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BURKINA FASO AND FRANCE: A CROSS-CULTURAL STUDY OF THE JUDGMENT OF ACTION READINESS IN FACIAL EXPRESSIONS OF EMOTION

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Previous research has documented that the major forms of emotional action readiness are likely to be universal and that the main forms of states of action readiness are exhibited in facial expressions of emotion. A comparative study between an African (Burkinabe) and an European (French) population was conducted in order to investigate how these two cultures assess facial expressions of four emotions (joy, sadness, anger and fear) in terms of action readiness modes as well as in terms of emotion labels. Results show that specific patterns of action readiness modes characterize the facial expressions. According to discriminant analyses, these patterns yield high percentages of correct classifications, comparable to those yielded with emotion labels ratings. Action readiness patterns even allow, for the African group, better classifications of the facial expressions than do the emotion labeling. Finally, an ethnic bias seems to emerge. Compared to black faces, white faces are slightly better classified by French participants whereas black faces are somewhat better classified than are white ones by Burkinabe participants, except for anger expressions which profile of result differ from the other facial expressions.

Key words: action readiness, facial expressions of emotion, Burkina Faso/Africa, France/Europe, black and white faces

The question regarding in what ways emotion is the same or is different across cultures is essential for cross-cultural emotional understanding (Lofland, 1985). Current cognitive theories of emotion conceive this phenomenon as a particular set of psychological structures composed of different elements such as antecedents, appraisal, action readiness, etc. (e.g., componential approaches to emotions: Frijda, 1986a; Lang, 1995; Scherer, 2001). Cross-cultural similarities and differences for the main components of the emotion process have notably been extensively and thoroughly reviewed by Mesquita and Frijda (1992). Among others, one principal component of the emotion process is the emotional action readiness, that is readiness or unreadiness for establishing particular kinds of relationship with the environment (Frijda, 1986a). According to Frijda, action readiness is central to emotion since change in action readiness is the major aspect of the response to emotionally significant events. Results from studies in which subjects had to report on emotional states (Frijda, 1987; Frijda, Kuipers, & TerSchure, 1989) show that patterns of action readiness present distinct relations to the various emotion categories studied. It

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appears from these studies that emotions can be described and analyzed in terms of modes of action readiness.

Since only a few basic forms of subject-environment interaction exist, the modes of action readiness are hypothesized to be cross-culturally highly general or even universal (Frijda & Mesquita, 1994). Indeed, the kinds of possible relationships between an individual and his/her environment are limited, which means that the number of action readiness modes must be restricted and therefore very general or even universal. A cross-cultural study conducted by Frijda, Markam, Sato, and Wiers (1995) supports this assumption. They have shown that different sets of action readiness modes characterized the emotions investigated (more than 20) in the three cultural groups they have studied (Indonesia, Japan and Netherlands); those patterns of features having similar and meaningful values in all three groups. This structural similarity led them to conclude that the major forms of emotion are rooted in universal modes of action readiness (p. 24). The results of Wallbott and Scherer's (1988) 27-country study also indicate that patterns of action tendencies such as "moving toward" or "withdrawing" appear to be emotion-specific across cultural groups. Even though these preliminary studies have examined emotional experience through subjective reports and emotion concepts, the sparse existing evidence on observed behaviour suggests that the major forms of action readiness are probably universal (Frijda et al., 1995; Mesquita & Frijda, 1992). Hence, some particular movements are cross-culturally recognized as "emotional movements" (Rimé, Boulanger, Laubin, Richir, & Stoobants, 1985). Unfortunately, too little is known on how people from different cultures are inclined to act or not to act when they are feeling different emotions (Mesquita & Frijda, 1992) even if the rare works provide some striking examples (Bryson, 1991; Davitz, 1969; Le Breton, 1998).

More is known about how people from different cultures behave facially when they are emotionally aroused. During the last two or three decades, the issue of the universality of emotional facial expression has been addressed by several researchers. A large body of research has confirmed that people in many different cultures can reliably identify the emotional category displayed by static facial expressions (Ekman et al., 1987; Mandal, Bryden & Bulman-Fleming, 1996; Matsumoto et al., 2002, among others), even though some cross cultural studies failed to obtain high percentages of accurate recognition (for example, Huang, Tang, Helmeste, Shioiri, & Someya, 2001). The existence of cross-cultural differences in judging facial expressions of emotions has crucial implications in many fields, be it of communication (Planalp, 1999) or clinical examination (Gepner, Deruelle, & Grynfeltt, 2001), especially because the specific emotional behaviours of each culture can lead to misattributions from a foreign observer and generate detrimental consequences. Given that life around the world is becoming more and more cosmopolitan and communication is frontierless, it seems necessary to expand research on the recognition of facial expressions in a cross-cultural perspective.

In doing so, many researchers (Haidt & Keltner, 1999; Russell, Suzuki, & Ishida, 1993) recommend studying facial expressions of emotion using new methodologies since the main method used to study the universality of facial expressions of emotion has been vigorously criticized (Russell, 1994). Among his remarks, Russell has raised the possibility

that viewers might use another kind of information than an emotion category one to interpret facial expressions. It could be that people interpret facial displays in terms of social intents (Fridlund, 1994). Hence, Yik and Russell (1999) found no significant difference in the amount of agreement between social messages type of answer and emotional message ones of Canadian, Chinese and Japanese participants rating standard facial expressions of emotion. Likewise, Haidt and Keltner (1999) have obtained high levels of recognition for facial expressions displayed to American and Indian participants, whatever the type of response, a social situation type of answer or an emotion word one. Interestingly, the most easily recognized expressions differed according to the format of answer (social situation *vs* emotion word). With the emotion word type of answer, the anger expressions elicited the highest recognition rates followed by disgust and happiness expressions. Conversely, with a social situation type of answer, disgust expressions were the most easily recognized, followed by happiness and anger expressions. The order of better recognized emotions thus depends on the format of answer.

