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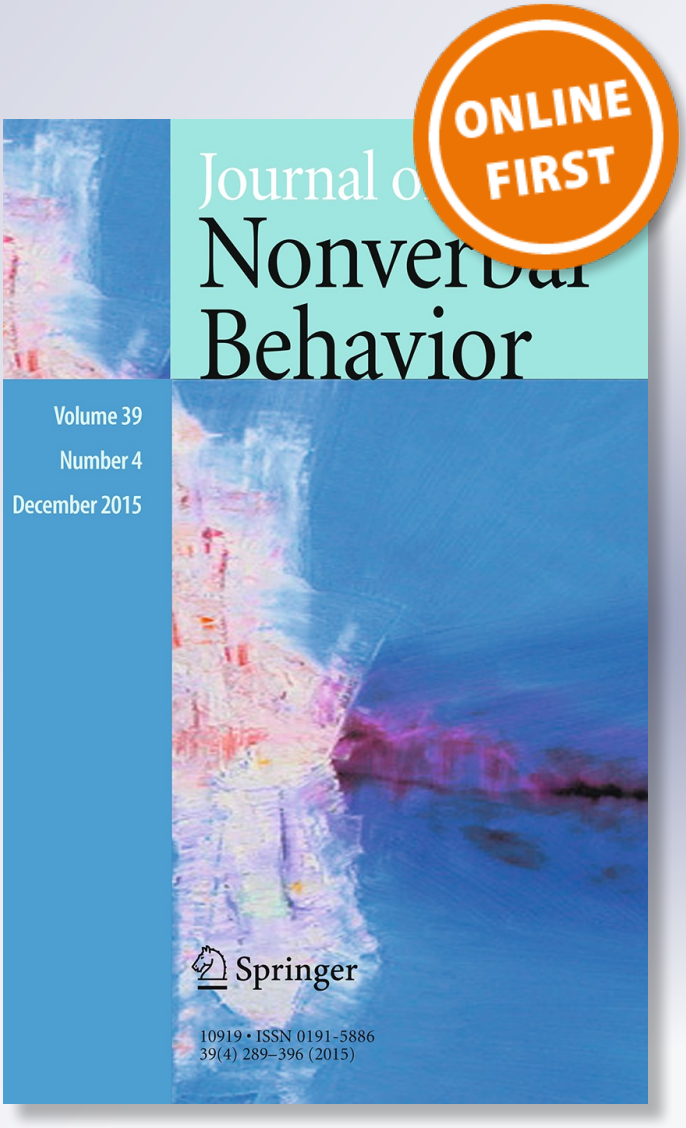

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ORIGINAL PAPER

Judging Facial Emotion Expressions in Context: The Influence of Culture and Self-Construal Orientation

Ursula Hess[1] · **Christophe Blaison**[1] · **Konstantinos Kafetsios**[2]

Abstract We assessed the impact of social context on the judgment of emotional facial expressions as a function of self-construal and decoding rules. German and Greek participants rated spontaneous emotional faces shown either alone or surrounded by other faces with congruent or incongruent facial expressions. Greek participants were higher in interdependence than German participants. In line with cultural decoding rules, Greek participants rated anger expressions less intensely and sad and disgust expressions more intensely. Social context affected the ratings by both groups in different ways. In the more interdependent culture (Greece) participants perceived anger least intensely when the group showed neutral expressions, whereas sadness expressions were rated as most intense in the absence of social context. In the independent culture (Germany) a group context (others expressing anger or happiness) additionally amplified the perception of angry and happy expressions. In line with the notion that these effects are mediated by more holistic processing linked to higher interdependence, this difference disappeared when we controlled for interdependence on the individual level. The findings confirm the usefulness of considering both country level and individual level factors when studying cultural differences.

Keywords Emotion expression · Context · Culture · Self-construal

Introduction

Emotion expressions do not occur in a vacuum, rather they are typically part of a larger social context. This context also often includes groups of people rather than just a single encoder facing a single decoder. In recent years, emotion research has been more

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frequently concerned with the impact of context on emotion perception. For example, the effect of information about the emotion-eliciting situation or concurrent emotion information provided by other channels (Barrett et al. 2011; Hassin et al. 2013) has been studied (for a review of types of context see, Matsumoto and Hwang 2010). One type of context that has attracted somewhat less interest, but is highly relevant to typical emotion-eliciting situations, is the presence of additional individuals in the stimulus picture. In fact, in perceiving emotion expressions we are often faced with several people at the same time, even if we are only focusing on one interaction partner. The small body of research on this topic has focused on how the level of congruence in expression between a central figure and surrounding others influences perceivers' decoding as a function of the perceiver's cultural orientation (Masuda et al. 2008, 2012).

