



# Behavioural responses to facial and postural expressions of emotion: An interpersonal circumplex approach

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While the recognition of emotional expressions has been extensively studied, the behavioural response to these expressions has not. In the interpersonal circumplex, behaviour is defined in terms of communion and agency. In this study, we examined behavioural responses to both facial and postural expressions of emotion. We presented 101 Romanian students with facial and postural stimuli involving individuals ('targets') expressing happiness, sadness, anger, or fear. Using an interpersonal grid, participants simultaneously indicated how communal (i.e., quarrelsome or agreeable) and agentic (i.e., dominant or submissive) they would be towards people displaying these expressions. Participants were agreeable-dominant towards targets showing happy facial expressions and primarily quarrelsome towards targets with angry or fearful facial expressions. Responses to targets showing sad facial expressions were neutral on both dimensions of interpersonal behaviour. Postural versus facial expressions of happiness and anger elicited similar behavioural responses. Participants responded in a quarrelsome-submissive way to fearful postural expressions and in an agreeable way to sad postural expressions. Behavioural responses to the various facial expressions were largely comparable to those previously observed in Dutch students. Observed differences may be explained from participants' cultural background. Responses to the postural expressions largely matched responses to the facial expressions.

Facial expressions are considered central for communicating emotions (Awasthi & Mandal, 2015) and for facilitating avoidance or approach behaviours in others (Marsh, Ambady, & Kleck, 2005). In terms of the interpersonal circumplex (Leary, 1957; Wiggins, 1991), facial emotion expressions can convey communion and agency (Hess, Adams, & Kleck, 2005; Knutson, 1996) and may lead others to respond in a more or less communal and agentic way (aan het Rot, Hogenelst, & Gesing, 2014). Research on communal and agentic responses to emotional expressions has thus far been limited to one study, conducted in a mixed sample of Dutch and international students and focused on facial expressions of emotion (aan het Rot *et al.*, 2014). This study aimed to (1) replicate the findings of aan het Rot *et al.* (2014) in a sample of Romanian students, and (2) examine

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whether behavioural responses to postural expressions of emotion are similar to behavioural responses to facial emotion expressions.

Once perceived by others, facial emotion expressions may elicit a response. Several researchers have examined behavioural responses to emotional faces in terms of approach versus avoidance (von Borries *et al.*, 2012; Marsh *et al.*, 2005; Seidel, Habel, Kirschner, Gur, & Derntl, 2010; Wilkowski & Meier, 2010). These studies mostly focused on happy, angry, sad, and fearful expressions. While happy expressions may in general elicit approach (Seidel, Habel, Finkelmeyer, *et al.*, 2010; Seidel, Habel, Kirschner, Gur, & Derntl, 2010), responses to the other emotional expressions have been found to be more variable. Sad expressions may elicit approach at an explicit level yet avoidance at an implicit level (Seidel, Habel, Kirschner, *et al.*, 2010). An angry expression tends to elicit avoidance (Marsh *et al.*, 2005; Seidel, Habel, Kirschner, *et al.*, 2010) but may elicit approach when followed by a fearful expression (Wilkowski & Meier, 2010). Fearful expressions elicit approach (Marsh *et al.*, 2005) even though they are often considered to signal a threat that presumably should be avoided (Harmer, Mackay, Reid, Cowen, & Goodwin, 2006; Munafo, Hayward, & Harmer, 2006).

Adding to the approach-avoidance literature, aan het Rot *et al.* (2014) investigated behavioural responses towards facial emotion expressions in a two-dimensional manner, using a method derived from the interpersonal circumplex (Leary, 1957; Wiggins, 1991). This model has proven useful for the conceptualization, organization, evaluation, and assessment of interpersonal dispositions and behaviours (Fournier, David, & Zuroff, 2010; Locke, 2010) and is considered a facilitator of communication between researchers in different fields of psychology (Hopwood *et al.*, 2011). The interpersonal circumplex organizes interpersonal behaviour around a circle defined by the orthogonal dimensions of communion and agency (Leary, 1957; Wiggins, 1991). Communion represents behaviour that determines interpersonal bonds; this dimension ranges from quarrelsomeness to agreeableness. Agency represents behaviour that determines interpersonal status; this dimension ranges from submissiveness to dominance. Utilizing a novel computer task, aan het Rot *et al.* (2014) found that happy expressions elicited agreeable dominance, angry expressions elicited quarrelsomeness as well as a mild dominance, highly sad expressions elicited agreeableness and neither dominance nor submissiveness, and highly fearful expressions elicited agreeable submissiveness. They concluded that studying behavioural responses to facial expressions in the two-dimensional interpersonal circumplex can yield insights above and beyond the insights that may be obtained using the single dimension of approach versus avoidance; that is, their results indicated that approach of emotional faces may either be prosocial (e.g., agreeable-dominant behaviour in response to happy expressions) or antisocial (e.g., quarrelsome-dominant behaviour in response to angry expressions).