These lines of evidence suggest that the type of format of response can yield slightly different results, underpinning the necessity to use other methods than the basic one, especially in cross-cultural studies where, as stressed by Haidt and Keltner (1999), cultural differences in the degree to which facial expressions are interpreted emotionally could be masked by such a method (p. 229). Finally, the likelihood that observers can use another kind of information than an emotion category one to interpret facial expressions has also been shown when linking facial expressions to instrumental actions, e.g. action tendencies (Frijda & Tcherkassof, 1997; Tcherkassof, 1997). According to the social interaction, one is inclined to approach or to avoid others, to show hyper- or hypo-activation, to be interested or uninterested and so on (Planalp, 1999). The manner in which the individual at a particular moment relates (or does not relate) reflects on his/her face, that is, action readiness exerts subtle influences on facial behavior. In other words, facial expressions express states of action readiness, they represent the position taken: moving toward, moving away or moving against. They represent the activity or lack of activity in taking positions: highly or weakly active, or inactive (as in apathy or rest). They also represent how that activity is manifested: freely deployed or under restraint, inhibited (as in anxiety paralysis) or lacking in direction (as in nervousness). Thus, action readiness changes may be deduced by an observer since they are manifest in small signs of facial expressions (Frijda, 1986b). More specifically, it may even be that the nature of the information recognized by an onlooker consists of the expresser's readiness to relate with and respond to the environment, and the kind of relationship — accepting, rejecting ... — that he/she is ready to engage in.

Empirical data support this assumption (Tcherkassof, 1999). In this study, subjects had easily and meaningfully associated particular states of action readiness with particular expressions. They were presented with 28 prototypical facial expressions (from Matsumoto & Ekman's, 1988, slides), four for each of the seven emotion categories. They rated each expression on 34 action readiness items adapted from Frijda et al. (1989) questionnaire on a 3-point scale (not at all, somewhat, quite a lot). In a second round, subjects rated each slide on seven 3-point emotion items corresponding to Matsumoto and Ekman (1988)

emotion labels. A large majority agreed upon at least one of the action readiness items for each slide group. For all but *contempt* slides, at least one item was checked by over 90% of the subjects for the four slides in the group together. Moreover, predicted action readiness items for the different emotion categories were checked by 77% of the subjects or more. Indeed, a discriminant analysis (using all 34 items), with the emotion group label as the criterion, yielded nearly 75% correct assignments. Furthermore, when comparing the emotional ratings and action readiness ones, the results showed that the highest percentages did not differ much.

The data mentioned leads to the hypothesis that facial expressions are relational activities flowing from a state of readiness to maintain or change the relationship with the environment. In this sense, emotions and facial expressions are intrinsically linked since emotions are states of action readiness. As noted earlier, only a few kind of possible relationships between an individual and his/her environment exists which means that the major forms of action readiness can be considered basic, or even universal, forms of person-environment transaction. They form discrete categories. As emphasized by Frijda and Tcherkassof (1997), given that certain emotions paradigmatically embody these forms of action readiness, and that the corresponding states may paradigmatically be manifested in certain facial expressions, it makes sense to consider these emotions as basic emotions, and certain facial expressions to represent them. Only extensive cross-cultural research can give substance to this idea. Unfortunately, so far no research exists on this issue with such a perspective.

Our aim is to fill this gap and thus study the recognition of facial expression of emotion using other types of interpretation than the emotion labeling one. The theoretical framework adopted is that emotion is linked to action readiness (Frijda, 1986a; Frijda & Tcherkassof, 1997). We believe that the major forms of action readiness are probably universal, and that the major states of action readiness are paradigmatically exhibited in certain facial expressions. Thus, our main assumption is that facial expressions of emotion can be described in terms of action readiness modes whatever the culture. In order to investigate this hypothesis, we conducted a comparative study between an African and an European population. This choice was dictated by the fact that research on cross-cultural accuracy of emotion recognition has seldom examined African groups (for a review, see Elfenbein & Ambady, 2002), except for Zambians (Kilbride & Yarczower, 1983) and Ethiopians (Ducci, Arcuri, Georgis, & Sineshaw, 1982; Wolfgang & Cohen, 1988). Beyond the intrinsic interest of studying a given cultural group, it has been previously noted that Africans recognition performances are significantly less accurate than those of other cultural groups (Izard, 1971). Moreover, Kilbride and Yarczower (1983) reported an ethnic bias in the recognition of facial expressions in the sense of a greater uncertainty of judgment of Zambians when assigning emotional labels to American facial expressions and more uncertainty of judgment of American observers to Zambian expressions. These results are in line with the literature about the recognition of faces which suggests a differential recognition of face according to one's own ethnic group. Thus, white subjects have been found more accurate in recognizing white faces as compared to black faces, and black subjects more accurate at recognizing black faces than

white faces (Brigham & Williamson, 1979; Malpass & Kravitz, 1969). This existence of a bias in the direction of a better recognition of faces from one's own ethnic group (the exact grounds of this ethnic bias is still unknown) led us to make use of black and white faces. As a matter of fact, the assessment of ethnic bias requires that Africans and European participants judge the facial expressions of both white and black posers. To summarize, the purpose of this study is to examine how facial expressions are judged on 5-point modes of action readiness scales by observers of two cultures, African (Burkinabe) and European (French). Observers from the two cultural groups were asked to judge photographs of facial emotions expressed by both Black and Caucasian posers.

