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BRIEF REPORT

Do proposed facial expressions of contempt, shame, embarrassment, and compassion communicate the predicted emotion?

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Shame, embarrassment, compassion, and contempt have been considered candidates for the status of basic emotions on the grounds that each has a recognisable facial expression. In two studies ($N = 88$, $N = 60$) on recognition of these four facial expressions, observers showed moderate agreement on the predicted emotion when assessed with forced choice (58%; 42%), but low agreement when assessed with free labelling (18%; 16%). Thus, even though some observers endorsed the predicted emotion when it was presented in a list, over 80% spontaneously interpreted these faces in a way other than the predicted emotion.

Keywords: Facial expressions; Free labeling; Forced choice; Response method; Emotion.

Evidence that an emotion is universally recognised from its facial expression has been proposed as a criterion for that emotion being "basic" (e.g., Ekman, 1984). Research on the classic list of basic emotions (anger, fear, happiness, sadness, disgust, and surprise) has recently been expanded to other emotions, in order to provide a better basis to discuss issues on universality. Therefore, evidence that emotions other than those considered the classic basic emotions are recognisable from faces has important implications for the discussion on basic emotions and the universality of facial expressions. One of the key issues in this debate is the implications of the use of forced-choice versus free-response methods. A forced-choice format might not capture the observer's spontaneous emotion attribution, but rather a judgement made only in the context of choosing among available options. The forced-choice format can thus produce an artificially high proportion of observers agreeing with the predicted emotion (Russell, 1993). The present study aimed to

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contribute to this discussion by directly comparing the two methods in the attribution of emotion for a set of facial expressions that have not reached the status of "basic": embarrassment, shame, compassion, and contempt.

In their research on these four emotions, among others, Haidt and Keltner (1999) studied observers in two cultures, using two methods to test recognition of facial expressions of emotion. They noted that forced-choice responses have been shown to yield a higher proportion of agreement than a freer format, and they acknowledged potential problems with the usual forced-choice response format in which perceivers must choose one term from a short list of emotions. Haidt and Keltner thus included a freer response format and compared results from this format with those from a forced-choice format. Their forced-choice format differed from that used by Ekman and Friesen (1971) by including 14 emotion options plus a "none of the above" option. On the basis of their comparison, Haidt and Keltner concluded that both methods yielded "essentially the same results" (p. 261). This important conclusion may depend on the differences between their forced choice and that used by Ekman and Friesen, and, in any case, bears scrutiny because conclusions drawn by researchers depend on the methods used. The current studies therefore used both forced-choice and freer-response formats. Indeed, it was the freely produced responses that revealed that few people spontaneously interpret these expressions in the predicted manner.

In Study 1, 88 university students each rated 10 different facial expressions, first with a free-label format, and then with a forced-choice format. These ratings were made in the context of a study of apparent sex differences in expressers; those data are reported elsewhere (Widen, 2010). In Study 2, results of Study 1 were replicated with 60 university students with ratings taken without the context of the study of apparent sex differences.

STUDY 1

Method

Participants

Participants were 88 psychology students at Boston College (44 males and 44 females) between the ages of 18 and 23 (mean age = 19.4; $SD = 1.02$). The sample was ethnically diverse and representative of the ethnic composition of Boston College: 70.0% of participants were Caucasian, 12.2% Asian, 7.8% African American, 4.4% Hispanic, and 5.6% of mixed ethnicity. All participants were proficient in English and participated in the study in exchange for class credit.

Materials

Photographs of facial expressions. The 10 prototypical facial expressions used here were all posed by the same woman and had been developed by Haidt and Keltner (1999). Six emotions were dubbed "old"; these were the emotions—happiness, sadness, anger, fear, surprise, and disgust—studied by Ekman and Friesen (1971). Four were dubbed "new"; these were the emotions—contempt, shame, embarrassment, and compassion—proposed subsequent to Ekman and Friesen's list. Haidt and Keltner's set of 10 had been coded with Ekman and Friesen's (1978) *Facial Action Coding System* (FACS) and validated in a study of adults in two cultures (USA and India).

Procedure

The free-labelling task was presented first, followed by forced choice.

Free-labelling task. The questionnaire began: "In this section, please label the emotion expressed in each ... picture ... Use a single emotion word where possible". The facial expressions were presented one at a time in one of four random orders.