Postural expressions of emotion have been studied less often than facial expressions. Nonetheless, postures alone provide sufficient information for the proper decoding of emotional states (Kret & de Gelder, 2013; Thoma, Soria Bauser, & Suchan, 2013; Volkova, Mohler, Dodds, Tesch, & Bülthoff, 2014). Indeed, there are several reasons for using postural expressions as stimuli in emotion research. Firstly, posture contributes significantly to emotion recognition (Meeren, van Heijnsbergen & de Gelder, 2005). Secondly, the perception of postural expressions is automatic (de Gelder & Hadjikhani, 2006). Thirdly, postural expressions allow for the detection of emotional states from a distance (de Gelder, 2009; Gunes, Shan, Chen, & Tian, 2015). Studies directly comparing the recognition of postural and facial emotion expressions

have found that people recognize emotions expressed by a face or a posture equally well (Coulson, 2004; Magnee, Stekelenburg, Kemner, & de Gelder, 2007), both types of expressions are processed holistically (Van den Stock, Righart, & de Gelder, 2007; Willems, Vrancken, Germeys, & Verfaillie, 2014), and faces and postures are processed by the brain in partially overlapping ways (Gliga & Dehaene-Lambertz, 2005; Kret, Pichon, Grèzes, & de Gelder, 2011; van de Riet, Grèzes, & de Gelder, 2009). Further, postural expressions can contribute to the recognition of facial expressions and vice versa (App, Reed, & McIntosh, 2012; Kret, Stekelenburg, Roelofs, & de Gelder, 2013; Shields, Engelhardt, & Ietswaart, 2012; Van den Stock & de Gelder, 2014). Furthermore, one study found that the approachability of happy postural expressions may be enhanced by a happy facial expression while the approachability of neutral facial expressions may be enhanced by a neutral postural expression (Willis, Palermo, & Burke, 2011); this suggests that postural and facial expressions may both contribute to the behavioural response to facial and postural expressions, respectively.

In this study, we examined behavioural responses to facial and postural expressions of happiness, anger, sadness, and fear. The study had two major aims. First, we aimed to replicate the study by aan het Rot *et al.* (2014), who examined behavioural responses to facial emotion expressions in a mixed sample of Dutch and international (mostly German) students. This study was conducted in a Romanian sample. While we mostly expected this sample and the sample studied by aan het Rot *et al.* (2014) to respond in similar ways, we envisioned there might be some cultural differences. According to cultural dimensions theory, Romania mostly differs from the Netherlands and Germany in terms of Power Distance, and Individualism (Hofstede, Hofstede, & Minkov, 2010). As Romania scores higher on Power Distance, which represents a culture's attitudes towards a hierarchical order, and lower on Individualism, which represents the level of autonomy among members of a culture, we hypothesized that the present sample would respond in a less agentic and more communal way, at least to some facial expressions. We also explored whether behavioural responses to the various facial expressions would vary depending on the sex of the target making the expression (cf. Suh, Moskowitz, Fournier, & Zuroff, 2004).

Second, we aimed to extend the study by aan het Rot *et al.* (2014) by examining behavioural responses to postural emotion expressions. We administered a Facial Emotion Response Task (cf. aan het Rot *et al.*, 2014) and a novel Postural Emotion Response Task. In both tasks, participants were asked to simultaneously indicate their behavioural responses in terms of quarrelsomeness versus agreeableness (reflecting communion) and in terms of dominance versus submissiveness (reflecting agency). We expected responses to the various emotions in this study to be similar to the study by aan het Rot *et al.* (2014). In line with this study, we also examined the impact of mood state.

## Method

### Participants

The Ethics Committee of the University Faculty at which the study was conducted approved the study. From this Faculty, we recruited 101 third-year students, 88 women (87%), and 13 men (13%). Participants ranged from 20 to 31 years of age ( $M = 22$ ,  $SD = 2$ ) and received course credits for their participation.