METHOD

Participants:

Ninety-six undergraduate students from the University of Grenoble, France (79 females, 17 males, mean age 23, *SD* 5.84), and an identical number from the University of Ouagadougou, Burkina Faso (22 females, 74 males, mean age 23,9, *SD* 2.18), volunteered as observers. The Burkinabe sample consisted of two groups, one group of 48 students (15 females, 33 males) interrogated in French and one group of 48 students (7 females, 41 males) interrogated in Mooré. The gender balance reflects socio-educational practices specific to each country.

Although French is the official language in Burkina Faso most people habitually use the traditional dialect, the Mooré dialect, especially when they are in family contexts. French is written and spoken only by people who have been provided with schooling. In order to make sure that facial expressions are judged equally whatever the language used, African participants were thus separated into two groups, according to the version of the questionnaire (French or Mooré). Observers had no familiarity with the specific facial expressions depicted in the photographs prior to experimental investigation.

Material:

In order to draw on standardized facial expressions, two sets of photographs depicting facial expressions of four emotions (joy, sadness, anger, fear) were selected. The white faces came from the JACFEE (Matsumoto & Ekman, 1988) set. The second set consisted of pictures of black faces, from the DANVA2-AAAF (Nowicki, Glanville, & Demertzis, 1998) set. Since the set of black faces displays only 4 emotions, the corresponding emotional expressions have been selected from the JACFEE set. Two photographs (one male, one female) depicting each emotion were selected from each set (2 photographs × 4 emotions × 2 sets = 16 stimuli) for administration. Subjects had to answer two questionnaires, one consisting of 35 modes of action readiness items and another of 4 emotion labels items (Appendix). The French version of the questionnaires was identical to the Tcherkassof's (1999) study. A Mooré version, using a back translation procedure, was elaborated for the purpose of the present investigation. The only problem encountered was the translation of the word "against" that does not exist in the Burkinabe lexical repertoire. Since no concept is equivalent in Mooré, a paraphrase was necessary to account for the meaning of the item.

Procedure:

The study was undertaken in two steps. In the first step, observers were shown 4 photographs of facial expressions displayed by two females and two males, with two black and two white faces. For each photograph, observers were required to make a judgment for each action readiness mode, on a 5-point scale (1 = not applicable, 5 = very much applicable). The second step was conducted to examine the categorical judgment of the emotion displayed on each facial expression. Observers were shown the same photographs one more time and were asked to rate each of them on a 5-point scale (1 = not applicable, 5 = very much applicable) for each of the 4 emotions (joy, sad, anger, fear). The merit of this experimental design is to mask the explicit emotional nature of the experiment. During the first part of the trial run (action readiness questionnaire), participants are not alerted to the experimenter's expectation that the facial expressions are to

be interpreted in emotional terms.

Each participant was shown facial expressions of three different emotions (out of joy, sadness, anger, fear). One emotion category was thus seen twice by each participant since each of them had to rate a total of 4 photographs. Once again, this procedure eludes a possible experimenter demand since it avoids the possibility that participants infer, by deduction, the emotion displayed by the faces. As a matter of fact, if 4 emotion displays are to be assessed on 4 emotion scales, subjects could implicitly assign each stimulus to an emotional category and treat them as somewhat mutually exclusive.

Pictures were shown one at a time. The order of presentation of photographs was fixed randomly before the experiment. One half of French observers had white faces first and black faces next; the rest half of French observers had African faces first followed by Caucasian ones. An identical procedure was followed in the administration of photographs for African observers. The order of presentation was also established so that stimuli would be seen in a different sequence by each participant.

Once the judgment task was completed, participants had to answer two questions to check if they were sensitive to the culture of the posers.

RESULTS

The gender unbalance was first controlled in order to verify that a sex difference does not account for the subsequent results. Four random sub-samples were set up for the French female and Burkinabe male samples. Multivariate analysis of variance were performed (SPSS MANOVA) on 41 French participants (24 females and 17 males) and 46 Burkinabe participants (22 females and 24 males). Four 2×2 between-subjects MANOVAs indicated that the combined DVs were significantly affected by country but not by the sex of participants, nor by their interaction (MANOVA #1: $F(39, 285) = 2.92$, $p < .001$; $F(39, 285) = 1.03$, *ns*; $F(39, 285) = 1.25$, *ns*, respectively. MANOVA #2: $F(39, 285) = 3.31$, $p < .001$; $F(39, 285) = 1.23$, *ns*; $F(39, 285) = 1.24$, *ns*, respectively. MANOVA #3: $F(39, 285) = 3.89$, $p < .001$; $F(39, 285) = 1.36$, *ns*; $F(39, 285) = 1.41$, *ns*, respectively. MANOVA #4: $F(39, 285) = 2.63$, $p < .001$; $F(39, 285) = 1.42$, *ns*; $F(39, 285) = 1.10$, *ns*, respectively).

