

Running head: CALLOUS TRAITS AND BODY POSES

Callous-Unemotional Traits Are Related to Combined Deficits in  
Recognizing Afraid Faces and Body Poses

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### Abstract

**Objective:** The aim of the present study was to examine accuracy in labeling body poses conveying fear. Youths with callous-unemotional traits experience emotional processing deficits seemingly on par with deficits displayed by patients with amygdala damage. That is, there is growing evidence that children with callous-unemotional traits have problems recognizing afraid emotional expressions. Although people with amygdala damage show deficits in labeling afraid faces, they have an intact ability to label afraid body poses.

**Method:** Boys (N=55; ages 8-16) from a community center were recruited to label emotional faces and static body poses and to complete the Inventory of Callous-Unemotional Traits and a measure of violence and antisocial behavior.

**Results:** Callous-unemotional traits were related to poorer accuracy when labeling afraid faces and afraid body postures. However, when response bias was taken into account, callous-unemotional traits were related to deficits in many facial expressions. Notably, the combination of poorly labeling afraid faces and body poses was linked to the highest levels of callous-unemotional traits and violence.

**Conclusion:** Findings support a generalized deficit in processing displays of fear that are not specific to faces. The results support the argument that a general ‘fear-blindness’ is related to a lack of empathy and to violence and antisocial behavior. Methodological issues with regard to deciding whether people are accurately labeling fear and other emotions are discussed.

However, early identification of fear deficits that affect multiple modalities is argued to be important for clinical intervention.

**Keywords:** Callous-unemotional traits; emotion recognition; violence.

## Callous-Unemotional Traits Are Related to Combined Deficits in Recognizing Afraid Faces and Body Poses

People with callous-unemotional traits show interpersonal problems such as lack of empathy, an uncaring attitude toward others, and general lack of feelings. Cleckley's<sup>1</sup> description of adults with psychopathy included being callous and without remorse, and these affective and interpersonal features figured prominently in his descriptions. The affective component of psychopathy (i.e., callous-unemotional traits) has been found to indicate greater severity of delinquency and violence in children and youths.<sup>2-8</sup> Among youths with disruptive behavior disorders, such as conduct disorder, callous-unemotional traits<sup>7-9</sup> predict poor outcomes. Consistent with conceptualizations of callous-unemotional traits as originating from a temperament described by low fear, low emotional arousal, and by reduced reactivity to cues of punishment<sup>10, 11</sup>, youths<sup>12-16</sup> with these traits display problems recognizing emotions and these emotional deficits are similar to the emotional deficits displayed by adults<sup>17-19</sup> with psychopathic traits. People with callous-unemotional traits may treat others poorly because of their own emotional deficits, which can be due to their own experiences and their ability to recognize others' experience of emotions.

People with callous-unemotional traits experience interpersonal problems, and one reason may be because they experience deficits in recognizing what others are feeling. People are generally inhibited from being violent toward others. However, children with callous-unemotional traits may fail to be inhibited by expressions of fear in others, and may consequently be uninhibited about taking advantage of other people.<sup>20</sup> People low in empathy, such as those with callous-unemotional traits, may thus engage more frequently in antisocial and violent behavior because they lack inhibition.

There is growing evidence that children with callous-unemotional traits have problems recognizing facial expressions that convey fear.<sup>13, 14</sup> A recent meta-analysis<sup>17</sup>

revealed that people with callous-unemotional traits and those from antisocial populations exhibit deficits in identifying emotional facial expressions, and that this deficit is specific to fear. People with damage to the amygdala also have problems recognizing fear in faces.<sup>21, 22</sup> Thus, youths with callous-unemotional traits experience emotional processing deficits seemingly similar to the deficits displayed by patients with amygdala damage.

Facial emotional expressions are but one way of knowing how other people are feeling. Recently, emotion recognition research has extended to the investigation of recognizing the emotions conveyed by body postures. This research is interesting, given the debate over the relative importance of emotional versus cognitive deficits as the primary deficits in people with psychopathic traits.<sup>23, 24</sup> It is possible that people with callous-unemotional traits use “body language,” rather than facial expressions to recognize fear in other people. Research with people with amygdala damage supports this possibility to use other methods to recognize emotion. That is, people with amygdala damage are able to label afraid body postures,<sup>21, 25</sup> despite having deficits in recognizing fear in faces.

