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Cultural Values Influence Relations Between Parent Emotion Socialization and Adolescents' Neural Responses to Peer Rejection

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Abstract

Adolescents' responses to negative social experiences can be influenced by parenting behaviors. This includes how parents react to their child's expression of emotions, an aspect of parenting referred to as emotion socialization. Emotion socialization may intersect with cultural values, particularly collectivism, a socially-relevant attitude that emphasizes the importance of interpersonal relationships. Examination of a neural measure called the feedback-related negativity (FRN), thought to reflect the degree to which feedback is experienced as aversive, could help elucidate neural contributions to and consequences of the role of collectivism in such family dynamics. Thus, this study examined whether adolescents' endorsement of collectivism moderated the association of parents' dismissive emotion socialization responses (called override responses) and FRN following peer rejection. A community sample of 83 Latinx ($n = 32$), Asian American ($n = 20$), and non-Latinx White ($n = 31$) adolescents ages 13–17 completed a computerized peer feedback task while continuous electroencephalogram was recorded. Their parents completed a battery of self-report questionnaires. Regression analyses demonstrated that adolescents' endorsement of collectivism moderated the association of override responses and FRN following peer rejection, such that FRN was enhanced as override responses increased for adolescents endorsing low and moderate levels of collectivism. Results suggest that there is cultural variation in the association of the emotion socialization strategy of override and adolescents' neural responses to socially-salient events. Findings have implications for parenting interventions designed to enhance adolescents' emotion regulation abilities.

Keywords Emotion socialization · Culture · Collectivism · Adolescent · Feedback-related negativity

Family-level experiences are thought to lay the foundation for the development of adolescents' psychological and neural sensitivities to peer interactions. This heightening of sensitivity to social context has been described as a process of affective "tuning" during which biases emerge in response to adverse or supportive aspects of the social environment (Pluess, 2015). Although adolescents are more likely to find parents to be dismissive of their emotions (Klimes-Dougan et al., 2007) and have less interaction with parents than with peers (Schneiders et al., 2007), parenting behaviors can still have great impact on youth behavioral and psychophysiological responses to social experiences, particularly during the adolescent years when peer interactions take on greater salience (Steinberg & Morris, 2001). For example, positive parenting strategies have been found to buffer emotional reactivity to negative peer events among youth with anxiety disorders (Oppenheimer et al., 2016), and negative maternal affect during a challenging task that required supportiveness from mothers was associated

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with attenuated adolescent responsiveness to peer acceptance in brain regions involved in social-affective processing (Tan et al., 2014).

Parental emotion socialization practices, which include the reactions parents have to their children's emotions (Fabes et al., 2001), are believed to be particularly influential on youth's emotional functioning in social contexts (Campos et al., 2004; Hazel et al., 2014; Mezulis et al., 2006; Oppenheimer et al., 2016). Parents' emotion socialization responses are generally categorized as supportive or non-supportive (O'Neal & Magai, 2005). Supportive responses include comforting, validating, and empathetic behaviors such as reward (e.g., physical affection). In contrast, non-supportive responses encompass disapproving behaviors such as punishment of an emotion (e.g., telling a child they are "being a baby" when they express fear). Research indicates that supportive responses encourage a youth's emotion regulation capabilities (Taylor et al., 2013), whereas non-supportive responses can lead to emotion dysregulation and difficulties with social competence (Eisenberg et al., 1998, 1996). Override responses are an emotion socialization strategy that refer to parents' dismissal of an emotion or distraction of the youth from the emotion they are experiencing (e.g., telling a child to "cheer up"; buying a child a present). Factor analyses have grouped override strategies with supportive emotion socialization practices (Garside, 2004; Klimes-Dougan et al., 2001), and they are believed to attenuate children's negative affect. However, the direction of association between override responses and emotion regulation and psychopathology outcomes in youth has not been uniform across studies (Bennett et al., 2019; Buckholdt et al., 2009; Klimes-Dougan, 2007; O'Neal & Magai, 2005). These inconsistent results suggest that interpretation of override responses as either supportive or non-supportive could be dependent on context (Bennett et al., 2019; O'Neal & Magai, 2005).

Culture is one context that could account for differences in how youth interpret parents' responses to their emotions. Conceptual frameworks addressing the role of culture in emotion socialization suggest that a child's emotions are shaped by parents in order to maintain a sense of well-being that is aligned with the values and goals of the family's social environment (for review, Cole & Tan, 2016). One such value shown to be associated with parental emotion socialization practices and their relation to youth outcomes is collectivism, an attitudinal orientation that emphasizes connectedness with others and places a high value on harmonious interpersonal relationships within and beyond the family (Singelis, 1994). Socialization practices among parents from collectivistic cultural groups are often oriented toward goals such as group agreement and cooperation (Greenfield et al., 2003; Keller et al., 2006), which can shape youth behavioral responses (e.g., obedience) (DiBartolo & Rendon, 2012; Heinrichs et al., 2006; Yoon & Lau, 2008). For example, some Chinese parents have been shown to engage in socialization practices aligned with override including emphasizing attunement and sensitivity to the emotions of others through minimizing attention to and talking less about their child's own emotions (Wang, 2001). Further, Latinx mothers have been found to exhibit a combination of warmth and control when interacting with their children (Ispa et al., 2004) and to encourage obedience and respect for adults (Gonzalez-Ramos et al., 1998). As such, emotion socialization strategies that might be classified as non-supportive (such as downplaying emotions or reacting to emotions in a manner that is controlling/strict but not punitive [Bornstein et al., 2012; Lugo-Candelas et al., 2015]) could actually be interpreted as consistent with cultural values and therefore supportive. Nonetheless, studies have yet to examine how cultural values (e.g., collectivism) might contribute to individual differences in associations between parental emotional socialization and youth's emotion regulation. This gap in the literature is particularly important to address given that concepts of what emotion socialization strategies are considered supportive versus non-supportive have been derived from research that predominantly recruited White, middle-income families and may not generalize to other racial/ethnic groups (Friedlmeier et al., 2011; Pintar Breen et al., 2017).