Forced-choice task. The same photographs were then shown again, one at a time. Participants were to choose the one term from a list of 11 emotion labels (*angry*, *compassion*, *contempt*, *disgusted*, *embarrassed*, *scared*, *happy*, *sad*, *scorn*, *ashamed*, *surprised*) that best described the emotion expressed in the face. (*Scorn* was added to the list as an alternative to *contempt*.[1]) Our list was shorter than Haidt and Keltner's because we did not include love, enthusiasm, or amusement. The facial expressions were presented in one of four random orders, each different from the order in which they were presented for the free-labelling task.

Scoring

For the responses to the free-labelling task, two raters judged each word used by a participant as to which of 12 categories the word fitted: happiness, sadness, anger, fear, disgust, surprise, shame, embarrassment, compassion, contempt, cognition, and "other" (any response that did not fit into one of the first 11 categories). Any words on which the raters disagreed were judged by a third rater. The labels that were scored as correct for each category were:

- for happiness – *content*, *glad*, *happy*, *pleased*, *satisfied*;
- for sadness – *depressed*, *disappointed*, *distraught*, *hopeless*, *hurt*, *sad*, *upset*;
- for anger – *angry*, *annoyed*, *bitter*, *enraged*, *frustrated*, *furious*, *hostile*, *infuriated*, *irritated*, *mad*, *pissed off*, *revenge*, *vengeful*;
- for fear – *frightened*, *horrified*, *petrified*, *scared*, *terrified*;
- for surprise – *amazed*, *astonished*, *disbelief*, *shocked*, *surprised*;
- for disgust – *disgusted*, *grossed out*, *repulsed*;
- for embarrassment – *embarrassed*, *bashful*, *shy*;
- for compassion – *compassionate*, *concerned*, *sorry for someone*, *sympathetic*;
- for shame – *ashamed*, *dejected*, *guilty*, *shameful*;
- for contempt – *disapproving*, *smug*; and
- for cognition – *confused*, *curious*, *debating*, *doubtful*, *perplexed*, *sceptical*, *suspicious*, *uncertain*, *unsure*.

Responses coded as "other" were *agitated*, *alone*, *empty*, *bored*, *calm*, *challenging*, *cocky*, *cunning*, *cynical*, *devious*, *distressed*, *disturbed*, *feels bad*, *flirtatious*, *frown*, *helpless*, *impassive*, *in disagreement*, *indifferent*, *inquisitive*, *intense*, *intent*, *intrigued*, *like a bully*, *like she wants to cry*, *like her nose is itchy*, *longing*, *mischievous*, *modest*, *nothing*, *numb*, *occupied*, *peaceful*, *penetrated*, *relaxed*, *relief*, *self-confident*, *serious*, *she's laughing*, *sick*, *silly*, *sly*, *snide*, *spoiled*, *stern*, *stoic*, *tired*, *uneasy*, *unhappy*, *uninterested*, *unloved*, *violated*, *whatever* and no answer.

Results

The proportion scored "correct" for the facial expression with each response format is given in Table 1. We examined the effect of response format for old (the traditional six facial expressions of happiness, sadness, anger, fear, surprise, disgust) and new facial expressions (shame, embarrassment, compassion, contempt) with a repeated-measures analysis of variance (ANOVA; $\alpha = .05$). Response Format (2 levels: forced choice, free labelling) and Facial Emotion (2 levels: old, new) were within-subject factors; there was no between-subjects factor. The dependent variable was mean proportion correct (out of 6 for old, out of 4 for new).

The main effect for Response Format was significant, $F(1, 87) = 124.49$, $p < .001$, $\eta_p^2 = .59$, with forced choice (0.66) producing a greater proportion correct than free labelling (0.47). The main effect for Facial Emotion was also significant, $F(1, 87) = 236.52$, $p < .001$, $\eta_p^2 = .73$, with old facial expressions (0.75) higher than the new ones (0.38). These two factors also interacted,

[1] In pilot testing, several subjects indicated that they were unfamiliar with the meaning of the word *contempt* and, therefore, failed to choose it in the forced-choice task. In order to alleviate this problem, "scorn" was included in the forced choice list as a synonym for contempt. Both *scorn* and *contempt* were scored correct for the contempt face.

