responses to the neutral film clip. Depressed and nondepressed individuals did not differ in their physiological responses (i.e., cardiovascular, electrodermal), reports of emotional experience (positive or negative), or expressive behavior (negative, Duchenne, or non-Duchenne smiles) during the neutral film clip. Therefore, when interpreting group differences in responses to the sad and amusing film clips, we were able to conclude that such differences occurred in response to the emotional content of the film clips rather than to watching the film clips.

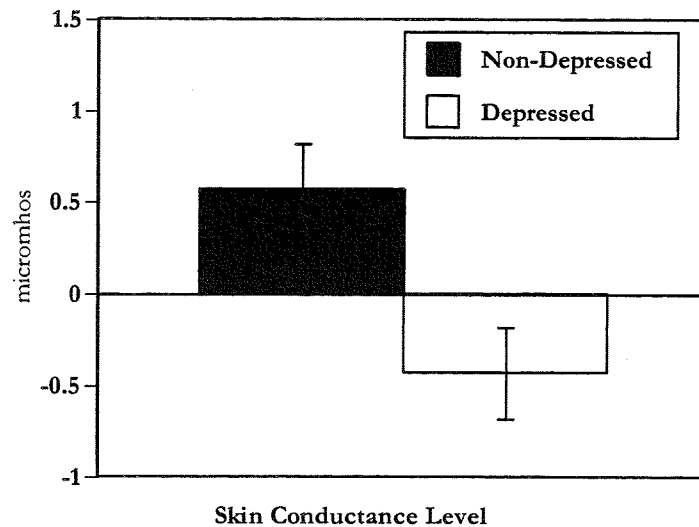
#### *Effects of Depression on Responses to the Emotional Film Clips*

**PHYSIOLOGICAL RESPONSES.** We conducted  $2 \times 2 \times 2$  (Group [nondepressed vs. de-

pressed]  $\times$  Emotion [sad vs. amusing]  $\times$  Stimulus [human vs. animals]) repeated measures ANOVAs on the cardiovascular aggregate and measure of skin conductance reactivity. Group was treated as a between-groups variable; emotion and stimulus were within-group variables. To detect significant effects or interactions involving group, we used a Bonferroni-corrected rejection level of  $p < .025$  ( $.05/2 = \text{original rejection level/number of statistical tests conducted on physiological measures}$ ). There were no main effects or interactions involving group for the cardiovascular aggregate; however, analyses revealed a significant main effect of group for changes in skin conductance levels,  $F(1, 20) = 7.23$ ,  $p = .014$ ,  $d = 1.20$ . Depressed participants showed decreases in skin conductance levels, whereas nondepressed participants showed increases in skin conductance levels across the four film clips (see Figure 1). Thus, contrary to our hypotheses that depressed Latinas would demonstrate less physiological activation during the amusing film clips and more physiological activation during the sad film clips, depressed Latinas demonstrated less skin conductance than nondepressed Latinas overall.

**REPORTS OF SUBJECTIVE EMOTIONAL EXPERIENCE.** To examine whether there were group differences in reports of emotional experience, we conducted  $2 \times 2$  (Group [depressed vs. nondepressed]  $\times$  Stimulus [humans vs. animals]) repeated ANOVAs on reports of negative emotion during the sad film clips and reports of positive emotion during the amusing film clips. We used a Bonferroni-corrected rejection level of .025 ( $.05/2 = \text{original rejection level/number of statistical tests conducted on reports of emotional experience}$ ). Contrary to our hypotheses, analyses revealed no significant main effects or interactions involving group for these measures.

**EXPRESSIVE BEHAVIOR.** To examine whether there were group differences in expressive behavior, we conducted  $2 \times 2$  (Group [de-



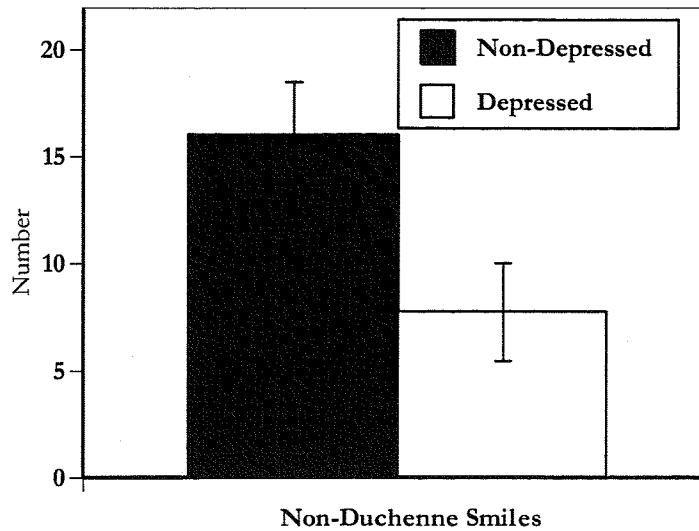
**Figure 1.** Mean and standard errors for changes in skin conductance levels (in  $\mu\text{mhos}$ ) for nondepressed ( $n = 10$ ) and depressed ( $n = 12$ ) Latinas during both film clips. The axes are oriented so that the upward direction indicates greater activation.  $p = .017$ .