Much research that has examined cross-cultural differences in emotion socialization has focused on cultural group differences or used race/ethnicity as a proxy for collectivism (e.g., individuals from Asian and Latinx cultural groups are presumed to be collectivistic; Oyserman et al., 2002). From these group comparison studies, it could be inferred that adolescents who endorse greater collectivism could experience their parents' override responses as in line with socialization practices common to their cultural group. Consequently, they may interpret their parents' behavior as supportive of emotional experiences. For example, one study showed that Latinx mothers of preschool-aged children were more likely to minimize or ignore their children's negative affect than European American mothers, yet this emotion socialization response pattern was not associated with poor functioning outcomes for Latinx children (Lugo-Candelas et al., 2015). In contrast, among European American parents, a common child rearing perspective is that emotion expression should be encouraged and is critical for adaptive development (Gottman et al., 1997). Adolescents who are more aligned with an individualistic worldview may experience parents' override responses as attempts to stifle emotional expression, representing a non-supportive response. As a result, this may undermine an adolescent's ability to process and regulate emotionally-laden information from an especially salient social context, namely evaluative feedback from peers.

Considerable research has examined behavioral associations of parenting behaviors and child emotional reactivity and regulation (Morris et al., 2017), yet there remains much to be known about the psychophysiological correlates (for review, see Tan et al., 2020). Greater

understanding of the neural processes implicated in the pathways by which parental emotion socialization influences youth outcomes could lead to improved insight into the neurodevelopment of emotion regulation in youth as well as more precise treatment targets. As such, the feedback-related negativity (FRN) is a negative deflection in the event-related brain potential measured using the electroencephalogram (EEG) that is a manifestation of neural response to feedback (Foti et al., 2011; Gehring & Willoughby, 2002). An enhanced (more negative) FRN has been observed when outcomes are perceived to be worse than expected (Holroyd & Krigolson, 2007) and following unfair and rejecting offers in experimental paradigms (Mothes et al., 2016; Polezzi et al., 2008; Hewig et al., 2011). FRN amplitude has also been shown to vary as a function of motivational states (Gehring & Willoughby, 2002; Holroyd & Coles, 2002; Gu et al., 2015), the valence and perceived relevance of feedback (Santesso et al., 2011; Severo et al., 2017), experimenter observation (Voegler et al., 2019), cultural values such as collectivism (Hitokoto et al., 2016), and racial/ethnic group membership (Zhu et al., 2016; Zhu et al., 2016). Together, this research suggests that FRN tracks perceptions of feedback, with enhanced FRN indicating more negative perceptions, and that FRN is sensitive to both individual-level and contextual factors. FRN could provide insight into individual differences in adolescents' reactivity to negative social events such as peer rejection that perhaps would not be discernable with other research methods and could provide a more complete understanding of the intersection of emotion socialization and culture, as well as inform translation of this information into clinical efforts. This is particularly so given evidence that adolescents are likely to suppress observable expressions of emotions (Klimes-Dougan et al., 2007) and research finding demonstrating that although European American and Asian American undergraduates did not differ in their ratings and non-verbal expressions of disgust when viewing gruesome images, European Americans demonstrated greater physiological reactivity when asked to suppress their emotional reactions, suggesting cultural differences in how this emotion regulation strategy is perceived to be adaptive (Soto et al., 2016).

Additionally, FRN is a clinically-relevant neural measure. Abnormalities in FRN amplitude are characteristic of individuals with a range of psychiatric outcomes. For example, blunted FRN has been found in individuals with depression and problematic alcohol use (Bress et al., 2013; Soder et al., 2020) whereas enhanced FRN amplitude has been associated with internalizing disorders such as social anxiety (Cao et al., 2015; Harrewijn et al., 2018; Kessel et al., 2015; Kujawa et al., 2014). Further, FRN has been shown to reflect harsh parenting (Levinson et al., 2017) and is responsive to treatment (McDermott et al., 2018); as such, FRN could potentially be used to assess responsiveness to parenting-focused interventions. Overall, FRN is clinically informative, possibly representing a transdiagnostic, modifiable treatment target or a biomarker of treatment response.

Present Study

The *primary aim* of the present study was to evaluate the moderating effect of youth ratings of collectivism on the association of parental override emotion socialization responses and youth neural response to peer rejection. The *primary hypothesis* was that parental report of use of override responses would be associated with enhanced FRN to peer rejection in low collectivism youth, indicating that parental override responses were interpreted as non-supportive, and that parental override would be associated with attenuated FRN for high collectivism youth, indicating that this response was interpreted as supportive. We conducted three follow-up moderator analyses to further clarify this relation. The *secondary aim* was to compare override with strategies that are consistently considered supportive (i.e., reward) and non-supportive (i.e., punishment). We anticipated no significant interaction of reward and collectivism when predicting FRN following peer rejection (*Hypothesis 2*). A significant interaction of collectivism and punishment was hypothesized such that use of punishment responses would be associated with enhanced FRN to peer rejection in low collectivism youth and attenuated FRN for high collectivism youth (*Hypothesis 3*). Finally, given that most research in this area has used racial/ethnic group as a proxy for collectivism, as an *exploratory aim* we tested the interaction of racial/ethnic group and override. Although racial/ethnic group differences in the association of emotion socialization strategies and youth outcomes have been documented in the literature, race/ethnicity also fails to fully represent an individual's cultural views. As such, we did not make a specific prediction about whether results of analyses with race/ethnicity as a moderator would be consistent with analyses that included dimensional collectivism ratings.