Table 1. *Propotion correct as a function of response format*

		Study 1			Study 2		
		Response format			Response format		
	Facial expression	Free labelling	Forced choice	Mean	Free labelling	Forced choice	Mean
Old	Happiness	0.94	0.99	0.97	0.85	0.78	0.82
	Surprise	0.91	0.94	0.93	0.97	0.92	0.94
	Sadness	0.80	0.81	0.80	0.70	0.72	0.72
	Fear	0.76	0.73	0.74	0.50	0.53	0.51
	Anger	0.63	0.42	0.52	0.87	0.68	0.78
	Disgust	0.41	0.58	0.49	0.15	0.37	0.26
New	Shame	0.32	0.66	0.49	0.22	0.55	0.38
	Embarrassment	0.30	0.48	0.39	0.42	0.50	0.46
	Compassion	0.07	0.39	0.23	0.00	0.08	0.04
	Contempt	0.03	0.81	0.42	0.00	0.08	0.05

Note: Maximum possible is 1.00.

$F(1, 87) = 108.88$, $p < .001$, $\eta_p^2 = .56$. As illustrated by Figure 1, with old expressions, free labelling and forced choice did not differ, but, with the new ones, free labelling was significantly ($p < .001$) lower than forced choice.

With forced choice, mean endorsement of the predicted emotion for the four new facial expressions was higher in the current study (58%) than in Haidt and Keltner's (45%) and was similar to that seen for the old expressions. Nevertheless, forced choice is capable of producing misleading results (Haidt & Keltner, 1999; Russell 1993), and so no definitive answer is provided with this method. With free labelling, in contrast, mean performance for the four new faces yielded little evidence of recognition: mean "correct" (18%) was lower than Haidt and Keltner's (1999, 27%; Table 2). In addition, even when assessed with

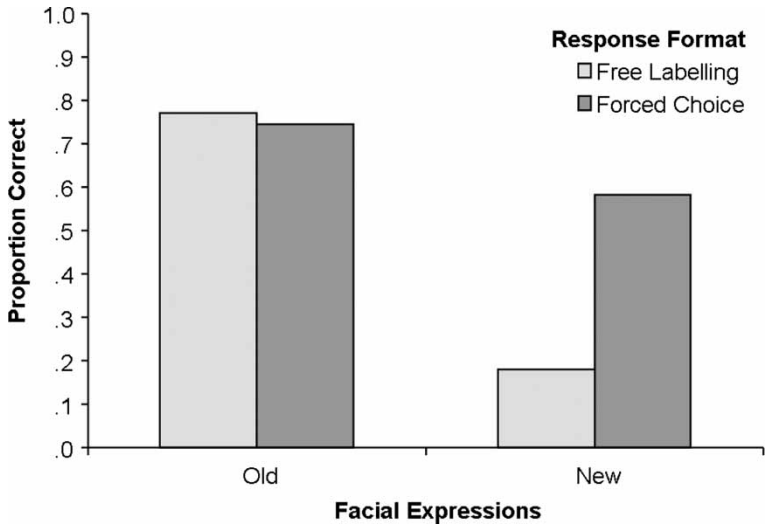

Figure 1. *Proportion of correct responses to the old (happiness, sadness, anger, fear, surprise, disgust) and new (shame, embarrassment, compassion, contempt) facial expressions on the free-labelling and forced-choice tasks in Study 1.*

Table 2. *Propotion correct in the current studies and in Haidt and Keltner's (1999) study with free labelling*

	Current studies		*Haidt and Keltner (1999)*		
Facial expression	*Study 1*	*Study 2*	*Reported result*	*Proportion of sample*	*Proportion correct in total sample*
Shame	0.32	0.22	0.16	0.80	0.13
Embarrassment	0.31	0.42	0.74	0.58	0.43
Compassion	0.08	0.00	0.00	0.80	0.00
Contempt	0.03	0.00	0.19	0.53	0.10
Mean	0.18	0.16	0.27	0.68	0.16

the same method, free labelling, recognition for the new expressions was lower than for every old emotion in our study.

