Hellenic Journal of Psychology, Vol. 5 (2008), pp. 117-146

PERCEPTION OF EMOTIONAL EXPRESSION IN LINE-DRAWINGS CREATED BY ARTISTS

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Abstract: This article reports on a research project that focuses on intra-cultural and inter-cultural (Greek-Canadian) variation of the perceptual experience of artistic, non-representational line-drawings depicting the subjective experience of the emotions of *joy* and *fear*, as compared to the relevant emotion schemas stated in words. The main purpose of the study was to explore how far Greek artists and spectators are in accord as to the referential and expressive properties of line-drawings, and how emotional, perceptual and conceptual structures are related in the dynamic person-object relationship in drawings perception. Two experiments were carried out to gain insight into the complexities of self-aesthetic object interaction involving the perceptual experience, which is the basis of artistic communication, and emotional concepts that bear cultural diversity. Analysis of the results revealed a shared "embodied" frame of reference cross-culturally especially for the negative emotion of fear.

Key words: Artistic communication, Embodiment, Emotional expression perception.

Expressive perception and pictorial meaning

Perception and emotion are closely linked in art (Arnheim, 1974). What is expressed in art is likely to remind the viewer of situations or experiences with particular moods or emotions (Kreitler & Kreitler, 1972; Takahashi, 1995). Closely related to this is an equal tendency to regard works of art as essentially expressive of or embodying or communicating emotions

Acknowledgement: The first part of this research (Experiment 1) was supported by the Greek Scholarship Foundation, Award for Post-Doctoral Research; the second part (Experiment 2) by the International Council for Canadian Studies Award for research. I would also like to thank Prof. Keith Oatley for his hospitality at OISE (Toronto, Canada) and his support in the data collection.
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(Langer, 1953). Yet, cultural context inevitably influences artists' choices of subject, their mode of representation, the range of symbols, allegory or allusion within the picture, and the spectator's interpretative acts (Goodman, 1976).

According to Takahashi (1995), art involves a sharing in experiences that is not initially one's own; such sharing will be to some degree sympathetic, based on a process of sympathetic identification. In sympathetic identification there is no linear association between expressive perception and emotion experience, nor between expressive perception and production. Contrary to this viewpoint stand the theories that maintain a strong view of universality in emotion recognition (Takahashi, 1995; for a review see Feldman-Barrett, 2006; Russell, Bachorowski, & Fernandez-Dols, 2003). Instead, in sympathetic identification there is a *congruence* of feeling, rather than an *identity* of feeling, between the sender (the reacting person) and the receiver (the person to whom he or she is reacting), and the feeling may be congruently positive (sympathetic enjoyment) or congruently negative (sympathy or compassion). For Takahashi (1995), the congruence of feelings may play a key role in artistic communication. However, whether congruence of feeling is in fact reached between painters and spectators, is still an open issue and one with which the present study is concerned.

Expressive perception refers to one's capacity to see a painting as expressing, say, melancholy, joy, or other subtle feelings that are inexpressible in words (Arnheim, 1974; Goodman, 1976; Wollheim, 1987). More specifically, expressive perception in arts, although rooted to the more general nature of perception, constitutes a distinctive kind of pictorial meaning making; a picture may denote or represent some kind of information or may be capable of expressing a mood or an emotional state (Arnheim, 1974; Takahashi, 1995). Accordingly, one can describe art objects as being symbols (Goodman, 1976). A picture is defined as an object whose identity is given by a spatial layout of figures-objects and dynamic features (configurational aspects and dynamic structural elements). Thus, it has been argued that symbols such as pictures convey meaning in themselves, and pictures have often been contrasted with words and sentences (e.g., Langer, 1953; Takahashi, 1995).

The nature of the contrast, however, has not always been made clear. The dichotomy between verbal and non-verbal cues of expression is possibly similar to that between depictive and propositional representations. It has been argued that other symbols such as words or music achieve their

full potency only when they have been organised into a symbol system, that is, a collection of symbols that have through cultural practice come to be used in an organized or systematic way –see also arguments on depictive representation vs. propositional representations (Kirby & Kosslyn, 1992). Depictive representation –unlike the propositional that allows for any number of symbols or classes of symbols to be combined according to a set of specific rules– uses "juxtapositions" that are combined into spatio-temporal dynamic structures in a "presentational" rather than representational form (Langer, 1953). Research on pictorial perception (Takahashi, 1995) argues that whereas the semantics of propositional representation depend solely on the interpretation of its symbols, a depictive representation conveys a meaning by visual resemblance. Goodman (1976), however, points out that a symbol of a given kind (pictorial, musical, verbal, etc.) expresses only those metaphorical properties that it refers to via exemplification, as a symbol of that kind. In this sense, expression in art, since limited to what is possessed and moreover to what is acquired second-hand, is doubly constrained as compared to denotation by selective association and by habits that differ widely with time, place, person, and culture.