Methods

Participants and Procedures

One hundred and thirteen adolescents (ages 13–17) were recruited from throughout Los Angeles County to participate in a larger study through numerous avenues including in-person events (e.g., health fairs) and online postings. All study procedures were approved by the Institutional Review Board at the University of

California, Los Angeles, and written parental consent and youth assent were obtained before any procedures were conducted. First, participants completed screening procedures to determine eligibility. Exclusion criteria were clinical-level elevation of Attention-Deficit/Hyperactivity (ADHD) symptoms assessed via the Youth Self Report (Achenbach, 1991), IQ less than 80 as determined by select subtests of the Wechsler Abbreviated Scales of Intelligence (Wechsler, 1999), and diagnosis of Autism Spectrum Disorder as reported by parent during a brief review of youth psychiatric history. These criteria were established to ensure that participants were able to attend to stimuli for an extended period of time and remain responsive to social stimuli, given that study participation included completion of three computerized EEG tasks each lasting 20–30 min and including an experimental manipulation of social context (e.g., priming with emotional faces). Six adolescent participants were excluded following screening due to clinically elevated ADHD symptoms. Parents of eligible participants were given the option of completing an approximately one-hour battery of self-report questionnaires either in-person or online. Questionnaires were available in English and Spanish. Ninety-one parents (85.0%) completed questionnaires. The parent sample was comprised predominately of mothers ($n = 78$; 85.7%), and approximately 19% of parents chose to complete questionnaires in Spanish ($n = 17$).

Next, the remaining 107 adolescents completed computerized flanker, go/no-go, and peer feedback tasks while continuous EEG was recorded. The present study included EEG data only from adolescent participants who completed the peer feedback task and whose parent completed the optional self-report battery of questionnaires ($n = 90$). Participants who did not have complete parent data ($n = 17$) were comparable to those that did in terms of gender, race/ethnicity, and low-income status, $x^2 = 0.01$, $p = 0.91$, $x^2 = 0.78$, $p = 0.68$, $x^2 = 2.10$, $p = 0.14$, respectively. These adolescents were somewhat older than those with parent data, No parent data: $M(SD) = 15.94(1.14)$, Complete parent data: $M(SD) = 15.00(1.35)$, $t(105) = 2.68$, $p = 0.01$, $d = 0.75$. This age difference likely occurred because many older adolescents were able to attend study appointments unaccompanied by parents. When this happened, parents were sent an online link to the questionnaire battery, potentially leading to more attrition than for those parents who completed questionnaires in-person.

From this sample of 90 youth, three participants had incomplete youth or parent data. Four participants were excluded from analyses, as these cases appeared to be statistical outliers based on inspection of several indices (e.g., standardized residuals, Cook's Distance, leverage). Following these exclusions, data from 83 participants were included in subsequent analyses. This sample was 57.8% male and 42.2% female with an average age of 15.0 years ($SD = 1.4$). The sample was comprised of Latinx ($n = 32$; 38.6%), Asian American ($n = 20$; 24.1%), and non-Latinx White (NLW; $n = 31$; 37.3%) adolescents. Per 2018 U.S. Department of Housing and Urban Development guidelines for Los Angeles County, 31.3% of youth were from families considered low-income (84.6% of which were Latinx) based on annual family income and number of individuals in the household, as reported by parents. The majority of youth reported that English was their first language (85.5%), with some youth endorsing Spanish (12.0%) and Mandarin Chinese (2.5%). On average, youth described that they were proficient in English, $M(SD) = 5.83(0.78)$, using a rating scale of 0 ("Not at all fluent") to 6 ("Fluent").

Measures

Demographics

Race and ethnicity of the youth were reported by parents during the screening process. Parents were asked to select their child's race from the following options: (a) American Indian or Alaska Native, (b) Asian, (c) Native Hawaiian or Other Pacific Islander, (d) Black or African-American, (e) White, or (f) Other. Ethnicity was assessed using a free-response question ("What is your child's ethnicity?"), with a follow-up question specifically assessing Latinx ethnicity ("Do you consider your child to be Hispanic or Latino?"). Age and gender were collected via a standard demographic form completed by the youth. Youth also reported their first language and provided a rating of their English proficiency. Parents provided an estimate of annual family income by selecting from 10 ranges of estimated annual earnings as well as reporting the number of individuals supported by this income. This information was used to categorize families as low-income or not low-income using U.S. Department of Housing and Urban Development guidelines.

Emotion Socialization Responses

Parental emotion socialization behavior was assessed using the Emotion Socialization Measure (ESM; Garside & Klimes-Dougan, 2002; Klimes-Dougan et al., 2001). Adapted from the Emotions as a Child Scale (Magai, 1996), this self-report measure asks parents to rate their responses to children's expression of anger, sadness, and fear, separately for each emotion. Specifically, there is an introductory prompt for each emotion querying parents to rate their response to their child's emotion generally over time (i.e., "When your child has been [sad, angry, afraid], how often did you …?"). Responses to each emotion were rated on a scale of 1–5, with anchors of "Not at all" (1), "Sometimes" (3), and "Very much" (5).