The theoretical rationale for the research cited above is that individuals who differ in self-construal differ also in the way they see and reason about the world. Self-construal refers to an individual's culturally contingent thoughts, feelings, and actions that are concerned with one's understanding of the self as connected with others (interdependence) or distinct from others (independence, Markus and Kitayama 1991; Cross et al. 2011). Persons from collectivistic cultures or those with interdependent self-construal use a more holistic perceptual style and are more susceptible and attentive to the context within which the perceived event takes place, as well as the relationships between objects (Kitayama et al. 2003; Nisbett and Masuda 2003). Conversely, persons from individualistic cultures or those with independent self-construal use an analytic perceptual style, focus on salient objects and use salient categories to organize their environment. Independent self-construal and analytic cognition on the one hand and interdependent self-construal and holistic cognition on the other hand influence a host of cognitive processes including the perception of emotion (Morling and Masuda 2012). Importantly, the effects of interdependence on perceptual processes are not restricted to chronic effects of culture but can also be found when individuals are temporarily primed with the relevant self-construal (Kühnen and Oyserman 2002; for a review see Nisbett and Miyamoto 2005), that is, this effect can also be observed as a function of individual level self-construal.

Consequently, when faced with targets who are surrounded by groups of people, individuals with more interdependent self-construal are expected to be and indeed are, more influenced by the surrounding facial expressions than individuals with more independent self-construal. In two studies Masuda et al. (2008) demonstrated this culture by social context effect for emotion perception. Decoders from a collectivistic country (Japan) perceived targets' facial emotion expressions as more intense when the group of persons surrounding the target showed the same emotion as the target rather than a different one and were more likely than Western participants to attend to the group's emotions and be influenced by them in their emotion perception. More recently, Ito et al. (2013) demonstrated that these effects are due to how agency is conceptualized in interdependent and independent cultures. In independent societies agency is attributed to the central figure whereas in interdependent societies more agency is attributed to the group.

Yet, as mentioned above, individual level variations in self-construal also affect emotion perception. In this vein, Kafetsios and Hess (2013) found that both chronic and temporarily activated interdependent self-construal in an interdependent culture (Greece; see Hofstede 2012) resulted in lower accuracy in the perception of negative facial expressions of emotion in a group facial emotion perception task similar to the one employed by Masuda et al. (2008). Specifically, the chronically and temporarily activated interdependent mind-sets interfered with the accurate decoding of the focal target's emotion expression when the target was surrounded by others. Kafetsios and Hess (2013)

interpreted this finding in line with the notion that individuals with an interdependent mind-set employ a more holistic cognitive style and hence are more susceptible to be influenced by the context. Moreover, they found that interdependent (but not independent) priming had the same effect as elsewhere reported for country level interdependence.

Yet, cultural effects on emotion perception are not restricted to the effects linked to holistic perception. Rather, emotion perception is also affected by the cultural norms and motivations associated with, among other sources, interdependent self-construal. Namely, in interdependent cultures negative emotion displays are often discouraged, especially those of antagonistic emotions, to preserve interpersonal harmony (Biehl et al. 1997; Markus and Kitayama 1991). Such a suppression, in turn, can lead to lower motivation to attend to negative emotions and hence lower accuracy. According to Buck (1984) this constitutes a parallel process to display rules, which he labels decoding rules. Yet, culture level display rules are not only affected by single cultural values. Thus, for example, the expression of anger in Germany is culturally acceptable, whereas in the US it is largely proscribed—yet both cultures are considered high in independence. Thus, decoding rules should not be expected to be mediated by a single cultural value. In principle, emotion perception differences due to the perceptual effects of holistic thinking and those derived from decoding rules can interact.

Overview of the Present Research

The present research aimed to study the perception of emotion expressions shown by individuals embedded within a context versus individuals shown alone as a function of self-construal in Greece (a more interdependent culture) and Germany (a less interdependent culture). Most research on the effects of self-construal on cognitive processes has been conducted comparing Asian and North American individuals, who tend to span the extremes in self-construal. However, these two groups also share many other differences, most notably in cultural and philosophical traditions and in their understanding of the world and of emotions (Averill and Sundararajan 2006). By contrast both Greek and German participants share the Greco-Roman origins of Western culture. As such, situating the study in these countries allows generalization over and above the limited culture sample of previous research.