Research on patients with damage to their amygdala indicate that people’s responses to body postures serve a different purpose besides allowing for feelings of empathy,<sup>26</sup> and may rely more on areas of the brain that are not strictly emotional. In other words, the amygdala is unlikely to be solely responsible for processing body postures that convey fear. Body postures that convey emotions activate parts of the brain that process what it feels like to experience emotions.<sup>27</sup> Thus, people recognize fear in others by generating an internal representation of their own body experiencing fear.<sup>26, 28</sup> One hypothesis is that parts of somatosensory-related cortices and limbic structures are activated, because in childhood they are involved in learning to link the emotion with one’s own experience during emotional situations.<sup>28, 29</sup> The ability to read other people’s body language correctly may be useful for human survival: for example, when others are afraid, one should proceed cautiously.<sup>26</sup> Such

sensitivity to the emotional landscape may be accomplished by activating areas of the brain that provide a bodily representation of fear.

Although people with callous-unemotional traits show deficits that are similar to those shown by people with amygdala damage, the brain areas that might be dysfunctional in the former group are unknown. Recently, children with callous-unemotional traits have shown reduced activity in the amygdala when viewing afraid faces.<sup>30</sup> Given that patients with bilateral amygdala damage do not show deficits in recognizing body postures that convey fear, perhaps the deficits exhibited by people with callous-unemotional traits are also specific to faces. To date, no known studies have examined the ability of people with callous-unemotional traits to correctly identify emotions conveyed by body poses.

The present study will investigate accuracy in labeling body postures conveying emotions. The aim is to determine whether children with callous-unemotional traits evince the same deficits in identifying afraid postures as they do with afraid faces. A deficit for body poses might indicate dysfunctions in parts of the brain other than the amygdala; recent evidence supports this.<sup>30</sup> Thus, a general dysfunction in recognizing fear which goes beyond faces is possible. Callous-unemotional traits, violence, and antisocial behavior will be measured via self-report with a community sample of boys. Accuracy for postures will be measured without confounding the presence of faces in body postures. The design is mainly correlational; however, the aim is to determine the levels of callous-unemotional traits in those subgroups of children who display deficits in identification of both facial and postural cues.

## Method

### *Participants*

Parents of children from the ages of 8 to 16 who were taking part in holiday activities at a community center in a large city in the Northwest of England were approached to take

part in the study. The participants were representative of the community surrounding the center. The community is highly deprived with regard to employment, education, income, and health, and has above average rates of crime when compared to other neighborhoods in England. The center itself has had reports of thefts, both consumer and staff property, and physical and sexual assaults. Despite this, an 83% participation rate (final N=66) was achieved and participants were compensated with a free swim voucher to use at their local pool. The sample used in the present study comprised the boys (n=55; Mean age=11.8, SD=1.9) who participated.

### *Measures*

*The Inventory of Callous-Unemotional Traits.*<sup>29</sup> The ICU is a 24 item self-report questionnaire designed to provide assessment of callous-unemotional traits. Answers were recorded on a four-point, Likert scale (0 = 'Not at all true', 1 = 'Somewhat true', 2 = 'Very true', 3 = 'Definitely true'). The ICU captures three dimensions of behavior: callousness, uncaring, and unemotional.<sup>32</sup> The ICU has been shown to be reliable in an investigation using a large sample of adolescents<sup>32, 33</sup>. Cronbach's alpha was computed for the total scale and for each subscale: alpha was acceptable and ranged from .76 to .84 for the full-scale and callous and uncaring subscales. The internal consistency was marginal to low for the unemotional subscale (.48). These values are similar to those found by Essau et al.<sup>32</sup>

*Self Report of Delinquency questionnaire.*<sup>34</sup> The Self Report of Delinquency (SRD) was used to measure levels of antisocial behavior. Only the items relating to minor forms of delinquency, namely property delinquency (10 items) were included as a measure of antisocial behavior. Items relating to violent delinquency (8 items) were also used. Items required participants to respond (1) 'yes' or (0) 'no' to each item and scores were summed and square root transformed, since the data consisted of counts.