This difference between our results and those of Haidt and Keltner (1999) prompted us to examine their results in more detail. The proportion "correct" that they reported from their free-labelling data was not based on their entire sample. Rather, they reported the proportion of participants who used the predicted label (or a synonym) out of only those participants who provided any emotion label at all—a proportion always less than 1.0; for the 4 new facial emotions, on average, two-thirds reported any emotion at all.[2] Table 2 shows our free-labelling results for the four new emotion expressions and those reported by Haidt and Keltner (1999). In the third column is the proportion of their total sample ($N = 40$) who provided any emotion word at all; this is the proportion of participants on which their free-label results were based. From these numbers, it is possible to calculate the proportion of their *total* sample who gave the predicted label (e.g., for shame: $0.16 \times 0.80 = 0.13$); that number is reported in the final column. These numbers in the last column are indeed closer to our findings. For the four new expressions, our results ranged from 0.03 to 0.32. The Haidt and Keltner results, on this new calculation, ranged from 0.00 to 0.43. Our mean was 0.18; theirs 0.16. Put differently, with free labelling, on average 82% of our sample and 84% of theirs failed to report seeing the predicted emotion in the face.

If, on average, only 18% of our participants interpreted the four new facial expressions as Haidt and Keltner (1999) predicted, how did the other 82% interpret them? To explore this question, "confusions" are examined in Table 3. With the forced-choice method, the predicted label for the four new faces was the modal label (although for the "compassion face", *sad* was a close second). Free labelling provided a different perspective. Although "confusions" were scattered across all the response categories, the most frequently endorsed were *happy*, *sad*, or cognition. (With forced choice, 50.3% and, with free label, 52.8% of "confusions" fell in these three categories.) For the "embarrassment face" the predicted label was modal. For "shame" and "compassion", *sad* was the modal label. For the "contempt face", cognition was modal.

Discussion

The results of this study suggest that response format affects whether facial expressions—at least those predicted to signal contempt, shame, embarrassment, and compassion—appear to be recognised as signalling the predicted emotion. Because the free-labelling findings with these four faces were unexpected, and because the findings were obtained in the context of a study on another

[2] In Haidt and Keltner's (1999) free-labelling method, participants were asked to explain what "happened to make the person feel this way" (p. 236) but were not required to label the emotion. Only after data collection did the authors find that a large proportion of the participants spontaneously provided an emotion label for the faces.

Table 3. *Propotion of participants' responses to the four new facial expressions that fit into each of four categories*

	Forced-choice response category				*Free-labelling response category*			
Face	*Correct*	*Happy*	*Sad*	*Cognition*	*Correct*	*Happy*	*Sad*	*Cognition*
Study 1 (N = 88)								
Shame	**0.66**	0.00	0.17	–	0.32	0.00	**0.42**	0.05
Embarrassment	**0.48**	0.19	0.11	–	**0.31**	0.24	0.23	0.01
Compassion	**0.39**	0.01	0.38	–	0.08	0.00	**0.33**	0.11
Contempt	**0.81**	0.02	0.00	–	0.03	0.02	0.02	**0.47**
Study 2 (N = 60)								
Shame	**0.55**	0.00	0.17	0.20	0.22	0.01	**0.35**	0.03
Embarrassment	**0.50**	0.10	0.08	0.12	**0.42**	0.15	0.22	0.05
Compassion	0.08	0.00	**0.33**	0.28	0.00	0.08	**0.37**	0.02
Contempt	0.08	0.00	0.00	**0.85**	0.00	0.03	0.05	**0.55**

Note: Maximum proportion for each cell is 1.00. **Bold** cells indicate the modal response for each facial expression.

topic, one must await a replication with a new sample. Such was the purpose of Study 2.

STUDY 2

Study 2 was aimed at replicating the main finding of Study 1, but with slightly altered method. Based on the cognitive labels freely produced in Study 1, we expanded the list of choices on the forced-choice task to include the three most commonly mentioned cognitive states (confused, thinking, suspicious) and a "none of the above" option (Frank & Stennett, 2001). This change brought the number of options in our forced-choice format closer to the number in Haidt and Keltner's (1999) study.

Method

The Method of Study 2 was identical to Study 1 except as noted.

Participants

Participants were 60 psychology students at Boston College (11 male, 49 female) between the ages of 18 and 22 years (mean age = 19.2; *SD* = 1.12). The sample was ethnically diverse and representative of the ethnic composition of Boston College: 71.7% of participants were Caucasian, 15.0% Asian, 5.0% African American, 5.0% Hispanic, and 3.3% of mixed ethnicity.

Procedure

Forced-choice task. In the forced-choice section, participants were asked to choose the one term from a list of 14 labels (*angry*, *anxious*, *compassionate*, *confused*, *contempt*, *disgusted*, *embarrassed*, *happy*, *sad*, *scared*, *shamed*, *surprised*, *suspicious*, and *thinking*) that best described the emotion expressed in each face. They were also given a "none of the above" option.