Research on emotion perception accuracy traditionally relies on standardized sets of emotional facial expressions. These sets have the advantage that they present highly standardized prototypical facial expressions that are recognized at high rates. Conversely, Masuda and colleagues used either cartoon depictions (Masuda et al. 2008) or posed expressions of high intensity (Masuda et al. 2012). However, such stimuli are not typical for everyday emotion expressions where people are likely to exhibit subtle non-prototypical expressions that can be open to different interpretations (Ekman 2003; Motley and Camden 1988). We therefore chose to use spontaneous emotion expressions.

Based on existing research (Ito et al. 2013; Masuda et al. 2008) we expected that for Greek participants, the presence of other individuals in the picture would be distracting due to the stronger holistic cognition tendencies associated with higher interdependent self-construal, whereas for German participants this should be less the case. This specific difference was expected to be mediated by interdependence as measured at the individual level. That is, we predicted an interaction between culture and context, which reflects a difference in perceptual style linked to self-construal in that Greek participants are more influenced by the presence of other individuals in the stimulus pictures. To the degree that

the participants' task was to focus on the emotion expression of the central person only, this influence represents a distraction for this specific task.

In addition, we also expected a general cultural difference in emotion decoding accuracy based on the above described cultural display/decoding rule regarding antagonistic emotions. In this vein, Hareli et al. (2015) found that German participants rated a group of individuals who expressed anger as more angry than did Greek participants and vice versa when the group expressed sadness. Also, Greece is higher in uncertainty avoidance, which has been linked to better sadness decoding (Schimmack 1996). Thus, we predict an interaction between culture and emotion expression, which reflects the differences in Greek and German decoding rules such that anger is rated more intensely in Germany and sadness more intensely in Greece. We did not have specific predictions for happiness and disgust.

Methods

Participants

A total of 87 German (18 men, mean age = 25.9; *SD* = 5.3) and 90 Greek (21 men, mean age = 22.4, *SD* = 5.5) participants were recruited from two large Greek and German universities. All participants were either students or had recently finished their studies. Participants were part of a larger study in which a social interaction diary was kept, following the laboratory emotion recognition task. These data are reported elsewhere (Hess et al. 2014). The German participants were slightly older than the Greek participants, however, there is no evidence of differences in emotion decoding ability as a function of age in this age group.

Stimulus Materials

We used the *Assessment of Contextualized Emotions-faces* (ACE-faces; see Hess et al. 2014) which consists of a series of photos showing four emotional expressions (happy, sad, angry, disgust) either by a single person or by a central person surrounded by two others who show either congruent or neutral expressions. The spontaneous facial emotion expressions were elicited during a relived emotion task, which has been shown to be an effective technique to elicit emotional expressions (e.g., Levenson et al. 1991; Tsai et al. 2002).

For this, groups of three same sex individuals who identified themselves as close friends were invited to a recording studio at the Campus of the Humboldt-Universität zu Berlin. The three people were arranged in an open semi-circle and the central person in this group was instructed to remember a time when they as a group had felt happiness, sadness, disgust, and anger and to then recount the events as vividly as possible to the other two. The incongruent neutral expressions were obtained by cutting and pasting the central person from the emotional condition into a frame from the neutral condition. The expressions were validated in a pilot study with 26 participants (12 men). Figure 1 shows an example for male anger with congruent and incongruent group expressions.

A Latin square design was used to create 12 parallel orders of 48 stimuli including 6 congruent, non-congruent, and individual male and female stimuli for each emotion.[1] This

[1] Each presentation was interrupted 12 times with a short emotion contagion questionnaire. These were presented in an equal probability manner for every order. These data will not be discussed in the present context.