*Emotional faces.* Recognition of emotion in faces was assessed using pictures of four adults showing emotions using the criteria set out by Ekman.<sup>35</sup> Thirty-five children rated the faces, and six emotions conveyed in the faces of four adults were selected based on the ratings. In a follow-up investigation, three cohorts of preschoolers, preadolescents, and adolescents labeled the emotions and good test-retest reliability (Cronbach's alphas ranging from .72 to .84) was shown after a one month interval. Consistent with developmental changes in understanding and recognizing emotions, the preschoolers were significantly less accurate in labeling emotions than the preadolescents and adolescents, who did not differ significantly from each other. In the present study there was a trend for increasing age to be related to increasing accuracy for labeling sad faces. This result is consistent with the idea that young children have problems discerning sadness in faces,<sup>36</sup> and provides evidence for the validity of the emotional faces stimuli. Participants in the present study were given a printed booklet with 24 faces displaying six emotions: happy, sad, afraid, angry, surprised, and disgusted. A six-alternative forced-choice response was used to label the emotions.

*Emotional body postures.* Recognition of emotions in body postures was assessed using full-light static body posture pictures<sup>25</sup> in which the faces were Gaussian blurred to avoid confounds due to identifying a face or facial expression. Participants were given a booklet with 18 body postures of two men and two women displaying happy, sad, afraid, angry, surprised (only 2 here). The 18 postures that were most reliably labeled in a prior investigation were chosen.<sup>25</sup> See Figure 1 for a sample body pose. The body postures had been tested by Atkinson et al. with 38 adults and the postures used in the present study were labeled using a single modal emotional label at least 50% of the time. Patients with amygdala damage labeled these same body postures conveying fear correctly when given a forced-choice response paradigm.<sup>25</sup> A six-alternative forced-choice response was used to label the emotions in the present study.

### *Procedure*

Children were given a letter to take home from the community center. If the parents consented, the child was then individually approached to ask for their written assent/consent. Participants completed a booklet which included some demographic questions, the pictures of emotional faces, the pictures of emotional body postures, and the ICU questionnaire. The participants, in groups of about 25, were supervised in a room at the community center. After completion of the study, each participant received a free swim voucher and was fully debriefed. All procedures were approved by the Ethics Committee at the University of Central Lancashire, in the UK.

### *Data Analysis*

First, partial correlations between the number of accurately labeled faces/ body poses and callous-unemotional traits are presented. Thus, any deficits found can be inferred to be due to callous-unemotional traits and not to the behavior related to these traits. Next, a corrected accuracy was calculated by squaring the numerator in the conventionally used accuracy rate (the “hit rate”) and dividing the result by the product of the bias in using the label and the number of stimuli in the emotion set.<sup>37</sup> This takes into account response biases. The resulting proportion was then normalized using an arcsine-root transformation and correlations were re-examined. Calculating accuracy using these two methods allows for comparing the present findings to those of prior research.

Next, the combination of being poor in recognizing fear both in faces and body poses was examined. A series of two-step hierarchical regressions were performed with callous-unemotional traits and violence as the dependent variables and corrected accuracy for afraid faces and body postures as the predictors. The predictors were centered by subtracting the sample mean from each participant’s score. The first step in the regression regressed the dependent variables onto accuracy for afraid faces and body postures. The second step added



the multiplicative term. The forms of significant interactions were examined by the post-hoc probing methods suggested by Holmbeck.<sup>38</sup> Post-hoc probing was done to test the association between accuracy for afraid faces and the dependent variable of interest (e.g., callous-unemotional traits) at high and low levels of accuracy for afraid body postures. The significance of these simple slopes (standardized betas and t-values) were then calculated.<sup>38</sup> The form of the interaction was plotted by computing the full regression equation at high (1 SD above the mean) and low (1 SD below the mean) levels of the two predictors (i.e., accuracy for afraid faces and body postures).

## Results

### *Accuracy in Labeling Fear and Callous-Unemotional Traits*

Table 1 notes the descriptive statistics for the main study variables. The first aim was to determine whether callous-unemotional traits were related to accuracy in labeling afraid faces and body postures. Table 2 notes the results of the partial correlation analyses using the traditional ‘hit rate’ and bias-corrected accuracy. The relation between afraid faces and callous-unemotional traits was significant and negative,  $sr(51) = -.34, p < .05$ . Youths who were high callous-unemotional traits had fewer correct responses to afraid faces, even controlling for violence and antisocial behavior. The deficits in afraid faces for youths high on callous-unemotional traits found are consistent with the findings reported by<sup>13</sup> who also found a significantly negative partial correlation. Using the corrected accuracy, a general deficit in labeling faces was found and no specific deficit for fear. Youths who were high in callous-unemotional traits used ‘afraid’ ( $r(51) = -.28, p < .05$ ) and ‘anger’ ( $r(51) = -.38, p < .01$ ) labels infrequently and this response bias explained the poor accuracy in afraid and angry faces that was found when using the ‘hit rate’. However, a general deficit in facial emotion recognition is not *inconsistent* with prior research.<sup>18</sup> Findings by<sup>13</sup> support poorer accuracy for faces in youths with high callous-unemotional traits, although not all negative coefficients

were significant. Most studies have neglected to adjust accuracy, and the results of the present study highlight the need to adjust for biases.