## Materials

Except for the language, the Facial Emotion Response Task was identical to the one used by aan het Rot *et al.* (2014). It contained greyscale face images taken from the Pictures of Facial Affect Series (Ekman & Friesen, 1976). Three male and three female models portrayed four emotional faces and a neutral face. The emotional faces (happy, angry, sad, or fearful) varied in intensity (20%, 40%, 60%, 80%, or 100%). All 126 face stimuli appeared on a computer screen in random order for 500 ms each. A fixation symbol, shown for 300 ms, preceded the appearance of each face. After each face, participants were asked 'How would you behave towards the person you just saw?' They indicated their behavioural response by clicking a mouse cursor in a grid that included a horizontal (*X*) and a vertical (*Y*) axis. The *X* axis represented communion and the *Y* axis represented agency. Communion ranged from agreeableness on the right to quarrelsomeness on the left and agency ranged from submissiveness in the bottom to dominance in the top. Both axes ranged from  $-100$  to  $+100$  with 0 representing neutral behaviour. A time bar located above the grid indicated how long participants had left for answering the question. The maximum response time was 5000 ms.

For the Postural Emotion Response Task, the face stimuli used in the Facial Emotion Response Task were replaced with greyscale images taken from the Bodily Expressive Action Stimulus Test (BEAST; de Gelder & van den Stock, 2011). Otherwise, the two tasks were identical. The BEAST is a database composed of postural expressions of happiness, anger, sadness, and fear, as well as neutral (control) expressions, made by 46 targets whose faces appear blurred. We used the five expressions of 31 randomly selected targets (19 female, 12 male), resulting in 155 stimuli in the task. The list of stimulus files is available upon request.

The Positive Affect and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988) is a self-report measure of positive affect (PA) and negative affect (NA). Item scores could vary between 1 (not at all) and 5 (extremely). In the present sample, the Cronbach coefficient  $\alpha$  was .88 across the 10 PA items and .87 across the 10 NA items.

## Procedure

Students who volunteered to participate in the study first read an information sheet, which explained the aims and procedures, and then signed an informed consent document. All participants first completed the PANAS and then, in a counterbalanced order, the Facial Emotion Response Task and the Postural Emotion Response Task. To understand the tasks, including the use of the response grid, participants received a scripted explanation from a research assistant, who used a standardized instruction sheet. This approach was identical to one used by aan het Rot *et al.* (2014). The total duration of a study session was about 45 minutes.

## Data analyses

We used multilevel models with maximum-likelihood estimation in SPSS 20.0 (IBM Corporation, Armonk, NY, USA) to examine the effects of Target (1–6), Expression (Neutral, Angry, Happy, Fearful, Sad), and Target Sex (Male, Female) on Response times, Communion, and Agency. For the Facial Emotion Response Task, we also considered the effect of Intensity of emotion (0–100%). Each model included a random intercept with a scaled identity covariance structure.

For both tasks, response times of more than 5 s were excluded. As the response times were not normally distributed, they were (1) transformed into a percentile rank and (2) submitted to an inverse normal transformation using the mean and the standard deviation (Templeton, 2011).

For the Facial Emotion Response Task data, the following analysis steps were taken. First, we explored whether response times differed by expression. Given the results of this first analysis (subsequently presented) and to be able to compare our results with the findings of aan het Rot *et al.* (2014), we included the variable Response Time as a covariate in all subsequent analysis steps. In the second step, we examined the effects of Target and Expression on Communion and Agency. The variables Target, Expression, and their interaction were included in the fixed-effects portion of each model. Third, we examined the effects of Expression and Intensity on Communion and Agency. The fixed-effects portion of each model included Expression, Intensity, and their interaction as predictors. Behavioural responses to neutral expressions were excluded from the analyses as they did not vary in intensity. Fourth, the variables Expression, PA or NA, and their interaction were used as predictors of Communion and Agency. Neutral expressions were again excluded.

For the Postural Emotion Response Task data, the analysis approach was very similar. First, we explored variation in response times across the different expressions. Again, given the results in this first step, we included the variable Response Time as a covariate in both subsequent analysis steps. In the second step, we examined whether there was a main effect of Expression on Communion and Agency. Third, the variables Expression, PA or NA, and their two-way interaction were entered as predictors of Communion and Agency.

An  $\alpha$  level of .05 was used for the statistical tests. All *post-hoc* comparisons were corrected using the Bonferroni method. We calculated the effect size for each significant effect according to Rosnow and Rosenthal (1996).