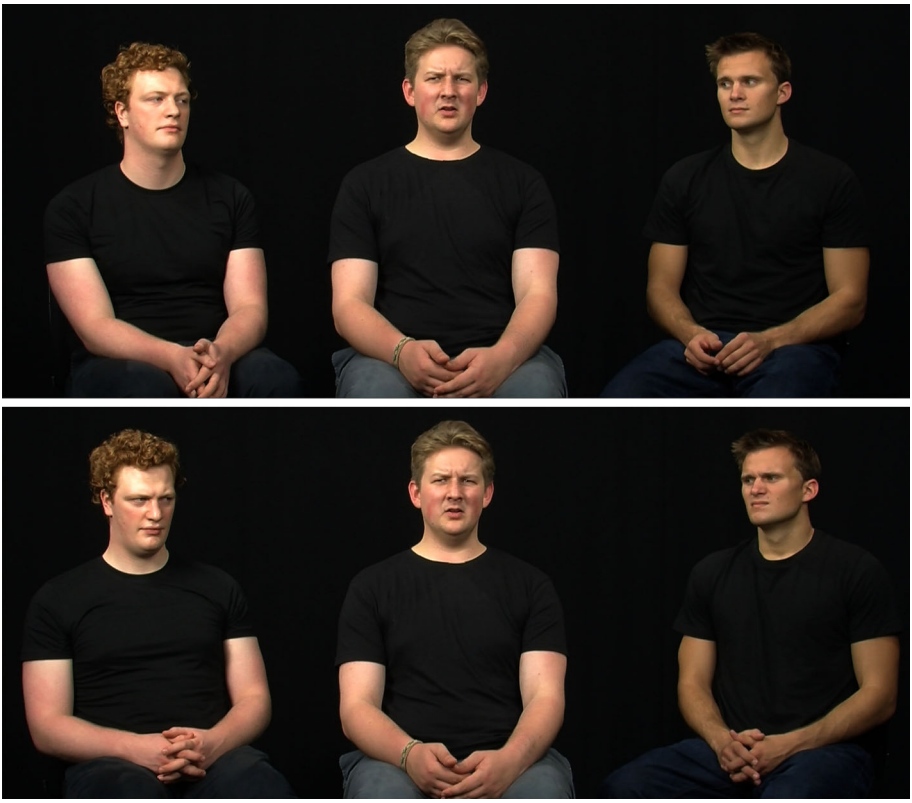

Fig. 1 Example from the ACE-faces showing an angry man surrounded by friends showing either a neutral expression or matching expression

design allows to completely balance the order of presentation across participants. Hence the central figure from each of the 6 male and 6 female groups was always either shown (a) with their two friends expressing the same emotion or (b) with their two friends showing a neutral face or (c) alone.

Emotion Perception Task

The participants' task consisted of rating the central person's emotion expressions on each of the following 7-point scales anchored with 1-*not at all* and 7-*very much*: calm, fear, anger, surprise, disgust, sadness and happiness. Expressions were presented for six seconds before the rating scales appeared. For the purpose of this study, only the intensity rating for the focal emotion, that is, the intensity of ratings of anger for anger expressions, of ratings of happiness for happy expressions, etc. was retained.

Self-Construal

Participants completed the Greek and German versions respectively of the revised Singelis Self-Construal Scale (SCS, Singelis 1994) by Kwan et al. (1997) that consists of two orthogonal dimensions that measure the strength of independent and interdependent self-

construal [independence $\alpha = .67$ (Greece) and $\alpha = .70$ (Germany), interdependence $\alpha = .70$ (Greece) and $\alpha = .65$ (Germany), r_{Greece} (90) = .14, ns, $r_{Germany}$ (87) = −.13, ns]. Each subscale contains 15 items and responses were made on a seven point Likert-type scale (1 = *strongly disagree*, 7 = *strongly agree*). The independent self-construal subscale contains items that assess uniqueness in social behavior and related cognitions and emotions (e.g., "I do my own thing, regardless of what others think"); the interdependent self-construal subscale includes items that asses connectedness in social behavior especially emotions, cognitions, and behavior with regards to in-groups (e.g., "It is important to me to respect decisions made by the group"). Several studies have linked culture-level differences in individualism and collectivism with person-level independent or interdependent self-construal as measured by the SCS (e.g., Singelis and Brown 1995). Equally, several studies have shown the SCS distinguishes between independent and interdependent self-construal at the individual level (Singelis 1994).[2]

Results

Self-Construal

As expected, Greek ($M = 4.65$, $SD = .67$) and German ($M = 4.30$, $SD = .60$) participants significantly differed in interdependence, $t(175) = 3.66$, $p < .001$. However, they did not differ in independence [Greece: $M = 4.71$, $SD = .65$; Germany: $M = 4.57$, $SD = .60$; $t(175) = 1.49$, $p = .138$].