In order to check whether the different facial emotional expressions are differently assessed in terms of modes of action readiness, four discriminant analyses were performed. Discriminant analysis enables to determine the dimensions (e.g., the different sets of action readiness modes) along which groups (e.g., facial expressions of emotion) differ (discriminant analysis is MANOVA turned around, Tabachnick & Fidell, 1989, p. 505). They were first carried out separately on the two cultural groups data (French and Burkinabe), with the individual scores on the action readiness items as predictors and the emotion groups labels as the categories to be predicted. Two supplementary discriminant analyses were then performed on the Burkinabe sample (cf. Table 1).

For the French sample, three discriminant functions were calculated, with a combined $\chi^2(105) = 1082.68$, $p < .001$. A classification procedure for this sample yielded 85.4% correctly classified facial expressions on the basis of action readiness patterns. More specifically, when examining each emotional category, the patterns of action readiness modes attributed to facial expressions of joy yielded 95.5% correct classifications of these expressions in the "joy" category, 87% correct classifications of the sad expressions in the "sad" category, 80.6% of the anger expressions in the "anger" category, and 78.9% of the

fear expressions in the "fear" category.

For the Burkina sample, three discriminant functions were calculated, with a combined $\chi^2(105) = 648.13$, $p < .001$. A classification procedure yielded 72% correctly classified facial expressions.

We then examined further the data from the Burkinabe sample, by distinguishing those participants who answered the Mooré questionnaires to those who answered the French questionnaires. For the Burkina sample who answered the Mooré questionnaires, three discriminant functions were calculated, with a combined $\chi^2(105) = 366.91$, $p < .001$. A classification procedure yielded 76.2% correctly classified facial expressions. For the Burkina sample who answered the French questionnaires, three discriminant functions were calculated, with a combined $\chi^2(105) = 363.74$, $p < .001$. A classification procedure yielded 81.5% correctly classified facial expressions.

For the French participants as well as for the Burkinabe, the discriminant analyses suggest that a probabilistic function relates the action readiness modes to the emotion categories. This implies that patterns of action readiness modes characterize the facial expressions of the four emotions. Besides, these patterns characterize the facial expressions differently since the percentages of correct classifications are high for all the emotion categories. The anger expressions yield the lowest percentage of correct classification for the Burkinabe sample, which means that the pattern of action readiness modes is less consensual, even though this percentage remains pretty fair (63.2%). When examining the pattern of responses of the Burkinabe sample according to the language used when answering, results show that, on average, the French version give way to a slightly better classification, but not significantly different (81,5% *vs* 76.2%; $\chi^2(1) = 1.12$, *ns*).

We then compared action readiness ratings to emotion labels ones. More specifically, our aim was to see if the agreement on action readiness assignments to facial expressions would be as high as on emotion attributions. We conducted four discriminant analysis, as previously, with the emotion labels items scores as predictors. For the French sample, three discriminant functions were calculated, with a combined $\chi^2(12) = 1401$, $p < .001$. A classification procedure for this sample yielded 88.3% correctly classified facial expressions on the basis of emotion labels attribution. For the Burkina sample, three discriminant functions were calculated, with a combined $\chi^2(12) = 671.44$, $p < .001$. A classification procedure for this sample yielded 68.2% correctly classified facial expressions on the basis of emotion labels attribution. For the Burkina sample who had the Mooré questionnaires, three discriminant functions were calculated, with a combined $\chi^2(12) = 300.21$, $p < .001$. A classification procedure for this sample yielded 67.2% correctly classified facial expressions on the basis of emotion labels attribution. For the Burkina sample who had the French questionnaires, three discriminant functions were calculated, with a combined $\chi^2(12) = 388.73$, $p < .001$. A classification procedure for this sample yielded 72.9% correctly classified facial expressions on the basis of emotion labels attribution.

On average, the percentages of correct classification of facial expressions on the basis of emotion labels are high (from 61.5% to 96.9%). The only exception is the one of anger which expressions yield only 53.1% of correct classification in the "anger" category. Nearly half of these expressions are misclassified, that is, are classified in the

Table 1. Percentages of Correct Classifications for the Two Cultures

			Joy	Sadness	Anger	Fear	Total
French sample		AR modes	95.5	87.0	80.6	78.9	85.4
		Emo.labels	96.9	83.3	87.5	85.4	88.3
Burkinabe sample		AR modes	90.0	67.0	63.2	67.0	72.0
		Emo.labels	93.8	61.5	53.1	64.6	68.2
Burkinabe sample	Mooré question.	AR modes	93.6	65.2	71.1	74.5	76.2
		Emo.labels	95.8	52.1	54.2	66.7	67.2
	French question.	AR modes	90.7	83.3	81.0	70.7	81.5
		Emo.labels	91.7	75.0	60.4	64.6	72.9

other emotional categories. When comparing the correct classifications of the facial expressions on the basis of action readiness modes and that of emotion labels, results show that the percentages are identical for the French group (85.4% *vs* 88.3 respectively; $\chi^2(1) = 1.09$, *ns*). As regard to the Burkinabe group, action readiness modes yield better percentages of correct classifications than do the emotion labels (72% *vs* 68.2%) respectively; $\chi^2(1) = 5.95$, $p < .05$). Besides, the comparison of correct classifications for the Burkinabe group, when comparing the Mooré and the French versions of the questionnaires (cf. low part of Table 1) shows that it is especially true for anger expressions. Angry faces are better predicted by the action readiness assessments than by the emotion labels ratings, be it for the Mooré version (71.1% *vs* 54.2% respectively; $\chi^2(1) = 4.46$, $p < .05$) or for the French version (81% *vs* 60.4%; $\chi^2(1) = 7.26$, $p < .05$).