The results regarding body postures more clearly show a deficit that is specific to the emotion of fear. That is, callous-unemotional traits were related to fewer accurately labeled afraid postures,  $sr(51) = -.30, p < .05$ . However, violence was also related to fewer accurately labeled afraid body postures,  $sr(52) = -.35, p < .05$ , while controlling for total callous-unemotional traits. Although corrected accuracy for afraid poses was poorest, the relations with callous-unemotional traits and violence were not significant. Thus, the results for emotional faces show that deficits occur in multiple emotions and this is only true for callous-unemotional traits. The results for emotional body postures show that deficits are specific to fear, but the deficits in fear are true for highly callous-unemotional boys and violent boys.

More errors for angry faces were related to callous-unemotional traits,  $sr(51) = -.29, p < .05$ , and this result seems inconsistent with research stating a specific fear deficit in youths with callous-unemotional traits. However, patients with amygdala damage have deficits labeling anger (for example <sup>25</sup>), and results by <sup>13</sup> also support deficits in sadness and anger, although the coefficient was not as large as was found here. Surprisingly, violence was related to *greater* accuracy in identifying angry body postures,  $sr(51) = .39, p < .01$ , resulting from a bias in responding ‘anger’ to many different emotions ( $r(52) = .45, p < .001$ ). Simply choosing ‘anger’ on many items results in greater accuracy. Indeed, prior research supports a hostile attribution bias for aggressive individuals (see <sup>39</sup>).

Taken together, these results indicate a deficit in labeling afraid faces and afraid body postures among youths scoring highly on callous-unemotional traits, although accuracy was lower for more types of emotions than fear. It appears that performance on labeling afraid body postures was most discriminative of those with callous-unemotional traits, but this needs to be replicated as the relation was non-significant.

*Does “Fear Blindness” Indicate High Callous-Unemotional Traits and Violence?*

The next set of analyses was performed to ascertain whether having a general “fear blindness” across modalities was most important. The interaction between accuracy for afraid body poses and faces was significant in predicting total callous-unemotional traits ( $\Delta R^2=.16$ ,  $F(1,51) = 11.24$ ,  $p < .01$ ) and violence ( $\Delta R^2=.06$ ,  $F(1,51) = 4.17$ ,  $p < .05$ ). It accounted for 16% of the variance in total callous-unemotional traits. Figure 2 illustrates the form of the interaction predicting callous-unemotional traits. Boys who were poor at labeling both the afraid faces and afraid body postures had the highest levels of total callous-unemotional traits, which were close to one standard deviation above the sample mean. Similar post-hoc probing was done for violence, and the combination of both poor accuracy for afraid faces and body postures was associated with the highest levels of violence. Figure 3 illustrates this interaction. The combination of being poor in judging fear in faces and in postures was most problematic, such that the highest levels of callous-unemotional traits and violence were found.

### Discussion

This is the first known study to demonstrate a relationship between callous-unemotional traits and problems in interpreting emotions conveyed in body postures. In light of callous-unemotional traits as a personality construct that is often associated with antisocial behavior, the findings support that deficits in processing fear evinced by people with callous-unemotional traits are not just specific to faces and voices but encompass body language as well. Thus, people with callous-unemotional trait have trouble knowing when others are afraid and are unable to compensate by attending to body postures.

The findings regarding body posture labeling were exploratory yet very intriguing. These findings, as for faces, point to a deficit specific to fear among boys who are violent and among boys who lack empathy, do not care about things that others hold dear, and do not

show emotions. While accuracy for labeling facial emotions failed to reveal a unique deficit in fear, body postures more clearly defined a specific fear deficit for boys with high callous-unemotional traits. However, the relation was nonsignificant when corrected for bias. Further, a fear deficit was not specific to callous-unemotional traits. Although antisocial behavior was unrelated to deficits in recognizing emotions once callous-unemotional traits was partialled, violence was related to difficulties in recognizing fear in body postures. It may be that failing to recognize when others are putting up their hands in a plea to stop or when they are making moves to protect themselves can indicate a deficit in fear processing that could lead to a callous disregard of others and to violence.