Emotion Intensity Rating

To assess the influence of culture on the perception of emotions as a function of social context, we conducted a mixed-model analysis of variance (ANOVA) with emotion (anger, disgust, happy, sad) and social context (congruent, neutral, no social context) as within-subjects factors and country (Germany vs. Greece) as between-subjects factor on the emotion intensity ratings for the focal emotion. A significant main effect of emotion emerged, $F(3, 162) = 159.23$, $p < .001$, $\eta_p^2 = .75$, such that overall happiness was perceived as significantly more intense ($M = 6.25$, $SD = 0.73$) than disgust ($M = 5.65$, $SD = 0.93$), followed by sadness ($M = 4.81$, $SD = 1.01$) and anger ($M = 4.68$, $SD = 0.97$), which did not differ significantly. A significant main effect of country emerged as well $F(1, 164) = 3.77$, $p = .05$, $\eta_p^2 = .02$. As predicted, this main effect was qualified by an emotion by country interaction, $F(3, 162) = 29.54$, $p < .001$, $\eta_p^2 = .35$. Simple effects analyses showed that whereas Greek participants rated sadness, and disgust significantly more intensely than German participants, German participants rated anger more intensely than Greek participants (see Table 1). This finding is congruent with the posited effect of decoding rules on emotion recognition. In Germany the expression of anger is more culturally permissible than in Greece and conversely in Greece sadness is more valued. These decoding rules translate into encoding rules (Buck 1984), such that

[2] Participants further completed the Emotion perception subscale of the Mayer Salovey and Caruso Emotional Intelligence Test 2.0; the Situational Test of Emotion Management for the judgment of different emotional situations; the Wong and Law (Trait) Emotional Intelligence Scale; the Toronto Alexithymia Scale; the 10-item version of the Big Five Inventory; the Experiences in Close Relationships Scale—revised, a global attachment scale; the item: "How satisfied are you with your life; the Positive and Negative Affect Scale; the Rosenberg Self-esteem Scale; the 3-item Loneliness and a Psychological Well-being Scale.

Table 1 Means and standard deviations (in parentheses) of emotion intensity ratings as a function of emotion, context and country

	Congruent		Incongruent		Alone	
	Greece	Germany	Greece	Germany	Greece	Germany
Anger	4.54 (1.23)	5.04 (0.97)	4.20 (1.22)	4.93 (0.94)	4.81 (1.06)	4.58 (1.17)
Disgust	5.93 (1.10)	5.39 (1.00)	5.98 (1.04)	5.25 (1.13)	5.91 (1.05)	5.40 (0.96)
Happiness	6.28 (0.91)	6.27 (0.69)	6.34 (0.85)	6.06 (0.87)	6.19 (0.73)	6.35 (0.80)
Sadness	4.83 (1.33)	4.94 (1.25)	5.13 (1.40)	4.58 (1.23)	5.30 (1.22)	4.52 (1.37)

German participants rate anger expressions more intensely than do Greek participants and vice versa for sadness.

Also as expected, a significant social context by country interaction emerged, $F(2, 163) = 3.60$, $p = .030$, $\eta_p^2 = .04$, which was qualified by a social context by country by emotion interaction, $F(6, 159) = 2.51$, $p < .024$, $\eta_p^2 = .09$. Specifically, Greek participants perceived anger least intensely when the group showed a neutral expression, with no difference between congruent expressions and expressions without context, whereas sadness expressions were rated as most intense in the absence of social context.

In contrast, German participants perceived anger and happiness more intensely when target and group showed the same emotion. No other significant effect emerged. That is, German participants' emotion intensity ratings were simply reinforced by the presence of congruent others. However, as expected, Greek participants were more distracted when they had to rate a target that was surrounded by others, especially others with different expressions.

To assess whether, as predicted, interdependence at the individual level mediated the observed differences, we chose to conduct an analysis of covariance with interdependence as a covariate. Analysis of covariance does not allow to assess the strength of the indirect effect of the mediator, but has the advantage to be applicable to a complex factorial design such as the present one.