## Results

### Responses to facial emotion expressions

#### Response times

The effect for Expression was significant,  $F(4, 720) = 13.16$ ,  $p < .0001$ ,  $d = 0.27$ . Participants responded quicker to happy expressions ( $M = 1481$  s,  $SE = 46.14$ ) than to all other expressions (anger:  $M = 1694$  s,  $SE = 46.09$ , sadness:  $M = 1775$  s,  $SE = 46.14$ , fear:  $M = 1803$  s,  $SE = 46.08$ , neutral:  $M = 1692$  s,  $SE = 58.01$ ), all  $p$ 's  $< .0001$ ). There were no significant differences among the response times for these other expressions, all  $p$ 's  $> .05$ .

#### Task characteristics

For Communion, the effects for Expression  $F(4, 625) = 161.59$ ,  $p < .0001$ ,  $d = 1.01$ , Target,  $F(5, 8236) = 17.16$ ,  $p < .0001$ ,  $d = 0.10$ , and their interaction,  $F(20, 8119) = 4.45$ ,  $p < .001$ , were all significant. *Post-hoc* testing of the interaction revealed that participants tended to respond to one male target in a less agreeable or more quarrelsome way, particularly when his facial expression was angry (results not shown). This was the same target identified by aan het Rot *et al.* (2014).

For Agency, the effects for Expression,  $F(4, 642) = 9.34, p < .0001, d = 0.25$ , and Target,  $F(5, 8239) = 10.85, p < .001, d = 0.07$ , were significant. The target who was rated differently was same target rated differently in the study by aan het Rot et al. (2014). The two-way interaction was not significant,  $F(20, 8127) = 0.86, p > .64$ .

#### *Behavioural responses to facial expressions of varying intensity*

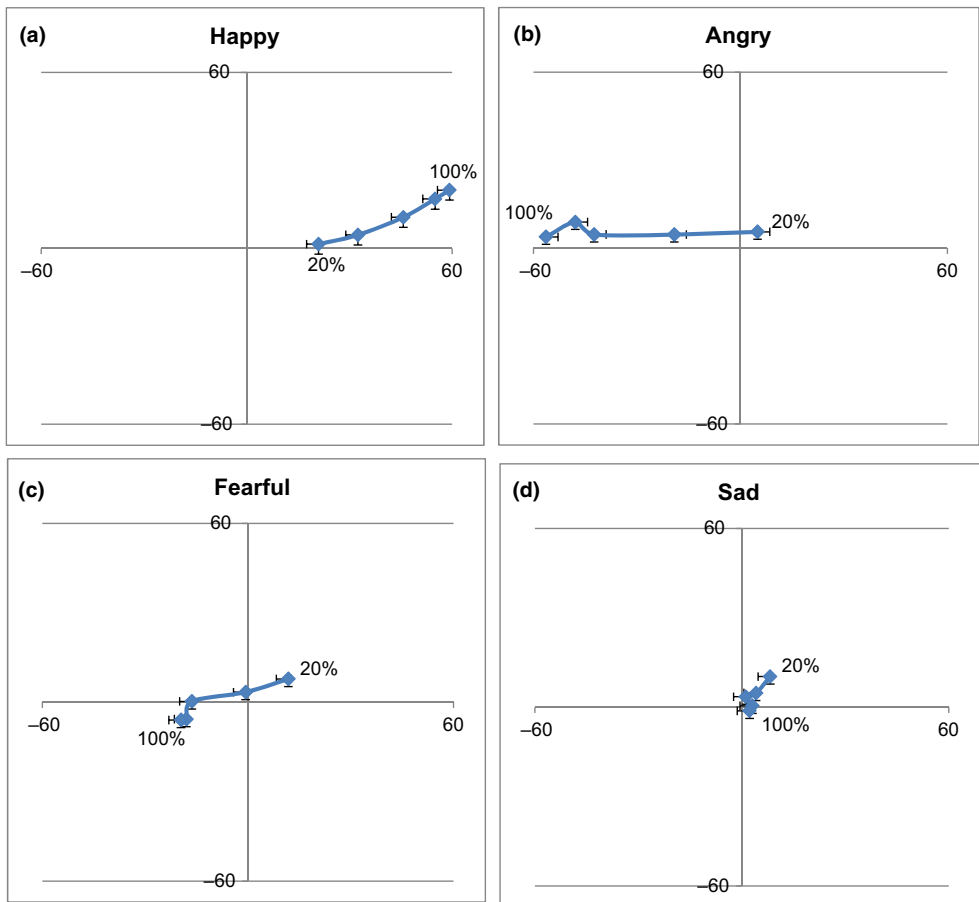
For Communion, the effects for Expression,  $F(3, 458) = 209.35, p < .0001, d = 1.35$ , Intensity,  $F(4, 7675) = 31.33, p < .0001, d = 0.12$ , and their interaction,  $F(12, 7676) = 56.38, p < .0001$ , were all significant. For happy expressions, the level of communion increased from 20% ( $M = 21.00, SE = 3.53$ ) to 40% ( $M = 32.49, SE = 3.55$ ) to 60% ( $M = 45.73, SE = 3.52$ ) to 80% ( $M = 55.01, SE = 3.59$ ) to 100% ( $M = 59.21, SE = 3.52$ ), indicating an increase in agreeableness. All *post-hoc* comparisons were significant (all  $p$ 's  $< .0001$ ) except for the comparison between 80% and 100% happiness ( $p > .05$ ). For angry expressions, communion decreased from 20% ( $M = 4.97, SE = 3.54$ ) to 40% ( $M = -19.16, SE = 3.51$ ) to 60% ( $M = -42.43, SE = 3.53$ ) to 80% ( $M = -47.87, SE = 3.53$ ) to 100% ( $M = -56.38, SE = 3.53$ ), indicating an increase in quarrelsomeness. The comparisons between 60% and 80% and between 80% and 100% were not significant ( $p$ 's  $> .09$ ) while the other comparisons were ( $p$ 's  $< .0001$ ). For sad expressions, the level of communion did not significantly differ between 20% ( $M = 8.24, SE = 3.50$ ), 40% ( $M = 4.14, SE = 3.53$ ), 60% ( $M = 1.18, SE = 3.54$ ), 80% ( $M = 3.07, SE = 3.57$ ), and 100% ( $M = 2.25, SE = 3.56$ ), all  $p$ 's  $> .29$ . For fearful expressions, communion decreased from 20% ( $M = 11.80, SE = 3.52$ ) to 40% ( $M = -0.67, SE = 3.54$ ) to 60% ( $M = -16.39, SE = 3.55$ ) to 80% ( $M = -17.96, SE = 3.51$ ) to 100% ( $M = -19.53, SE = 3.53$ ), indicating a shift from agreeableness to quarrelsomeness. All comparisons were significant,  $p$ 's  $< .001$ , except for the 60–80% and 80–100% comparisons,  $p$ 's  $> .05$ .