Subscale measures for five emotion socialization strategies were computed including: reward, punishment, override, magnify, and neglect. The present study focused on ratings of reward, punishment, and override strategies averaged across all three emotions. In other research, internal consistency of reward, punishment, and override subscales has been found to be acceptable ($\alpha = 0.72$—0.93; O'Neal & Magai, 2005) and was adequate in the present sample, reward: $\alpha = 0.78$, punishment: $\alpha = 0.64$, override: $\alpha = 0.81$.

Collectivism

Collectivism was measured using the Self-Construal Scale (Singelis, 1994), a 30-item self-report rated on a seven-point Likert scale. Items were summed to produce a collectivism score and an individualism score, with higher scores indicating greater endorsement. Only the collectivism score was used in the present study. This measure has been used extensively in a range of samples, including Asian American adolescents ($\alpha = 0.69$; Liu & Goto, 2007) and Latinx young adults ($\alpha = 0.71$; Shorey et al., 2002), and demonstrated adequate internal consistency in the present sample, $\alpha = 0.72$.

Experimental Task

A computerized social feedback task adapted from the "Island Getaway" paradigm developed by Kujawa et al. (2014) was used to elicit FRN following social feedback. Adolescent participants were told that they would be participating in a series of voting rounds to determine who from a group of 12 teenagers (including the participant) would make it onto a final team of six to play a group game. Participants were informed that players who were voted out at any point would play the same game but in a single-player format. A player profile which included basic demographic information (first name, age, gender, hometown, name of school, and main hobby) was created for each youth and also included a photograph taken by the experimenter at the start of the study visit. Players participated in six voting rounds in which they were presented with several different co-player profiles that included five male profiles and six female profiles, with ages ranging from 13–17 years. Unknown to the adolescent participant, all 11 co-players profiles were actually fictional and created by the experimenter. After casting a vote, players were presented with a fixation cross for 2000 to 3000 ms, followed by the co-player's profile again for 2000 ms. A fixation cross was then displayed for 1000 ms, followed by either a green thumbs up or a red thumbs down image for 1500 ms, representing acceptance or rejection of the participant by the co-player.

One co-player was randomly removed each round. To increase motivation and engagement, participants were asked to answer a free-response poll question (e.g., "What is your least favorite activity?") in between voting rounds that was then added to their profile. The participant was also shown each co-player's response. In total, the participant completed 51 feedback trials evenly split between acceptance and rejection trials with the last trial determined randomly. Feedback was presented in pseudo-random order with no more than three trials of either type of feedback in a row.

Electrophysiological Data Recording and Reduction

EEG recordings were obtained using a BioSemi ActiveView ActiveTwo system with an elastic cap containing 64 Ag/AgCl scalp electrodes. Two electrodes above and below the right eye and two electrodes near the outer canthi of both eyes were used to record the electrooculogram. Two electrodes were placed on left and right mastoids. Data were recorded referenced to a driven right leg passive electrode and common mode sense active electrode and re-referenced offline to the average of all head electrodes. Impedances were maintained below 30 kΩ. Data were digitized at 1024 Hz with filters set to pass 0.16–100 Hz.

The continuous EEG was segmented into 200 ms epochs following an initial screen for extreme artifacts. Gross artifact inspection was conducted using an automated algorithm that rejected all channels in an epoch in which (a) the absolute difference between two adjacent sampling points exceeded 50 μV, (b) the voltage range across the epoch exceeded 300 μV, (c) the amplitude exceeded 150 μV or fell below -150 μV across the epoch, and/or (d) sustained activity less than 0.5 μV within a 100 ms interval occurred. Independent Components Analysis was used to correct ocular artifacts (Makeig et al., 1996). Waveforms were then filtered with a Butterworth zero-phase 0.1–30 Hz bandpass filter. Figure 1 shows grand-average waveforms for acceptance and rejection trials.

Neural response to rejection and acceptance was quantified using mean amplitude measures relative to a pre-stimulus baseline of 100 ms prior to onset of feedback stimuli, based on visual inspection of grand-average waveforms and previous reports in comparable youth samples. Mean FRN amplitude was computed separately for acceptance and rejection feedback in a window 200–300 ms following onset of feedback stimuli. A repeated-measures ANOVA of feedback type (acceptance, rejection) and electrode site (FCz, Cz, Pz) was conducted to confirm the presence of the FRN, and post-hoc analyses of significant interactions utilized paired samples t-tests. After performing this manipulation check, only FRN following peer rejection was included as an outcome in the present study. Given that several choices for quantification of FRN could be made, procedures for doing so were determined *a priori*