Finally, we examined the correct classifications yielded for black and for white faces separately (Table 2). For the French sample who judged black faces, three discriminant functions were calculated, with a combined $\chi^2(105) = 549.27$, $p < .001$. A classification procedure for this sample yielded 86.1% correctly classified facial expressions on the basis of action readiness patterns. For the French sample who judged white faces, three discriminant functions were calculated, with a combined $\chi^2(105) = 642.05$, $p < .001$. A classification procedure for this sample yielded 90.2% correctly classified facial expressions on the basis of action readiness patterns. For the Burkina sample who judged black faces, three discriminant functions were calculated, with a combined $\chi^2(105) = 346.40$, $p < .001$. A classification procedure for this sample yielded 80% correctly classified facial expressions on the basis of action readiness patterns. For the Burkina sample who judged white faces, three discriminant functions were calculated, with a combined $\chi^2(105) = 383.07$, $p < .001$. A classification procedure for this sample yielded 77.6% correctly classified facial expressions on the basis of action readiness patterns. For the Burkina sample who answered the Mooré questionnaires and judged black faces, three discriminant functions were calculated, with a combined $\chi^2(105) = 239.11$, $p < .001$. A classification procedure for this sample yielded 90.1% correctly classified facial expressions on the basis of action readiness patterns. For the Burkina sample who answered the

Mooré questionnaires and judged white faces, three discriminant functions were calculated, with a combined $\chi^2(105) = 204.29$, $p < .001$. A classification procedure for this sample yielded 84% correctly classified facial expressions on the basis of action readiness patterns. For the Burkina sample who answered the French questionnaires and judged black faces, three discriminant functions were calculated, with a combined $\chi^2(105) = 214.98$, $p < .001$. A classification procedure for this sample yielded 92.4% correctly classified facial expressions on the basis of action readiness patterns. For the Burkina sample who answered the French questionnaires and judged white faces, three discriminant functions were calculated, with a combined $\chi^2(105) = 255.61$, $p < .001$. A classification procedure for this sample yielded 91% correctly classified facial expressions on the basis of action readiness patterns.

Discriminant analyses were then performed on the ratings in terms of emotion labels. For the French sample who judged black faces, three discriminant functions were calculated, with a combined $\chi^2(12) = 613.33$, $p < .001$. A classification procedure for this sample yielded 87.5% correctly classified facial expressions on the basis of emotion labels. For the French sample who judged white faces, three discriminant functions were calculated, with a combined $\chi^2(12) = 845.49$, $p < .001$. A classification procedure for this sample yielded 91.1% correctly classified facial expressions on the basis of emotion labels. For the Burkinabe sample who judged black faces, three discriminant functions were calculated, with a combined $\chi^2(12) = 286.24$, $p < .001$. A classification procedure for this sample yielded 68.2% correctly classified facial expressions on the basis of emotion labels. For the Burkinabe sample who judged white faces, three discriminant functions were calculated, with a combined $\chi^2(12) = 449.39$, $p < .001$. A classification procedure for this sample yielded 68.8% correctly classified facial expressions on the basis of emotion labels. For the Burkina sample who answered the Mooré questionnaires and judged black faces, three discriminant functions were calculated, with a combined $\chi^2(12) = 131.29$, $p < .001$. A classification procedure for this sample yielded 63.5% correctly classified facial expressions on the basis of emotion labeling. For the Burkina sample who answered the Mooré questionnaires and judged white faces, three discriminant functions were calculated, with a combined $\chi^2(12) = 202.3$, $p < .001$. A classification procedure for this sample yielded 70.8% correctly classified facial expressions on the basis of emotion labeling. For the Burkina sample who answered the French questionnaires and judged black faces, three discriminant functions were calculated, with a combined $\chi^2(12) = 171.78$, $p < .001$. A classification procedure for this sample yielded 75% correctly classified facial expressions on the basis of emotion labels. For the Burkina sample who answered the French questionnaires and judged white faces, three discriminant functions were calculated, with a combined $\chi^2(12) = 268.13$, $p < .001$. A classification procedure for this sample yielded 77.1% correctly classified facial expressions on the basis of emotion labeling.

When examining action readiness and emotion labels assessments, an ethnic bias seems to emerge. When assessed in terms of action readiness, white faces are as well classified than are black ones whatever the culture of participants, even if white faces are somewhat better classified by French participants than are black ones (90.2% *vs* 86.1%)

Table 2. Percentages of Correct Classifications According to the Color of Faces

				Joy	Sadness	Anger	Fear	Total
AR modes	French Sample		Black faces	93.5	88.6	80.9	81.4	86.1
			White faces	95.3	91.7	89.1	85.1	90.2
	Burkinabe Sample		Black faces	95.5	78.0	70.7	75.0	80.0
			White faces	89.1	72.3	76.1	72.7	77.6
	Burkinabe Sample	Mooré question.	Black faces	100	81.8	81.8	95.8	90.1
			White faces	100	62.5	91.3	82.6	84.0
		French question.	Black faces	100	94.7	89.5	85.0	92.4
			White faces	90.9	91.3	95.7	85.7	91.0
Emotion labels	French Sample		Black faces	100	83.3	83.3	83.3	87.5
			White faces	95.8	91.7	87.5	89.6	91.1
	Burkinabe Sample		Black faces	100	62.5	45.8	64.6	68.2
			White faces	91.7	47.9	58.3	77.1	68.8
	Burkinabe Sample	Mooré question.	Black faces	100	66.7	25.0	62.5	63.5
			White faces	91.7	54.2	58.3	79.2	70.8
		French question.	Black faces	100	75.0	58.3	66.7	75.0
			White faces	91.7	70.8	62.5	83.3	77.1