#### *Agency*

The effects for Expression,  $F(3, 459) = 11.54, p < .0001, d = 0.31$ , Intensity,  $F(4, 7675) = 4.06, p < .003, d = 0.05$ , and their interaction,  $F(12, 7677) = 3.43, p < .001$ , were all significant. For happy expressions, agency increased from 20% ( $M = 1.42, SE = 3.41$ ) to 40% ( $M = 4.57, SE = 3.43$ ) to 60% ( $M = 10.59, SE = 3.40$ ) to 80% ( $M = 16.83, SE = 3.47$ ) to 100% ( $M = 19.84, SE = 3.40$ ), indicating an increase in dominance. The 20–80%, 20–100%, 40–80%, and 40–100% comparisons were significant, all  $p$ 's  $< .001$ . All other comparisons were not, all  $p$ 's  $> .08$ . For angry, sad, and fearful expressions, agency did not vary significantly by intensity. Participants generally responded in a mildly submissive way to angry expressions ( $M = -5.20, SE = 2.71$ ), in a neutral way to sad expressions,  $M = -1.09, SE = 2.71$ , and in neutral way to fearful expressions,  $M = -2.44, SE = 2.71$ . The comparisons between the three types of expressions were not significant, all  $p$ 's  $> .97$ .

Figure 1 provides a summary of the impact of different facial expressions on communion and agency. Participants responded in an increasingly agreeable-dominant way to increasingly happy targets (Figure 1a) and in an increasingly quarrelsome (but not more or less dominant) way to increasingly angry targets (Figure 1b). Participants did not significantly change their behavioural responses to increasingly sad targets (Figure 1c). They responded in an increasingly quarrelsome way to increasingly fearful targets (Figure 1d).





**Figure 1.** Self-rated behaviour towards targets with (a) happy, (b) angry, (c) fearful, and (d) sad facial expressions of varying intensity (20–100%).

*Note.* Communion ranges from agreeableness on the right to quarrelsomeness on the left and agency ranges from submissiveness in the bottom to dominance in the top. The data points represent estimated means and error bars for communion and agency on the horizontal and vertical axes, respectively.