Scoring

For the responses to the free-labelling task, the scoring key that was created in Study 1 was used. All new responses obtained were rated with the same method as described in Study 1. New labels that were scored correct were:

- for happiness – *elated*, *excited*, *joyful*;
- for sadness – *dejected*;
- for anger – *aggravated*, *bothered*, *grumpy*; and
- for fear – *afraid*, *alarmed*, *anxious*, *fear*.

Responses coded as "other" were *apologetic*, *attentive*, *awkward*, *bewildered*, *confident*, *critical*, *funny*, *itchy*, *laughter*, *left-out*, *lethargic*, *nonchalant*, *playful*, *prayerful*, *sarcastic*, *sleepy*, *sneaky*, *tense*, *tough*.

Results

The proportion scored correct for each facial expression with each response format is given in Table 1. Again, the six facial emotions studied by Ekman and Friesen (1971) were dubbed "old" (happiness, sadness, anger, fear, surprise, disgust). The four not studied by them were dubbed "new" (shame, embarrassment, compassion, contempt). In a repeated-measures ANOVA ($\alpha = .05$), Response Format (2 levels: forced choice, free labelling) and Facial Emotion (2 levels: old, new) were within-subject factors; there was no between-subjects factor. The dependent variable was proportion correct (out of 6 for old, out of 4 for new).

The main effect for Response Format was significant, $F(1, 59) = 26.24$, $p < .001$, $\eta_p^2 = .31$, with forced choice (0.54) producing a greater proportion correct than free labelling (0.42). The main effect for Facial Emotion was also significant, $F(1, 59) = 142.68$, $p < .001$, $\eta_p^2 = .71$, with old facial expressions (0.67) higher than the new ones (0.29). These two factors also interacted, $F(1, 59) = 37.83$, $p < .001$, $\eta_p^2 = .39$. As illustrated by Figure 2, with old facial expressions, free labelling and forced choice did not differ, but, with new ones, free labelling was significantly ($p < .001$) lower than forced choice.

With forced choice, mean endorsement of the predicted emotion for the four new facial expressions was lower in the current study (30%) than in Haidt and Keltner (1999, 45%) and in Study 1 (58%). Comparisons across studies are hazardous, but these comparisons are consistent with the claim that the particular list of options available in forced choice can affect the results. The 4 additional options (3 cognition labels and "none of the above") drew 87%, 32%, 22%, and 13%, of responses for "contempt", "compassion", "shame", and "embarrassment" faces, respectively. The four new expressions generally fared more poorly than did the six old expressions (Table 1).

By free labelling, mean proportion correct for the "shame", "compassion", and "contempt" faces was low, for "embarrassment", it was moderate. Our mean for these four faces (16%) was lower than Haidt and Keltner's (1999, 27%; Table 2). In the current study, for the four new expressions, results ranged from 0.00 to 0.42. When the Haidt and Keltner results were recalculated to take into account the full sample rather than only the

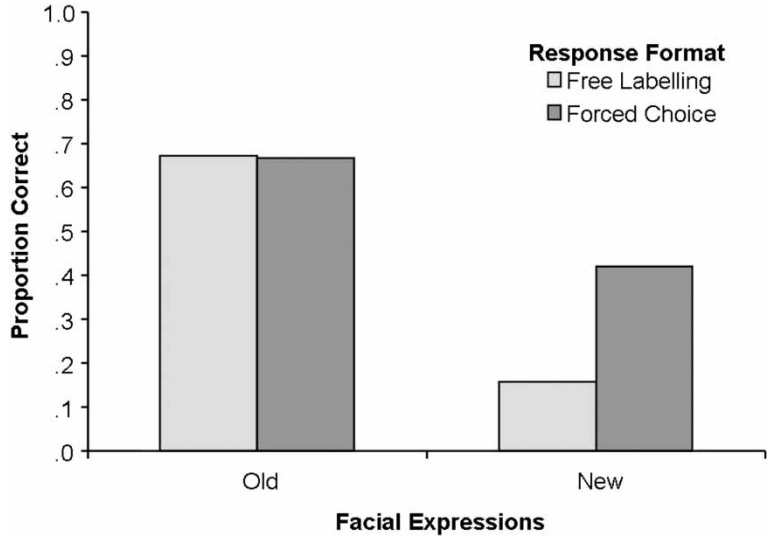

Figure 2. *Proportion of correct responses to the old (happiness, sadness, anger, fear, surprise, disgust) and new (shame, embarrassment, compassion, contempt) facial expressions on the free-labelling and forced-choice tasks in Study 2.*

subsample who used an emotion word, their means ranged from 0.00 to 0.43 and the mean for these four facial expressions was 0.16—the same as ours.