pressed vs. nondepressed]  $\times$  Stimulus [humans vs. animals]) repeated ANOVAs on the aggregate of negative emotional expressions during the sad film clips and on Duchenne smiles during the amusing film clips. In addition, we conducted a  $2 \times 2 \times 2$  (Group  $\times$  Emotion  $\times$  Stimulus) repeated measures ANOVAs on non-Duchenne smiles. We used a Bonferroni-corrected rejection level of .017 (.05/3 = original rejection level/number of statistical tests conducted on measures of emotional expression) to identify significant effects or interactions involving group. Analyses revealed no significant main effects or interactions involving group for Duchenne smiles during the amusing film clips or negative emotional expressions during the sad film clips. However, there was a significant Group  $\times$  Emotion  $\times$  Stimulus interaction,  $F(1, 20) = 6.73$ ,  $p = .017$ , for non-Duchenne smiles. Follow-up analyses revealed that during the amusing-human film clip, nondepressed participants displayed more non-Duchenne smiles than did depressed participants,  $F(1, 20) = 5.95$ ,  $p = .025$ ,  $d = 1.09$  (see Figure 2). Thus, contrary to our first and second hypotheses, there was not a

significant group difference in expressions of happiness during the amusing film clips or in expressions of negative emotion during the sad film clips. However, in partial support of our third hypothesis, there were group differences in non-Duchenne smiles during the amusing-human film clip (we had predicted that there would be such differences across the film clips and that they would be particularly pronounced during the human ones).

### Discussion

In the present study, we explored the effects of depression on emotional reactivity in a sample of Spanish-speaking Latinas. We had hypothesized that depressed Latinas would demonstrate less positive emotion during the amusing film clip and more negative emotion during the sad film clip compared with nondepressed Latinas; these hypotheses were not supported. Thus, in our sample, depression appeared to minimally influence the capacity of our participants to respond emotionally to the film clips.



**Figure 2.** Mean and standard errors for non-Duchenne smiles (in numbers) for nondepressed ( $n = 10$ ) and depressed ( $n = 12$ ) Latinas during the amusing-human film clip.  $p = .025$ .

Instead, we found that across all film clips, depressed Latinas showed dampened skin conductance responses compared with their nondepressed counterparts. This finding is consistent with previous studies of Anglo Americans that consistently associate depression with reductions in skin conductance reactivity during a variety of stressful stimuli (Dawson, Schell, & Catania, 1977; Donat & McCollough, 1983; Greenfield, Katz, Alexander, & Roessler, 1963; Iacono et al., 1983; Lader & Wing, 1969; McCarron, 1973; Noble & Lader, 1971; Zuckerman, Persky, & Curtis, 1968), which may reflect the internal preoccupation and withdrawal that accompanies depression.

We hypothesized that depressed participants would display fewer non-Duchenne smiles than nondepressed participants, particularly in response to the human film clips. Our findings were consistent with this hypothesis, but only for the amusing-human film clip, suggesting that for this sample, depression may selectively alter responses to events that typically induce positive emotion and that involve other people. Although these findings require further replication, they suggest that, for Latinas, depression may have a greater effect on the interper-

sonal aspects of positive emotional response (i.e., the ability to mask negative emotion or demonstrate socially appropriate responses) than on the internal ones (i.e., the capacity to experience emotion).

#### *Comparison With Other Cultural Groups*

In future studies, we hope to compare directly the effects of depression on emotional reactivity across cultural groups to examine explicitly the effects of culture on depression and emotional functioning. Although not entirely comparable, a number of studies have been conducted with primarily Anglo Americans. Our study is most similar to that of Berenbaum and Oltmanns (1992), who also used film clips to induce positive and negative emotional states in a primarily Anglo American sample. In this study, depressed Anglo American participants reported less amusement and displayed fewer Duchenne smiles during the amusing film clip than did their nondepressed peers, suggesting that depression affected the internal aspects of positive emotion for this group. Depressed Anglo Americans, however, also displayed fewer non-Duchenne smiles than

their nondepressed counterparts during the amusing film clip. These findings suggest that for Anglo Americans, depression may affect both the internal and interpersonal aspects of positive emotion to similar extents, whereas for Latinas, depression may affect the interpersonal aspects of positive emotion more than the internal ones. These findings are consistent with proposals that for members of Western cultures, the locus of emotional symptoms associated with depression may be more internal than it is for members of non-Western cultures (Lewis-Fernandez & Kleinman, 1994; Manson, 1995). Future studies will determine whether this is the case.

#### *Limitations and Future Directions*

Our study has a number of limitations. First, we did not include men, and therefore, it is possible that our findings are specific to Latina women. Similarly, our sample was primarily Mexican; future studies should examine whether our findings generalize to other specific Latino groups (e.g., Cuban Americans, Puerto Ricans). Second, our measure of cultural orientation was limited in a number of ways. Although we obtained a global assessment of orientation to American and Latino cultures, we did not measure the specific cultural variables (e.g., *simpatía*) that we predicted would influence emotional responding in our sample. Finally, our sample size, although within the range of that of other studies, was small; as a result, additional group differences may have been obscured due to insufficient power. We plan to address all of these limitations in future studies.

In summary, we found evidence for similarities and differences in the impact of depression on the emotional responses of Spanish-speaking Latinas and previously studied Anglo Americans. Our findings suggest that whereas the physiological markers of depression may be similar across cultures, the facial-behavioral correlates of depression may be slightly different, reflecting the

different cultural imperatives of the groups studied.

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