### Responses to postural emotion expressions

#### Response times

The effect for Expression was significant,  $F(4, 603) = 8.68, p < .0001, d = 0.23$ . Participants were slower to respond to fearful expressions ( $M = 1689$  s,  $SE = 43.37$ ) than to all other expressions (anger:  $M = 1561$  s,  $SE = 43.43$ ; sadness:  $M = 1521$  s,  $SE = 43.37$ ; happiness:  $M = 1506$  s,  $SE = 43.36$ ; neutral:  $M = 1433$  s,  $SE = 43.36$ ), all  $p$ 's  $< .05$ . There were no significant differences among the response times for these other expressions, all  $p$ 's  $> .05$ .

#### Behaviour

For Communion, the effect for Expression was significant,  $F(4, 512) = 107.20, p < .0001, d = 0.91$ . Participants responded in a quarrelsome way to fearful ( $M = -14.44$ ,  $SE = 4.00$ ) and angry expressions ( $M = -27.67$ ,  $SE = 4.00$ ) yet in an agreeable way to

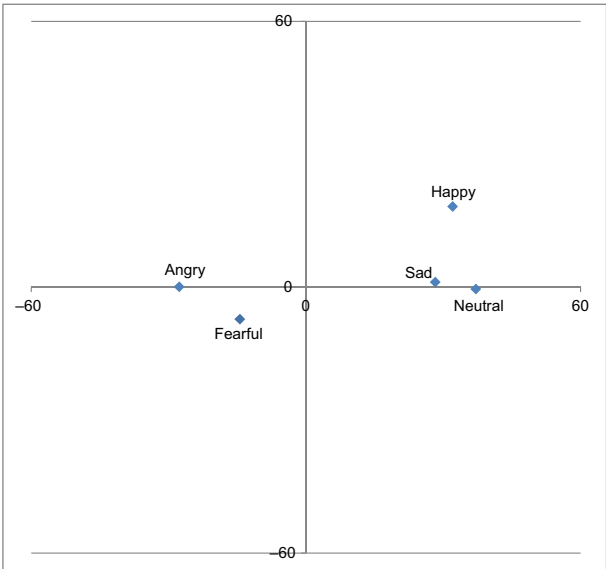
sad ( $M = 28.26$ ,  $SE = 4.00$ ), happy ( $M = 32.05$ ,  $SE = 4.00$ ), and neutral expressions ( $M = 37.10$ ,  $SE = 4.00$ ). The differences in quarrelsomeness in response to fearful or angry expressions versus sad, happy, or neutral expressions were all significant,  $p$ 's < .013.

For Agency, the effect for Expression was significant,  $F(4, 511) = 12.49$ ,  $p < .0001$ ,  $d = 0.31$ . Participants responded in a submissive way to fearful expressions ( $M = -7.22$ ,  $SE = 3.70$ ) and in a dominant way to happy expressions ( $M = 18.18$ ,  $SE = 3.70$ ). Their behaviour towards sad ( $M = 1.14$ ,  $SE = 3.70$ ), angry ( $M = 0.08$ ,  $SE = 3.70$ ), and neutral expressions ( $M = -0.43$ ,  $SE = 3.70$ ) was neither submissive nor dominant. The level of agency differed significantly between happy and all other postural expressions, all  $p$ 's < .001, but not among these other postural expressions.

Figure 2 provides a summary of the impact of different postural expressions on communion and agency. Participants responded in an agreeable-dominant way to happy targets, in a primarily quarrelsome way to angry targets, in a primarily agreeable way to sad targets, and in a quarrelsome-submissive way to fearful targets. Moreover, participants responded in an agreeable way to neutral targets.

**Impact of mood state**

The variables Facial or Postural Expression, PA or NA, and the two-way interaction were used as predictors of Communion and Agency. The outcomes of the analyses have been summarized in Table 1. In the Facial Emotion Response Task, there was a significant effect for the Expression by NA interaction on Agency. Participants with more NA rated their behaviour towards angry facial expressions as more submissive,  $M = -17.54$ ,  $SE = 4.62$ , than participants with less NA,  $M = 0.54$ ,  $SE = 3.15$ ,  $p < .004$ . Contrasts between



**Figure 2.** Self-rated behaviour towards targets with angry, fearful, happy, neutral, and sad postural expressions.

*Note.* Communion ranges from agreeableness on the right to quarrelsomeness on the left and agency ranges from submissiveness in the bottom to dominance in the top. The data points represent estimated means for communion and agency on the horizontal and vertical axes, respectively.



participants with more versus less NA were not significant for the other facial expressions, all  $p$ 's > .05. There were no other significant interaction effects, including in the Postural Emotion Response Task.