whereas black faces are somewhat better classified by Burkinabe participants than are white ones (80% *vs* 77.6%). Regarding emotion labels assessments, the correct classification small advantage of white faces for the French group remains. The slight advantage for the Burkinabe group towards black faces disappears (68.2% *vs* 68.8%). Besides, when considering the language version of the questionnaires, the pattern of correct predictions becomes different. Thus, only 25% of the expressions of anger have been correctly classified (that is in the "anger" category) when expressed by black posers (against 58.3% when expressed by white faces, $\chi^2(1) = 7.28$, $p < .05$) when assessed in Mooré. More specifically, the number of correct classifications of facial expressions of anger regarding emotion labels attribution is lower than the one of wrong classifications. The correct classifications are divided up as follows: 16.7% for the "joy" category, 50% for the "sad" category, and 8.3% for the "fear" category. Thus, the Burkinabe participants have assessed angry black faces as expressing more sadness than anger ($t(23) = 11.71$, $p < .001$). Interestingly, it can be noticed that facial expressions of anger expressed by black faces when assessed in terms of action readiness modes in Mooré, to the opposite, yield a high percentage of correct classification in the "anger" category (81,8%). Must it be repeated that the comparison of correct classifications for the Burkinabe group regarding anger faces is always in favor of action readiness modes assessment as compared to emotion labels ratings, whatever the language used (see above).

DISCUSSION

Our main hypothesis is that emotional action readiness and facial expressions are linked and that, since the major forms of action readiness are probably universal, this implies that facial expressions can be described in terms of action readiness modes by members of different cultures. We can conclude from the data that observers from the two countries infer readiness for specific actions from standard facial expressions with as much agreement, or even more, as they infer emotion labels. On average, the correct classifications of the facial expressions on the basis of action readiness modes and that of emotion labels are identical for the French group. However, for Burkinabe participants, action readiness modes even yielded significantly better percentages of correct classifications than did the emotion labels. This is especially true for anger. When examining the Burkinabe sample according to the language in which participants answered, perceptible differences in correct classifications come out for these expressions. When assessed in Mooré, action readiness modes characterize much better anger expressions than do the emotion labels (only half of these expressions are correctly classified on average when emotion labels ratings are used as predictors, whereas more than 70% of them are with action readiness ratings). When assessed in French, this difference persists for anger expressions: only 60.4% of these expressions are correctly classified when rated with emotion words against 81% of correctly classified expressions when interpreted in terms of action readiness. As a result, our findings confirm our predictions that facial expressions can be convincingly described in terms of action readiness both by Africans (Burkinabe) and Europeans (French). Nevertheless, further research is needed to explore deeper the language effect that came out. On the whole, the data provide us with different patterns of modes of action readiness that characterize cross-culturally the four emotional groups of the facial expressions studied (joy, sadness, anger and fear expressions). These patterns yield high percentages of correct classifications of the facial expressions in the corresponding categories of emotion. Thus, those patterns of action readiness dimensions seem to have meaningful values in the two cultural groups.

Nevertheless, the present study also found that facial expressions of emotion were sometimes "read" slightly differently by the two groups. Indeed, observers from the two cultures did not always agree with one another on the patterns of action readiness modes they attributed to faces. This is particularly the case for facial expressions of anger, and for sad and fear expressions to a lesser extent (anger expressions always yield a different profile of results as compared to the other expressions). When analyzing the Burkinabe data, especially when action readiness modes are assessed in Mooré and given out to black faces stimuli, some of the action readiness modes assigned to facial expressions of anger are quite different to those usually assigned (Tcherkassof and de Suremain, in preparation, for more details). For example, Burkinabe have considered facial expressions of sadness to reflect a state of "boiling inwardly" while this state of action readiness is habitually taken to characterize anger expressions. They also attributed states of "apathy", "inhibition", and "rest" to facial expressions of anger. Interestingly, the ratings to these

states decrease when these expressions are displayed by white posers. Thus it appears that, for Burkinabe, anger expressions manifest a shutting off state of action readiness whereas usually, sad — but not anger — expressions are considered as reflecting such a state. This finding can be linked to the fact that, when assessing expressions displayed by black posers, Burkinabe participants, on the whole, have rated facial expressions of anger as displaying more sadness than anger (only 25% of anger expressions are classified in the "anger" category). This pattern of confusion does not appear when faces are assessed in terms of action readiness. This phenomenon resembles the one of reapparaisal described by Mesquita and Frijda (1992) which corresponds to the fact of emphasizing an emotional feature (of the situation, of the reaction, etc.) and neglecting another, in order to the feature to be more acceptable to the individual. Reappraisal of anger has been especially observed in collectivistic cultures. Yet, as mentioned in the procedure paragraph, a difficulty had appeared for translating the concept "against" that does not exist in the Burkinabe culture. In Mooré, when one is somewhat "against", one in reality is "with". Thus, the Burkinabe culture do not conceptualize the fact of "going against an obstacle" for example, which is but even so a prototypical action tendency for Western people when characterizing antagonistic behaviors (as in anger). Nevertheless, these results are in line with previous research showing that specific modes of behavior may have different relational significance in different cultures (Frijda et al., 1995). Indeed, a given behavior can have cross-culturally similar relational aims even if the specific modes of behavior that implement these aims differ. Therefore, as stressed by Frijda et al. (1995), the meaning of these behaviors may, consequently, differ. As a matter of fact, the culturally specific meanings of particular behavioral patterns has already been acknowledged (Le Breton, 1998; Mesquita, 2001). Further analyses are currently performed in order to see how patterns of action readiness modes vary more specifically according to the cultural groups for each emotional facial expression.