When interdependence was included as a covariate the social context by country, $F(2, 162) = 1.40, p = .249, \eta_p^2 = .02$, and the social context by country by emotion interaction, $F(6, 158) = 1.79$, $p = .104$, $\eta_p^2 = .06$, as well as the main effect of country, $F(1, 163) = 3.50$, $p = .063$, $\eta_p^2 = .02$, became non-significant, confirming that interdependence mediated the observed differences. However, the emotion by country interaction, which reflects display rule effects, remained significant, $F(2, 162) = 26.37$, $p < .001$, $\eta_p^2 = .33$. Conversely, when interdependence was included as a covariate, the main effect of social context became significant, $F(1, 162) = 6.53$, $p = .002$, $\eta_p^2 = .08$, such that now across participants and emotions, expressions in the congruent condition were rated as more intense ($M = 5.44$, $SE = .056$) than expressions in the incongruent condition ($M = 5.36$, $SE = .058$) or shown without context ($M = 5.40$, $SE = .059$). Thus, the difference between German and Greek raters found in the initial analyses was entirely due to the greater interdependence of the Greek participants.

Discussion

Social context influences the processing of facial emotion expressions (Matsumoto and Hwang 2010). In particular, when facial expressions are shown within a group, culture has been found to exert a significant impact on the influence of the expressions of the

surrounding group on the perception of a focal expression (Ito et al. 2013; Masuda et al. 2008). The present study contributes to this literature by pointing to participants' culture and individual-level interdependent self-construal as important mechanisms in emotion expression processing.

Culture had an impact on emotion perception in two ways. First, the presence of more than one expresser had different effects on Greek and German participants. In the more interdependent culture (Greece) participants perceived anger to be the least intense when the surrounding group showed a neutral expression, whereas sadness expressions were rated as most intense in the absence of social context. In the less interdependent culture (Germany) a group context (others expressing anger or happiness) additionally amplified the perception of angry and happy expressions.

Importantly, interdependent self-construal orientation mediated these differences. When individual differences in interdependence levels in the two groups were controlled, the moderating effect of culture and emotion on social context became non-significant. In fact, when interdependence was controlled, only a main effect of social context was revealed, which corresponded to the way German participants had reacted to social context. That is, expressions in the congruent condition were rated as more intense than either expressions in the incongruent condition or those shown without context.

These findings point critically to the role of holistic cognition tendencies evidenced in more interdependent persons. For Greek participants who, as a group, were higher in interdependence, holistic cognition tendencies seem to result in dampening perceptions such that, for example, sadness expressions were rated as more intense in the absence of context. Conversely, in an independent cultural context, where no such holistic cognition biases are present, angry or happiness expressions are amplified by the group also expressing the same emotion.

That is, social context influenced emotion perception not only for the more interdependent group as was the case in Masuda et al. (2008). Rather, German participants were also affected by the presence or absence of others in the perception of emotion intensity but specifically for emotion expressions that are socially relevant in an independent culture. The difference in findings between Masuda et al. (2008) and our study for the independent culture can likely be tracked back to our use of a more ecologically valid test of emotion recognition, with spontaneous emotions in a naturally positioned group of individuals. Future research could examine the effects of spontaneous and posed facial expressive stimuli when studying independent and interdependent cultural orientations. Moreover, the depiction of the group differed somewhat from similar previous manipulations (Ito et al. 2013; Masuda et al. 2008) in that members of the group were made to face the target person and thereby created the clear impression of a group with members interacting with each other and not just a random assemblage of individuals facing the observer. As such, an argument can be made that the group emotions are indeed immediately relevant to the emotions of the central person. Nonetheless, culture clearly interacted with this information such that even though Greek and German observers' ratings were both influenced by the group, they were so in different ways. However, one should be careful in trying to account for every single element of difference observed. In many ways, a comparison between two countries is limited to an attempt to replicate the same study in different contexts. Even though all possible efforts were made to conduct the two studies in the same manner—and at the same time—unpredicted differences may be due to random effects and need to await further replication.

Second, in Greece, a more interdependent country, sadness and disgust were rated more intensely whereas in the less interdependent culture (Germany) participants perceived

angry facial expressions overall as more intense. These findings are congruent with a display/decoding rule interpretation such that in an interdependent culture there are strong norms regarding the down regulation of antagonistic negative emotion displays in a group context—in keeping with norms of interpersonal harmony (Biehl et al. 1997; Markus and Kitayama 1991).

As these rules are socialized early and part of the "proper" way to behave in a given culture, they were not directly mediated by individual level interdependence. In fact, even though cultural values likely underpin the establishment of display rules within a culture, it is unlikely that they depend crucially on a single dimension but rather one would expect them to be embedded into a richer cultural fabric.

The present study provides a more nuanced picture of the factors behind cultural differences in the perception of negative emotions. Cultural differences can act both through their effects on perceptual style and through cultural norms. This also confirms the usefulness of considering both country level individual level factors when studying cultural differences.

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