## Discussion

We used two computer tasks to examine behavioural responses to facial and postural emotion expressions in a Romanian sample. We found the results on the Facial Emotion Response Task to be similar but not identical to those previously found by aan het Rot *et al.* (2014) in a sample consisting mostly of Dutch and German students. Moreover, these results were similar but not identical to the results on the Postural Emotion Response Task. We subsequently discuss the findings for each of the four studied emotions, happiness, anger, sadness, and fear.

Firstly, the present sample responded to increasingly happy facial expressions in an increasingly agreeable and dominant way. This was also found by aan het Rot *et al.* (2014) and is in line with two Austrian studies reporting approach of happy facial expressions in both healthy and depressed samples (Seidel, Habel, Finkelmeyer, *et al.*, 2010; Seidel, Habel, Kirschner, *et al.*, 2010). Moreover, the present sample responded with agreeable dominance to postural expressions of happiness. Overall, the findings fit with the idea that happy expressions communicate a wish to strengthen social relations (Parkinson, 1996). Others are invited to approach regardless of how happiness is expressed.

Secondly, the present sample responded to increasingly angry facial expressions in an increasingly quarrelsome way. This was also found by aan het Rot *et al.* (2014). However, while their study participants also indicated they would respond in a mildly dominant way

**Table 1.** Expression, PA or NA, and the two-way interaction as predictors of communion and agency

	Facial emotion response task	Postural emotion response task
Communion		
Model including PA		
Expression	205.09***	106.48***
PA	0.02	0.40
Expression*PA	0.06	0.94
Model including NA		
Expression	173.00***	85.71***
NA	0.21	0.008
Expression*NA	0.80	1.80
Agency		
Model including PA		
Expression	12.51***	12.72***
PA	0.15	0.05
Expression*PA	2.27 <sup>†</sup>	0.28
Model including NA		
Expression	18.61***	11.45***
NA	0.48	0.22
Expression*NA	9.11**	1.42

Note. Values represent outcomes of  $F$  tests.

<sup>†</sup> $p < .10$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

towards angry facial expressions, the present sample reported mildly submissive behaviour towards these expressions. This is interesting in the light of a previous American study in which angry faces elicited approach when followed by a fearful face but avoidance when followed by a happy face (Wilkowski & Meier, 2010). Fear following anger and happiness following anger are thought to indicate defeat and victory, respectively (De Waal, 1986). As defeat and victory are associated with submissive and dominant behaviour, respectively, it appears that the present sample anticipated defeat rather than victory from seeing an angry face. This may represent a cultural difference in agency between the Romanians who participated in the present study and the Dutch and German individuals who participated in the study by aan het Rot *et al.* (2014). Specifically, the present sample might have been more likely to interpret the angry expressions in the context of their culture's communist past. During communism, Romanians were accustomed to being obedient (Stefan, 2009). Further, years after the end of communism, Romanian authoritarians were found to have kept intact their communist ideology and passed it on to their children (Krauss, 2002). Furthermore, Romanians continue to not trust others and be careful in dealing with others (World Values Survey Association, 2015). Finally, cultural dimensions theory predicts that Romanians are more concerned with maintaining social hierarchies than people from the Netherlands and Germany (Hofstede *et al.*, 2010). Others have also found cultural differences in agency (e.g., Furrer, Tjemkes, Aydinlik, & Adolfs, 2012).

While the present sample responded to facial expressions of anger with mild submissiveness, their level of agency in response to postural expressions of anger remained neutral. In contrast, Willis *et al.* (2011) previously found no difference in the avoidance of angry faces versus angry postures. One explanation for this discrepancy may lie in the fact that our Facial Emotion Response Task included stimuli with varying intensities, thus allowing for a more fine-grained analysis of behavioural responses. Nonetheless, as agentic responses to angry facial expressions in the present study and in the study by aan het Rot *et al.* (2014) were generally mild, the impact of angry expressions on agency may on average be limited. Future studies could consider individual differences in the behavioural response to angry expressions.

Thirdly, in the present study sad faces and sad postures both elicited mild agreeableness. These results are in line with aan het Rot *et al.* (2014), who found that participants became more agreeable when seeing faces with increasingly sad expressions, and with Seidel, Habel, Kirschner, *et al.* (2010), who found that sad facial expressions are generally approached. With respect to communion, the present results thus extend these previous results from facial to postural expressions of sadness. However, with respect to agency, while aan het Rot *et al.* (2014) found that Dutch and German participants became less dominant when seeing faces with increasingly sad expressions, the present Romanian sample responded to sadness with dominant nor submissive behaviour. Although it is possible that this finding reflects random variation between the two studies, the tendency to not behave agentially may also stem from an enhanced cultural focus on social hierarchies (cf. Hofstede *et al.*, 2010).