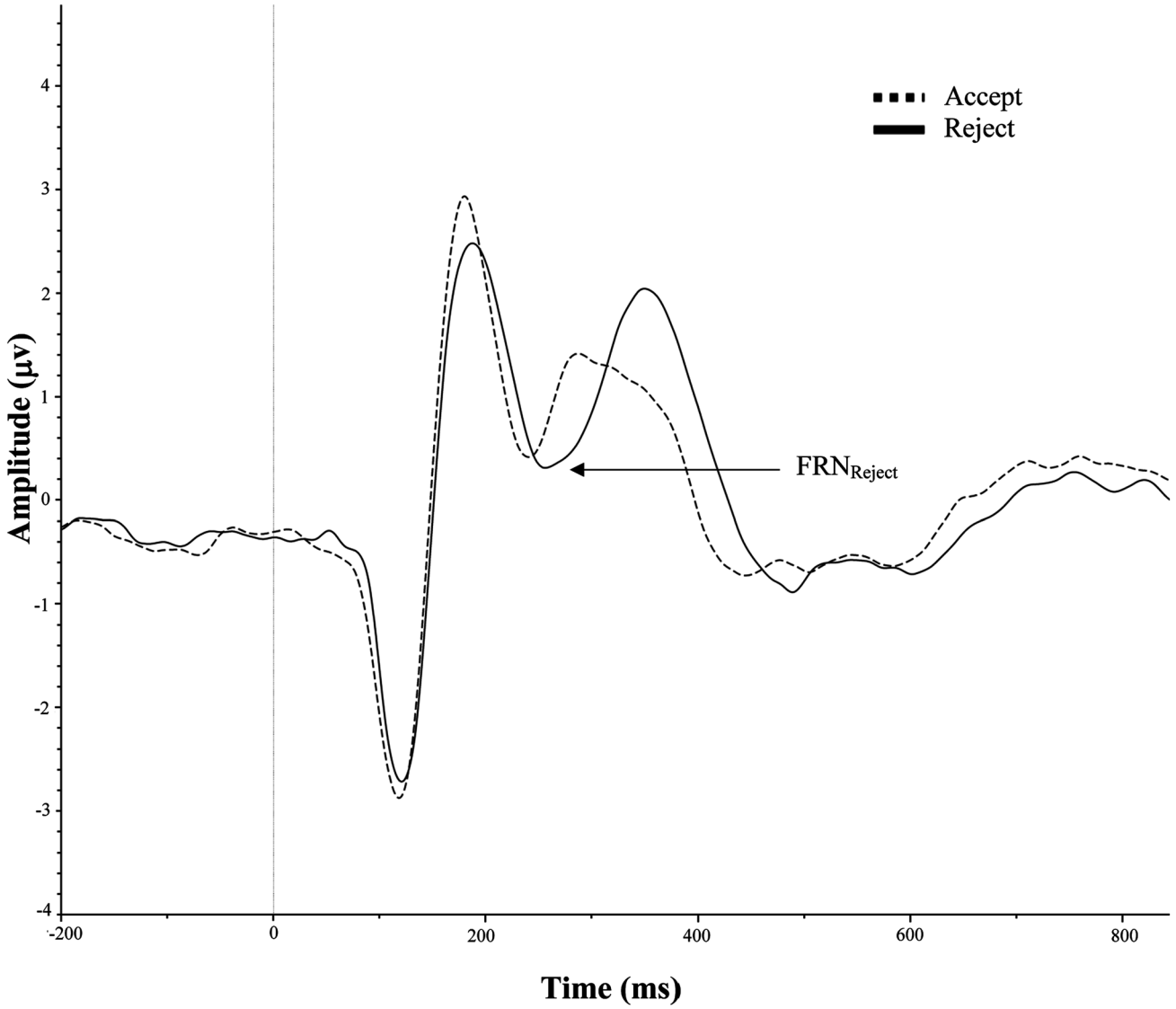

Fig. 1 Time Course of Youth Neural Response to Acceptance and Rejection Feedback at FCz Recording Site, Averaged Across Participants ($n = 83$)

in line with recommended guidelines (Luck & Gaspelin, 2017). Other research that has examined variability in the association of behavioral outcomes with FRN following negative social feedback (e.g., Cao et al., 2015) was used to inform methodological decisions.

Confirming Presence of the FRN

There was an enhanced negativity at frontocentral sites following receipt of feedback, as illustrated in Fig. 1. As a manipulation check, a repeated-measures ANOVA involving feedback type (acceptance, rejection) and electrode site (FCz, Cz, Pz) was used to confirm the presence of the FRN based on the valence of feedback and scalp topography, as well as to determine at which electrode site the component was maximal. Mauchly's Test indicated a violation of the assumption of sphericity for site ($\varepsilon = 0.66$). Main effects of site and feedback type confirmed a negativity following receipt of feedback at frontocentral sites that was more negative in rejection than in acceptance trials, $F(1.50, 122.98) = 6.64$, $p = 0.002$, $\eta_p^2 = 0.08$, $F(1,82) = 7.99$, $p = 0.006$, $\eta_p^2 = 0.09$, respectively. Post-hoc tests determined that FRN to acceptance and rejection was more negative at FCz than at Cz, acceptance: $t(82) = -5.06$, $p < 0.0001$, $d = 0.33$, rejection: $t(82) = -3.64$, $p < 0.0001$, $d = 0.31$. In summary, results indicated that the social feedback task was successful in eliciting FRN with typical scalp topography that varied as expected as a function of feedback type.

Table 1 Descriptive Statistics for Self-Report Measures

	Full sample *M(SD)*	Racial/ethnic group *M(SD)*			Gender *M(SD)*		Age group *M(SD)*	
		Latinx	Asian American	NLW	Female	Male	13–14	15–17
Override	10.1(2.3)	11.2(1.7)	10.7(1.9)	8.5(2.2)	10.6(1.9)	9.7(2.5)	10.0(2.4)	10.1(2.3)
Punishment	4.6(1.3)	5.2(1.2)	4.9(1.4)	3.9(1.0)	4.6(1.3)	4.5(1.3)	4.6(1.5)	4.6(1.2)
Reward	13.0(1.6)	13.3(1.7)	12.7(1.7)	12.9(1.4)	13.4(1.4)	12.7(1.7)	13.0(1.5)	12.9(1.7)
Collectivism	4.9(0.59)	4.9(0.57)	5.0(0.40)	4.8(0.73)	4.8(0.59)	4.9(0.59)	5.0(0.58)	4.8(0.60)