Although the present study cannot directly identify potentially dysfunctional brain areas in people with callous-unemotional traits or violent behaviors, the ability to identify others' emotions has been shown to involve areas of the brain that are used to represent one's own body.<sup>26, 27, 40</sup> Specifically, somatosensory cortices and areas in the frontal cortex, such as the frontal operculum, have been shown to be involved in recognizing emotions.<sup>28, 41</sup> Thus, to interpret what other people are feeling, one needs to access parts of the brain that are activated when expressing feelings. If some people are unable to feel fear, then they would have problems recognizing it in others. People who are callous and unemotional and people who are violent are relatively underreactive and fearless.<sup>42-45</sup> The amygdala may allow for people to identify situations where they should feel fear, and fearlessness may also involve the amygdala.<sup>46</sup> The amygdala is a plausible candidate given its established function as a processor for threatening stimuli. Studies involving primates suggest that bilateral amygdala damage can result in disinhibited behaviors due to the consequent reduction in anxiety.<sup>46</sup> This is observed in primates and other animals with amygdala damage who, rather than retreating, become very bold when confronted by threatening stimuli.<sup>46</sup> The present study cannot identify the structures that were activated; thus, further research needs to examine brain areas

that may be affected when youths with callous-unemotional traits view emotional body postures.

The findings suggest that cross-modal deficits in recognizing fear are most problematic in terms of callous-unemotional traits and violence. In fact, the interaction between poor performance on labeling afraid faces and afraid postures explained a high proportion of variance (16%) in callous-unemotional traits. The usefulness of identifying individuals with deficits in labeling afraid faces and body postures is evident, and could potentially be used to determine those most at risk of violent and callous behavior. In brief, poor performance on labeling afraid faces and body postures may be used as an alternate assessment of callous-unemotional traits, which may be useful in clinical settings.

A lack of attention to emotionally-salient parts of the face, that is, the eyes,<sup>47</sup> seem to be at the root of recognition deficits for faces displaying fear. Attending to the eyes is important in being able to take other people's points of view and to socially connect with others.<sup>47</sup> Focusing attention to the eye-region of the face resulted in better fear recognition for youths who were high on callous-unemotional traits.<sup>13</sup> The body parts that convey fear are yet unknown, and it may not be important since directing attention to the eyes yielded accurate recognition of fear that was only temporary.<sup>13</sup> Instead of indicating where the inattention lies, the findings from the present study suggest that the deficit in recognizing fear goes beyond faces (see <sup>48</sup>), and attending to bodily cues will not help youths with callous-unemotional traits to recognize fear displays. Blair's 'Violence Inhibition Mechanism' suggests that displays of submission, such as fear or sadness, become associated with the act that preceded the emotional display (e.g., a display of aggression). A child becomes socialized to avoid hurting other people, because they do not want to see others in distress.<sup>20</sup> Given the accumulating studies, children with callous-unemotional traits are 'blind' to fear<sup>47</sup>, whether displayed by faces or postures. If fear blindness is present from an early age, the

suggestion is that children will not be inhibited from hurting other people. Not only does registering fear in other people's faces prevent people from doing harm, it appears that registering fear promotes prosocial behaviors.<sup>49</sup> Skuse<sup>50</sup> argues that recognizing fear assists in the development of theory of mind, that is, the idea that other people have thoughts and feelings that are their own. One suggestion is that fear blindness and inattention to the eye region interferes with attachment processes with one's caregivers and results in a lack of empathy.<sup>51</sup> When this fear blindness occurs in conjunction with a generalized lack of fear, deficits in empathy might result and antisocial behavior and violence have the potential to increase.