Even if the present study did not aim at a competition between action readiness and emotion words interpretations, our findings challenge the widespread idea that the meaning of facial expression is best incarnate by emotion categories and that emotion labels best characterize the message of the expression. On the whole, as outlined previously, our observers agreed as much on action readiness modes reflected by the facial expressions as they did on emotion labels. Furthermore, for Burkinabe participants, action readiness modes even yielded better percentages of correct classifications than did the emotion labels. Our results support Yik and Russell's (1999) affirmation that "the cross-cultural studies purportedly showing high levels of agreement in interpreting faces in terms of emotion cannot be taken to single emotion out as special, because similar levels of agreement can be achieved on other — but related — types of messages" (p. 103). This remark seems specifically relevant for the African group we studied. Indeed, Mooré, the Burkinabe dialect, is primarily a contextual kind of language. When translators were working on the Mooré version of the questionnaires, they were constantly imagining a specific context linked to the items to be translated, be it an action readiness mode or an emotion label ("when one wants to keep someone at a distance when walking through the market place, one says ...; when one wants to protect a child from something, one says ...).

The concepts always seemed deduced from a specific context. Hence, this must have repercussions on how a Burkinabe judges a static facial expression. In this perspective, viewing expressions as forms of relational activity highlights this process. Without a doubt, facial expressions, in natural contexts, appear as object-related behaviours, that is with a relational sense. Since the action readiness items point to this relational meaning, it is not so surprising that they yield better classification for the Burkinabe participants than do emotion labels which are a-contextual.

The present study is a preliminary one, with some obvious limitations. First of all, the sample of 16 faces and four emotions employed in the present study is very small. It cannot be considered as representative of the wide variety of facial expressions, especially the culturally specific emotional expressions (such as those voluntary produced among others). Besides, the stimuli displayed persons acting different emotions. The problem of studying facial expressions using static and posed stimuli raises questions about the ecological validity and the generalizability of the results to real interpersonal emotional communication (Russell, 1994); more research is needed on the spontaneous interpretation of spontaneous facial expressions in everyday interactions (Tcherkassof, Bollon, Dubois, Pansu, & Adam, 2004), and cross-culturally. Secondly, the present investigation adopted a semantic attribution method which is not the best method to study the process of face recognition. As a matter of fact, it is not so sure that in real interpersonal settings people do attribute emotions to other persons whenever such others show facial expressions. One can doubt that "attribution of" is the best way to characterize the recognition process. As noted by Frijda and Tcherkassof (1997), facial expressions possess a meaning that is *perceived* by observers. This perception process is probably not accounted for when studied by approaches using an attribution method, because attributing means adding a signification. We assume that the information processed, the information "picked up" in facial expression by an observer before it is interpreted or before attribution is made, is a relational activity information. The question is how one can study this perception process of the relational activity, knowing that an attribution method is inappropriate. According to Wierzbicka (1999), a structural analysis of the iconic basis of expressions would be a better method for analyzing the facial meanings. In our sense, a trail of research would be to articulate a semantic analysis type of approach with an action readiness one. Finally, the faces used as stimuli do not originate from the specific cultural groups studied, especially the African ones. One cannot rule out that it can be an important source of the differences in the judgment ratings. Indeed, an ethnic bias seemed to emerge. White faces (all emotional expressions) are better classified than are black ones by French participants. To the opposite, except for anger expressions, black faces are better classified than are white ones by Burkinabe participants. It could be that these differences be lessened or even disappear if each ethnic group had displayed its own facial expressions. In the present study, we preferred to use a standardized material in order to collect robust evidences.

However, further research will need to use more suitable material, in particular for cross-cultural investigation because, as stressed by Vinsonneau (1997), one must be careful when exporting western investigation techniques in non Western cultures, especially when interpreting results. Procedures used in the present study must thus be

considered as the first, not the last step.

This study provides the first cross-cultural evidence that facial expressions of emotions are best viewed as relational activities since they can be meaningfully described and analyzed in terms of action readiness modes. The innovative findings raise interesting questions concerning the nature of the interpretation process, with implications for future research, especially regarding various lines of inquiry, substantially different from the usual judgments tasks, that could be used.

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Appendix

Action readiness and emotion labels equivalence in FRENCH, MOORÉ and ENGLISH

Action readiness in FRENCH: A votre avis, la personne photographiée a tendance à ...