M Mean, *SD* Standard deviation, *NLW* non-Latinx White

Data Analytic Strategy

Group differences in self-report measures and FRN mean amplitude measures were assessed using one-way ANOVAs or independent samples t-tests. To test hypotheses that parent emotion socialization responses would be related to FRN following peer rejection and that these associations would be moderated by youth collectivism, parallel linear regressions were conducted to produce the conditional effect of emotion socialization responses on FRN using the PROCESS macro (Hayes, 2017) for SPSS 26. Collectivism was employed by the PROCESS macro as a continuous variable, but the continuous relationship was evaluated at the 16th (low), 50th (moderate), and 84th (high) percentile of collectivism in order to enhance interpretability and visualization of the interaction. The Johnson-Neyman technique was also used to achieve greater region specificity. Gender, adolescent age (measured as a single integer ranging from 13–17), and race/ethnicity were also entered simultaneously in each model.

Sample Size Determination

Conducting an exact power analysis using a predetermined specific effect size requires a strong empirical basis (Miller & Yee, 2015). Because this basis was not available for the present study, we used the traditional recommendation of 0.80 for power at $\alpha = 0.05$ and computed analyses for a medium and large effect size. Taking into account a regression-based data analytic plan, a sample size of 74 was estimated to be adequately powered to detect medium effects.

Results

Overall Sample Characteristics

Descriptive statistics for self-report ratings are summarized in Table 1. Independent samples t-tests and one-way ANOVAs were used to test for differences in self-report ratings by youth demographic variables, specifically gender, age (dichotomized as younger [13–14 year old] and older [15–17 year old] adolescents), and race/ethnicity. There were no differences in collectivism ratings by demographic variables, although emotion socialization responses to negative emotions differed based on the youth's gender and race/ethnicity. Parents of female adolescents reported more reward responses to their children's emotions than did parents of male adolescents, $t(81) = 2.04$, $p = 0.04$. Ratings of override and punishment emotion socialization responses differed based on race/ethnicity, override: $F(2,80) = 16.39$, $p < 0.0001$, punishment: $F(2,80) = 14.89$, $p < 0.0001$. NLW parents endorsed fewer override responses than did Latinx and Asian/Asian American parents, $t(61) = -5.43$, $p < 0.0001$, $d = 1.36$, $t(49) = -3.69$, $p = 0.001$, $d = 1.07$, respectively. NLW parents also reported fewer punishment responses than did Latinx and Asian/Asian American parents, $t(61) = 4.57$, $p < 0.0001$, $d = 1.15$, $t(49) = -3.20$, $p = 0.002$, $d = 0.89$, respectively. Latinx and Asian/Asian American parents did not differ in their ratings of override or punishment responses to negative emotions. There were no racial/ethnic group differences in parental ratings of reward responses. In the full sample, bivariate correlations showed positive associations between override and both punishment and reward responses, $r = 0.54$, $p < 0.0001$, $r = 0.32$, $p = 0.004$, respectively. Reward and punishment responses did not demonstrate a correlational relation. Table 2 provides

Table 2 Correlations Between Responses to Sadness, Anger, and Fear for Each Emotion Socialization Strategy

	Override		Punishment		Reward	
	Angry	Afraid	Angry	Afraid	Angry	Afraid
Sad	0.54**	0.60**	0.42**	0.31*	0.60**	0.48**
Angry		0.49**		0.25*		0.48**

*$p < 0.01$; **$p < 0.0001$

Table 3 Regression Model Examining the Interaction of Override and Collectivism in Predicting FRN Following Peer Rejection

	β	*SE*	*p*	*LL CI*	*UL CI*
Override	-2.0	0.84	0.01	-3.7	-0.34
Collectivism	-3.4	1.7	0.04	-6.8	-0.10
Sex	-0.11	0.52	0.83	-1.1	0.93
Age	-0.08	0.17	0.64	-0.43	0.26
Ethnicity	1.1	0.35	0.003	0.34	1.7
Override x Collectivism	0.36	0.16	0.03	0.02	0.69

FRN Feedback-related negativity, *SE* standard error, *LL CI* Lower limit confidence interval, *UL CI* Upper limit confidence interval

Table 4 Regression Model Examining the Interaction of Punishment and Collectivism in Predicting FRN Following Peer Rejection

	β	SE	p	LL CI	UL CI
Punishment	-3.5	1.9	0.06	-7.3	0.19
Collectivism	-2.8	1.7	0.10	-6.2	0.58
Sex	0.19	0.51	0.70	-0.83	1.2
Age	-0.09	0.18	0.62	-0.46	0.27
Ethnicity	0.84	0.35	0.02	0.13	1.5
Punishment x Collectivism	0.63	1.9	0.08	-0.09	1.3

FRN Feedback-related negativity, *SE* Standard error, *LL CI* Lower limit confidence interval, *UL CI* Upper limit confidence interval

correlations between responses to sadness, anger, and fear for each emotion socialization strategy.

Independent samples t-tests revealed no differences in mean amplitude of FRN following peer rejection by age and gender. There were racial/ethnic group differences, $F(2,80) = 5.52$, $p = 0.006$, such that Asian American adolescents ($M(SD) = 2.42(2.32)$) demonstrated less negative FRN responses than did Latinx ($M(SD) = 0.40(2.48)$) and NLW ($M(SD) = 0.85(1.66)$) adolescents, $t(50) = -2.92$, $p = 0.005$, $d = 0.83$, $t(49) = -2.80$, $p = 0.007$, $d = 0.77$, respectively.