Table 3 shows participants' "confusions" in order to examine how observers who did not use the predicted label interpreted the faces. With forced choice, the predicted label was the modal label for the "shame" and "embarrassment" faces. For the "compassion" face, *sad* was modal, and for the "contempt face", cognition was. With free labelling, the pattern of responses was the same as in Study 1: for the "embarrassment face" the predicted label was modal; for "shame" and "compassion", *sad* was the modal label; for the "contempt face", cognition labels were modal.

GENERAL DISCUSSION

Haidt and Keltner (1999) asked whether a forced-choice response format yields valid evidence about recognition of emotion from facial expressions. They replied that "the answer given by the present study is yes" (p. 260). Their reply was based in part on their finding that "essentially the same results [found with forced choice] were found using a free response methodology" (p. 261). Our results lead to the opposite conclusion.

The findings that question the validity of the forced-choice method are the results from free labelling. Our results with forced choice for the "shame", "embarrassment", "compassion", and "contempt" faces generally replicated Haidt and Keltner's (1999) results for their American sample. Indeed, with forced choice, for these four expressions, our mean recognition for Study 1 (58%) was higher than theirs (45%), although in Study 2, with a different set of options, ours was lower (30%). Thus, forced choice with limited options can seem to support the conclusion that these expressions are recognised as expressing the predicted emotion (see also Hawk, van Kleef, Fischer, & van der Schalk, 2009). In contrast, our results with the free-response format support the opposite conclusion. Free labelling showed significantly lower recognition than did forced choice for each of the new expressions in Study 1 and in Study 2. Free labelling for these four faces was lower than for each of the old expressions (except for the "disgust face" in Study 2). Indeed, free labelling yielded little evidence of recognition for these four: our mean "correct" (18% in Study 1, 16% in Study 2) was lower than Haidt and Keltner's (1999) reported free-labelling results (27%) but equivalent to the results for their full sample (16%).

Our results with forced choice raise the question whether the specific options provided in a forced-choice format can shape the selections that people make. If the emotion that a person spontaneously attributes to a facial expression is not provided in the list, then the person must make the best selection from the available options. An example of the power of the response options to shape people's selections occurred in the current studies. In free labelling in Study 1, participants attributed cognitive states to some of the facial expressions. So, in Study 2, three cognitive states were added to the response options in the forced-choice list. Though it is not advisable to make statistical comparisons between studies, there was a large difference in forced-choice results for the four new facial expressions between Study 1 and Study 2 (Table 3)—a difference that we attribute to the different options provided. That is, for the "contempt face" and the "compassion face", participants in Study 2 were less likely than in Study 1 to select the predicted label and more likely to select one of the cognition options. This finding points to a weakness of forced choice among a limited set of options: It can be difficult to provide a list that will include all the responses people spontaneously attribute to the faces seen. And the results based on an incomplete list can be misleading. Clearly in Study 1, although 11 different response options were provided, those options did not include all the labels people spontaneously attributed to the faces. Haidt and Keltner (1999)

provided 15 different response options, but with results similar to ours.

One might suggest that the modal free-label response be taken to establish what observers see in a particular face. Indeed, for the old facial expressions, the modal free-labelling response was the predicted response (except for the "disgust face" for which *angry* was modal in both studies). In addition, for the "embarrassment face", the modal free label was *embarrassed* in both Studies 1 and 2. Still, it is troubling that the majority of observers interpreted the face otherwise. For the "shame", "compassion", and "contempt" faces, the modal free-label response was not the predicted label.

Our conclusion is that response format matters. Shown facial expressions predicted to be signals of contempt, shame, embarrassment, and compassion, a fair number of observers endorsed the predicted emotion when it is presented in a short list. On the other hand, over 80% spontaneously interpreted these faces in a way other than the predicted emotion. For these four expressions, we are not convinced that they signal the predicted emotion.

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