1. aller vers quelqu'un, s'en approcher.
2. être avec quelqu'un, rester à côté de quelqu'un.
3. se protéger de quelqu'un ou de quelque chose.
4. éviter quelqu'un ou quelque chose, rester à l'écart.
5. prêter attention à quelqu'un ou quelque chose.
6. garder quelqu'un ou quelque chose à distance.
7. rejeter quelqu'un ou quelque chose, avoir un mouvement de recul.
8. se désintéresser de ce qui se passe, ne pas se sentir impliquée par ce qui se passe.
9. ne pas vouloir que quelque chose soit comme elle est, vouloir que ça n'existe pas.
10. bouillir intérieurement.
11. aller contre quelque chose ou contre quelqu'un, s'opposer à quelqu'un ou à quelque chose.
12. réagir contre quelqu'un ou quelque chose, vouloir conquérir un obstacle.
13. interrompre ce qu'elle faisait ou être interrompue dans ce qu'elle faisait.
14. fusionner avec quelqu'un ou quelque chose.
15. être préoccupée, ne pas pouvoir se concentrer.
16. dominer la situation.
17. aider quelqu'un, prendre soin de quelqu'un.
18. vouloir disparaître de la vue des autres, ne pas vouloir être remarquée.
19. être inhibée, freinée, ralentie dans sa réaction, son activité.
20. se soumettre à quelqu'un, céder aux désirs de quelqu'un.
21. être apathique, ne s'intéresser à rien, ne rien vouloir faire.
22. abandonner, baisser les bras.
23. se renfermer, se couper de l'extérieur.
24. être impuissante, sans recours.
25. pleurer ou vouloir pleurer.
26. être excitée, être incapable de rester tranquille.
27. être exubérante.
28. rire ou vouloir rire.
29. être au repos, détendue, tranquille.
30. être crispée, contractée.
31. faire un effort.
32. être réceptive, ouverte à ce qui se passe.
33. incorporer, s'approprier quelque chose ou quelqu'un.
34. être tendue, tenir ferme contre quelque chose.
35. être immobile.

Action readiness in MOORÉ: San ya ne yamb tagesgo, ned ninga sen be foto wa zuga maanda boen?

1. N keng neda sera, n koolga.
2. Zinda ne neda, n pa ned seegen.
3. N kolg-y meng ne ned, wala ne bumbu.
4. N gil ned wala bumb, n pa keenga.
5. N yok-y-tags-n-kelg ned, mana guusg ne neda bi ne bumbu.
6. N kit ti ned ra koolga-y yé.
7. N lak-y meng ne neda bi ne bumbu.
8. N pa tuulg ti yaa wa-y tog be yel minga sen da maanda pugè.
9. N da tulg ti bumbu yi wa bumba rag n beeme ye, n tulg ta ra zind ye.
10. Gugl ma-y suraa puugè.
11. Kiissa buumb bi neda, n tondg ned bi bumbu.
12. Leoka bumba to ned be bumbu, n tuulgè n tong yeele.
13. A yalsa sen da manda, ma eb yalsa sen da manda.
14. Naaga meg ne ned bi bumbu.
15. Yaneb zugo toumda me, ti pa tak vuigo, n pa tongue ne yonkii mega.
16. Soga yella taore.
17. Songa neda, n gès ned yellé.

18. Solgem menga, ka rat ti ned yanf ye.
19. *Yanlse, guina maagame ti ka le toen leok ma tum ye.*
20. Sulga y meng ned taoré, ntuned raabo.
21. Pa sii, n pa gomd baa fi yellé, n pa raté man fi.
22. Bassa me, n bas raodo.
23. Pa-y ye, n pa gomd yig yel yé.
24. N pa Tong bumb yé, n ka tar songr yé.
25. N yanb bi y rat n yanbame.
26. Yi firfiri, n pa toon n pa si yé.
27. N wilga-y menga.
28. Laame bin tulgè laame.
29. Vuusame sii sindug pugè.
30. N mobg-y menga.
31. N wisga-y menga.
32. Sakda n bas yadr ne bumb ning sen manda faa.
33. N sog bumb bi neda
34. N tal kéké n bumbu.
35. Pa zi yeega.

Action readiness in ENGLISH:

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1. to approach, to make contact.
2. to be or stay close, to be receptive to someone.
3. to protect oneself from someone or something.
4. to have nothing to do with something or someone, to be bothered by it as little as possible, to stay away.
5. to observe well, to understand or pay attention.
6. to keep something out of the way, to keep it at distance.
7. to have anything to do with someons or something.
8. one is not involved by things going on; do not pay attention.
9. to want something not to be so, not to exist.
10. to boil inside.
11. to oppose, to assault ; hurt or insult.
12. to go against an obstacle or difficulty, or to conquer it.
13. to interrupt what one was doing or was interrupted.
14. to become one with someone or something.
15. to not concentrate or order the thoughts.
16. to stand above the situation ; to feel in command ; to hold the ropes.
17. to help someone, to take care of someone.
18. to sink into the ground, to disappear from the Earth, not to be noticed by anywone.
19. to feel inhibited, paralyzed, or frozen.
20. Not want to oppose, or want to yield to someone else's wishes.
21. Feel like doing anything ; to be interested by nothing, to be apathetic.
22. to quit, to give up.
23. to shut oneself off from the surrounding.
24. to do something, but not knowing what ; to be helpless.
25. to cry, to want to cry.
26. to be excited, restless, to can not sit still.
27. to want to move, to be exuberant sing, jump, undertake things.
28. to laugh, to have to laugh, want to laugh.
29. to feel at rest, to think everything is o.k, feel no need to do anything.
30. to be tensely contracted.
31. to do an effort.
32. to be opened, receptive to what happens.être réceptif, ouvert à ce qui se passe.
33. to embody to incorporate.
34. to be tensed, to remain steadfast.
35. to be still, to be immobile.

Emotion labels in FRENCH:

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1. de la joie.

2. de la tristesse.
3. de la colère.
4. de la peur.

Emotion labels in MOORÉ:

1. Sounongho.
2. Sounsangha.
3. Soutoogho.
4. Rabeem.

Emotion labels in ENGLISH:

1. Joy
2. Sadness
3. Anger
4. Fear