Emotion Socialization and Neural Response to Peer Rejection

Primary Aim

As summarized in Table 3, the first model, $R^2 = 0.16$, $F(6,76) = 2.33$, $p = 0.04$, showed an interaction between override responses and youth collectivism in predicting FRN following peer rejection, $\Delta R^2 = 0.05$, $F(1,76) = 4.60$, $p = 0.03$. Probing of this interaction revealed conditional effects illustrated in Fig. 2a such that override responses were associated with enhanced (more negative) FRN following peer rejection for adolescents who endorsed low (4.39) and moderate (4.93) levels of collectivism, $\beta = -0.43$, $p = 0.005$, $\beta = -0.23$, $p = 0.04$, respectively. The conditional effect for high collectivism youth (5.46) was nonsignificant. The collectivism value defining the Johnson-Neyman significance region was 4.94 (% below: 56.62; % above: 43.37).

Secondary Aim

Collectivism and reward responses did not appear to interact ($p = 0.98$), in line with Hypothesis 2. The regression model testing Hypothesis 3 and summarized in Table 4, $R^2 = 0.11$, $F(6,76) = 1.61$, $p = 0.09$, demonstrated a marginally significant interaction between collectivism

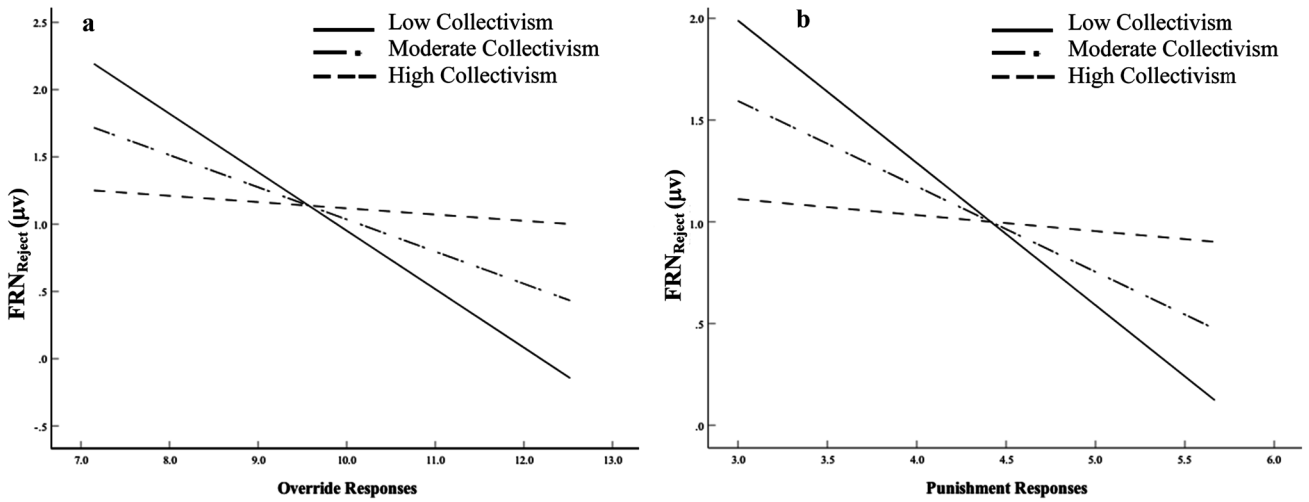

Fig. 2 Association of Youth FRN_{Reject} and Parental Override **a** and Punishment **b** Responses for Adolescents Endorsing Low (16%), Moderate (50%), and High (84%) Levels of Collectivism

and punishment responses, $\Delta R^2 = 0.04$, $F(1,76) = 3.00$, $p = 0.08$. When probed further, this interaction revealed conditional effects, illustrated in Fig. 2b, that mirrored those found when examining override responses such that greater endorsement of punishment responses was associated with enhanced (more negative) FRN following peer rejection for adolescents at low (4.50) and moderate (4.93) levels of collectivism, β = -0.70, $p = 0.02$, β = -0.41, $p = 0.05$, respectively. The conditional effect for high collectivism youth (5.46) was nonsignificant. The collectivism value defining the Johnson-Neyman significant region was 4.93 (% below: 54.88; % above: 45.12).

Exploratory Aim

Although the overall model accounted for significant variance in the outcome, $R^2 = 0.17$, $F(7,75) = 2.18$, $p = 0.04$, the exploratory test of the highest order unconditional interaction of race/ethnicity and override was nonsignificant, $\Delta R^2 = 0.03$, $F(2,75) = 1.34$, $p = 0.27$.

Discussion

Parental socialization behaviors have been shown to impact how youth respond to negative experiences in their social environment. The present study demonstrated that this influence extends to neural outcomes and further, that the relation between parental emotion socialization responses and neural measures of emotional reactivity can vary based on an adolescent's cultural values. Examination of the relation between override responses and youth outcomes has produced mixed findings, suggesting that a youth's interpretation of this specific strategy could be context dependent. Indeed, as seen in other research (e.g., Bennett et al., 2019), measures of parental override responses were positively correlated with both punishment and reward responses in the present study.