Fourthly, at increasing intensities of fearful facial expressions, the present sample shifted their communal behaviour from agreeable to quarrelsome. Moreover, postural expressions of fear primarily elicited quarrelsome behaviour. A shift from agreeableness to quarrelsomeness was also found by aan het Rot *et al.* (2014). Highly fearful expressions are thought to signal a threat (Harmer *et al.*, 2006; Munafo *et al.*, 2006). It appears this is true for people in the Netherlands and Germany (i.e., Western Europe) as well as Romania (i.e., Eastern Europe).

This is also evident from the finding that the present sample behaved in a mildly submissive way in response to postural expressions of fear. While this was not found for increasingly fearful facial expressions, towards which there was no significant change in agency, *aan het Rot et al.* (2014) previously reported that their participants became less dominant in response to expressed fear. This finding suggests that fear expressions may be seen as proof of an unsafe environment that requires activation of self-protective strategies (*Russell et al.*, 2011).

A fifth point for discussion is that in the present sample levels of agency were associated with mood state. Specifically, angry faces (but not postures) invited more submissiveness when levels of NA were higher. While *aan het Rot et al.* (2014) also reported an association between mood state and behavioural responses to facial expressions, their participants with higher NA responded in a less agreeable way to happy and sad faces. Thus, while Dutch and German individuals seem to respond differently to happy and sad faces depending on their mood state, in Romanians this appears to be true for angry faces. Moreover, in both groups a different dimension of behaviour was affected, that is, agency or communion, respectively. While *aan het Rot et al.* (2014) acknowledged that more variation in behavioural responses might have been observed after an experimentally induced mood change, it is noteworthy that interpersonal styles characterized by high submissiveness are common among patients with depression or anxiety (*Russell et al.*, 2011; Zuroff, Fournier, & Moskowitz, 2007), disorders characterized by elevated levels of NA and negative biases in the processing of emotional stimuli. In a future study, the tasks used in the present study could be administered to a clinical sample.

One limitation of our study is that we did not assess accuracy in recognizing the facial and postural emotion expressions. Therefore, we do not know whether participants recognized each expressed emotion. Yet behavioural responses to emotions will depend on (explicit or implicit) recognition of the emotions. In emotion recognition tasks, researchers usually consider both reaction time and accuracy, particularly when the emotional intensity of the stimuli varies, as it did in the Facial Emotion Response Task used in the present study. Participants are often less accurate at identifying emotions at the lower intensities. Thus, we should assume that, particularly at lower emotion intensities, recognition accuracy was suboptimal.

Another limitation is that while emotional expressions are usually interpreted in the social context in which they occur (*Barrett, Mesquita, & Gendron*, 2011), our Facial Emotion Response Task and Postural Emotion Response Task did not provide context. Participants were left to imagine the situations in which the emotional expressions presented on the computer screen might have occurred. Several prior studies suggest this may have biased the results. For example, imagining or not imagining a fearful posture when seeing a fearful face might influence emotion recognition (*Van den Stock & de Gelder*, 2014) and during actual social interaction the relative status of the people involved plays an important role in determining behaviour (*Moskowitz, Ho, & Turcotte-Tremblay*, 2007). Relatedly, it is not clear how participants interpreted terms such as dominance and submissiveness without being able to consider a particular context. Thus, there may have been interindividual variation in the analysis of the various emotional expressions.

A final limitation is that we asked participants to report how they would behave in a hypothetical situation. We did not truly examine how people actually respond when an emotion is expressed naturalistically. Like the extensive use of facial emotion recognition

tasks in various areas of psychology, our method has value, but we readily acknowledge its limitations.

In sum, we replicated previous findings by aan het Rot *et al.* (2014) with respect to behavioural responses to happy facial expressions and extended this to happy postural expressions. Further, we replicated and extended previous findings by aan het Rot *et al.* (2014) with respect to communal but not agentic responses to angry, sad, and fearful expressions. Differential results could be explained using cultural dimensions theory (Hofstede *et al.*, 2010). Furthermore, we observed that communal and, to some degree, agentic behaviour in response to facial and postural emotion expressions depended on the gender of the person expressing the emotion. This study addressed a void in the literature by focusing on facial as well as postural expressions of emotion and by being sensitive to subtle cultural differences between western Europe (the Netherlands, Germany) and eastern Europe (Romania) in how people respond to these emotional expressions.

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