The present study replicates and extends prior research on the relationship between callous-unemotional traits and deficits in recognizing emotional expressions conveying fear.<sup>13, 41</sup> A pattern is emerging, such that callous-unemotional traits in general appear to be related to recognizing fear, particularly when placed alongside accuracy in identifying other emotions. This interpersonal style is marked by a callous disregard for others, a lack of empathy and remorse, and an uncaring attitude toward one's performance in school or work and toward others. The deficits found are consistent with the idea that people with callous-unemotional traits exhibit at least deficits consistent with amygdala dysfunction.<sup>17, 30</sup>

The present study represents a preliminary investigation into the deficits exhibited by antisocial youths. However, the sample size was small and important differences were found that require replication. Further, poorer accuracy for labeling many emotions, including anger and sadness, were related to higher levels of callous-unemotional traits. This is consistent with research on psychopathy that finds general affect recognition deficits.<sup>18</sup> These findings, especially the corrected accuracy scores, support a more general deficit in recognizing fear than has been identified by prior studies. Part of the reason for these surprising results is the choice of using counts or percentages versus a method that is in use in facial behavior and

face perception studies.<sup>52</sup> Future research, where participants choose an emotion from a response list, needs to use methods of determining accuracy that take response bias into account. Such diffuse deficits are consistent with the involvement of the amygdala: people with amygdala damage show deficits in recognizing anger, although these are not as marked as their deficits in recognizing fear.<sup>22</sup> fMRI studies also support the involvement of the amygdala in processing anger in faces, again to a smaller extent than fear.<sup>53</sup>

The present study was able to describe a particularly at-risk sample; the study assessed a high percentage of the target sample, which was representative of the disadvantaged neighborhood where the community center was based. Also, the study used both self-report and performance based measures. Lastly, the methodology allowed for a comparison of the results to prior research, and may explain why some studies find a specific fear deficit, while others find a general affect recognition deficit.

In summary, the findings indicate that youths with callous-unemotional traits lack a robust internal representation of what it looks like to be afraid. This deficient representation of fear-related emotions in body postures support earlier studies showing deficits in recognizing fear using other modalities. Thus, a generalized deficit in recognizing fear seems to typify youths who are high in callous-unemotional traits and may underlie their lack of empathy for others.

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Table 1. Descriptives of main study variables.

	Perfect Labeling			
	N	(%)	Mean	SD
Callous-Unemotional Traits	55		34.16	11.24
Violent Delinquency	55		1.84 (1.09)	1.87 (0.81)
Antisocial Behavior	55		2.93 (1.51)	2.53 (0.82)
Faces-Sad	55	72.7	3.71	0.50
Faces-Happy	55	100	4.00	0.00
Faces-Afraid	55	41.8	3.16	0.81
Faces-Angry	55	43.6	3.18	0.86
Faces-Surprised	55	36.4	3.15	0.85
Faces-Disgusted	55	20	2.67	1.02
Postures-Sad	55	23.6	2.89	0.85
Postures-Happy	55	30.9	2.96	0.90
Postures-Afraid	55	32.7	3.00	0.86
Postures-Angry	55	76.4	3.73	0.53
Postures-Surprised	55	58.2	1.56	0.54

Note: Values in parentheses are based on the transformed values; Perfect Labeling=Percent of children who correctly labeled all four emotional stimuli (there were only two surprised postures).

Table 2. Partial correlations between emotions labeled correctly (bias-corrected accuracy) and main study variables.

		Violent	Antisocial
	CU Traits	Delinquency	Behavior
Faces-Sad	-.17 (-.24)	-.22 (-.16)	.12 (-.04)
Faces-Happy	-- (-.12)	-- (-.09)	-- (-.11)
Faces-Afraid	-.34* (-.22)	-.16 (-.22)	-.02 (-.03)
Faces-Angry	-.45** (-.29*)	-.11 (-.03)	.01 (.02)
Faces-Surprised	-.05 (.11)	-.08 (-.11)	-.14 (-.20)
Faces-Disgusted	-.04 (-.23)	-.07 (-.09)	.02 (.14)
Postures-Sad	-.00 (-.13)	.00 (.12)	-.05 (.09)
Postures-Happy	.05 (-.01)	-.19 (-.14)	-.16 (-.11)
Postures-Afraid	-.30* (-.15)	-.35* (-.27)	.02 (-.03)
Postures-Angry	-.11 (-.13)	.39** (.05)	.17 (-.11)
Postures-Surprised	.05 (.07)	.10 (-.18)	-.00 (-.19)

Note: Callous-unemotional (CU) traits are controlling for violent and antisocial behavior;

Violent delinquency and antisocial behavior are controlling for CU traits; \* $p < .05$ ; \*\* $p < .01$ .



### Figures

Figure 1. Sample fear static body posture.<sup>25</sup>

Figure 2. Interaction between accuracy for labeling afraid body postures and accuracy for afraid faces in predicting callous-unemotional traits.

Figure 3. Interaction between accuracy for labeling afraid body postures and accuracy for afraid faces in predicting violence.