Notably, however, associations varied by cultural context. Specifically, override responses were associated with enhanced FRN following peer rejection for youth who endorsed low and moderate levels of collectivism. Results from the model examining the interaction of punishment and collectivism in predicting FRN were consistent with this primary model, although these effects did not reach statistical significance for a two-tailed test and the punishment subscale demonstrated relatively low internal consistency, suggesting that these findings should be interpreted cautiously. Collectively, findings imply that adolescents who endorsed low to moderate collectivism perceived parents' use of override responses to their negative emotions as a non-supportive parental practice. Findings are in line with other research that has challenged the notion of parental use of override as uniformly supportive (Bennett et al., 2019) and has shown that similar emotion socialization responses such as suppression can exacerbate physiological reactivity to stress (Waters et al., 2020). This differential association of parental emotion socialization and youth outcomes by cultural values is also consistent with findings that although mothers from generally collectivistic cultural groups (e.g., immigrant Asian Indian; Latinx) demonstrated more non-supportive responses to their child's negative emotions than European American mothers, these emotion socialization practices were only related to problem behaviors for European American children (Lugo-Candelas et al., 2015; McCord & Raval, 2016). For youth who endorsed a high level of collectivism, override responses appeared to be experienced as neutral, acting in neither a deleterious nor protective manner in regards to neural response to peer rejection. This finding is consistent with other research that has examined cultural differences in physiological reactivity in service of emotion suppression, which is similar to override responses. European Americans have been found to have higher skin conductance levels and worse psychological functioning when asked to suppress emotions than do Asian Americans (Soto et al., 2016, 2011), supporting the notion that this emotion regulation strategy is inconsistent with European American cultural norms, and thus perceived to be distressing.

It was also notable that although there were racial/ethnic group differences in endorsement of override and punishment responses, race/ethnicity did not emerge as a significant moderator of the association of emotion socialization responses and FRN. This negative result suggests that the pattern of association between override and FRN did not vary by race/ethnicity, in contrast to the results that examined collectivism. Much of what is known about cultural differences in emotion socialization and youth outcomes has come out of racial/ethnic group comparisons. Although race/ethnicity is often considered a proxy for cultural values, present results support that race/ethnicity and collectivism are not one in the same. This finding speaks to more recent research challenging the notion that parents' endorsement of collectivistic versus individualistic child socialization goals falls into an "East versus West" dichotomy. Rather, research suggests that a diverse range of factors (e.g., motivation for economic advancement; level of education) could be more meaningful indices of child socialization priorities than racial/ethnic group membership alone (Park et al., 2014). Results underscore the utility of comprehensive assessment of cultural values over and above distal assessments of culture such as categorical demographics, particularly values related to interpersonal relationships, when understanding a youth's response to negative social events.

Findings from this study are clinically informative, suggesting that emotion socialization interventions for parents of adolescents could be improved by incorporating a cultural perspective. For example, the Tuning in to Teens program (TINT; Kehoe et al., 2020) teaches parents an emotion socialization style called "emotion coaching" (Gottman et al., 1997) that involves bolstering skills in how to attend and respond to emotions in a manner that promotes emotion competence. Tailoring a program like TINT to be based on cultural values of youth and parents could improve parent uptake and adolescent outcomes, particularly when considering the impact of intervention elements such as reducing dismissive reactions. Adolescence also represents a time of greater risk for difficulties with emotion regulation (Cracco et al., 2017) during which negative emotions become more intense and unstable (Beilen et al., 2018). Thus, being able to understand which parenting strategies for managing normative shifts in emotional experiences are more effective for a given adolescent could meaningfully bolster their ability to successfully transition into adulthood.

Despite several strengths of the present study, particularly a racially/ethnically diverse sample that included representation of Latinx and low-income families, results should be interpreted in light of some limitations. First, research indicates that emotion socialization practices in early childhood can longitudinally influence outcomes in early adolescence, suggesting that these processes are likely transactional and unfold over time (Perry et al., 2020; Rodas et al., 2017). The ability to study this in the present sample is limited by the study's cross-sectional design. Further, other methods of measurement could have enhanced understanding of how neural response to peer rejection relates to behavioral outcomes. A multimodal approach that included naturalistic observation methods such as ecological momentary assessment could offer a more nuanced view of how measures of neural reactivity relate to real-world behavior (Silk, 2019). Next, research has shown that mothers and fathers engage in differential emotion socialization strategies and that parent gender can moderate the influence of these strategies on youth outcomes (Waters et al., 2020; Wu Shortt et al., 2016). Our sample included too few fathers ($n = 13$; 14.3%) for a meaningful test of parental gender as a moderator or examination of the impact of gender discrepancies in caregiver-adolescent dyads (e.g., father-son versus father-daughter dyads). Finally, the present study focused specifically on collectivism but did not consider simultaneously held beliefs about individualism. Collectivism and individualism are not considered to be opposing poles on a single dimension, such that, if one is high in collectivism, one must be low in individualism. Instead, these constructs are conceptualized as not mutually exclusive (Oyserman, 1993; Singelis, 1994). That being said, the expression and meaning of collectivism could depend on one's individualistic views, as well as other contextual factors (Vargas & Kemmelmeier, 2013). Although examination of the interacting role of individualism was outside the scope of the present study, it is an important future research direction.

Overall, findings from the present study suggest that emotion socialization practices that include override responses to emotions can result in enhanced neural response to peer rejection for adolescents who endorse low and moderate levels of collectivism but do not appear to have the same deleterious effect for high collectivism youth. Some interventions have targeted parental emotion socialization responses to improve youth emotion regulation (Kehoe et al., 2020). Future research is needed to clarify how these program components could be tailored in correspondence with a family's cultural views to maximize effectiveness. These findings could be used together with neural measures obtained using EEG, a clinically-feasible methodology, to personalize interventions.

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Compliance with Ethical Standards

Conflict of Interest The authors have no conflicts of interest to declare.

Ethical Approval The study was approved by the Institutional Review Board at the University of California, Los Angeles.

Informed Consent Statement Written informed consent was obtained from participants' legal guardian, and written assent was obtained from participants.

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