This distinction between the implicit perceptual structure of depictions, such as pictures, and the explicit transportable conception of propositions or words parallels the distinction between perceptual and conceptual categories (e.g., Gelman, 1990). Studies in human subjects indicate that non-verbal expressive perception requires at least some configural processing which is holistic rather than feature-based (Tanaka & Farah, 1993). In addition, perceptual expressions in the social world are generally subtle, embedded in particular contexts, spontaneous, dynamic and fleeting, existing in combinations with other expressions, words and behaviours. As such it may be also the case that certain facial or body or dynamic expressions may be treated as symbols (emblems) for specific emotions for our westernized taste, just as a red heart stands for love (Russell et al., 2003). Moreover, the emotion perception literature suggests that people often automatically and effortlessly 'see' anger, sadness or fear on the faces, voices and other expressive cues of other people, and are able to assign expressive stimuli to these categories more consistently than would be expected by chance (Feldman-Barrett, 2006). However, Russell et al. (2003) argued that it may not be sufficient to treat emotion expression and emotion perception as equivalent since it is not clear whether the receiver's and sender's intention coincide. Thus, a more descriptive approach to how these two processes work is needed, especially when focusing

on expressivity in the arts and on the possible distinctiveness of pictorial meaning as compared to the verbally conveyed.

Another viewpoint arguing for the distinctiveness of art meaning claims that in creative reorganisation two kinds of processes are involved: one is the dedifferentiation of existing schematised behaviour patterns that is constrained by socially acceptable ways of thinking; the other is activation of primary processes at a pre-attentive level from which undifferentiated forms of perception and affect emerge (Glicksohn & Yafe, 1999; Takahashi, 1995; Werner, 1954). Werner (1954) focuses on a class of phenomena dealing with symbol formation and argues that the development of symbolization is grounded in the expressive/ physiognomic perception whose characteristics are its pervasive dynamics, the relative fusion or lack of differentiation of self and world, the total organism involvement (body-affective matrix), and the embeddedness of the perceived object in an atmospheric context of feeling and action (Glicksohn & Yafe, 1999).

There is some research evidence for consistency in how people relate line drawings and verbally define dimensions, or both, to connotative meanings or feeling tones (Osgood, 1959; Takahashi, 1995). The semantic deferential technique[1] is used in such studies showing that three bipolar affective dimensions appear to underlie the meaning processes. These are (a) pleasure, (b) potency-dominance, and (c) activity-arousal –see also recent relevant evidence in Russell et al. (2003) as related to the circumplex model of affect. Pleasure and activity-arousal have also appeared as universal dimensions of aesthetic judgements (Berlyne, 1974). Marks (1983) pointed out that because a peculiar representative property of a picture is the metaphorical expression of meaning or mood/emotional state, the sensory-perceptual and motor-affective processes, as well as the verbal processes, enter into a dialogue, the outcome of which is a set of categories of human experience. It has also been argued that the perception of dynamic aspects in pictures may result in a harmony between perception and action becoming a source of affectivity and experiential functioning (Stamatopoulou, 2004) which may play a crucial role in generating the aesthetic experience in pictorial perception (Avital & Cuipchik, 1998; Takahashi, 1995), and thus contributing to artistic communication.

1. Although there might be some concerns related to the fact that semantic differentials depend on the words rated, and thus on issues related to translation and language problems in representing the exact concepts, there is now evidence suggesting that the same dimensions emerge with other methods (e.g., similarity ratings) as well as across languages (Russell, 1994).

Thus, one 'candidate' for the process underlying the communicability of pictures may be the verbal-synesthetic relationship (Osgood, 1959; see also congruity theory[2]). Another could be the physiognomic apprehension, that is, the physiognomization of the referent[3] in the body-affective matrix when someone is engaged in the perceptual act (Werner & Kaplan, 1963). This process points to the primordial formative steps of symbolization (where in the symbolizer, the symbolic vehicle-symbol, the action and its referent are bound to the body-affective matrix). In addition, recent views of embodied cognition posit that emotion perception and emotion experience are inextricably linked and are subserved by the same processes (Niedenthal, Barsalou, Winkielman, Krauth-Gruber, & Ric, 2005).

Artistic communication, emotions, and culture

The study of emotions has a special fascination and a deep, inevitable, relation to arts: emotional experiences, like aesthetic experiences, are at the same time bodily responses and expression of judgements, i.e., somatic and cognitive (Tan, 2000). Works of art evoke kinaesthetic imitation followed by emotional experience and cognitive elaboration, and it is this dynamic merging that gives the multilayered nature of meaning to an aesthetic experience (Avital & Cupchik, 1998; Kreitler & Kreitler, 1972; Stamatopoulou, 2004). Kreitler and Kreitler (1972) argued that in art the emotional involvement is generated through empathy, which is characterised as a "feeling into". These authors assume that there are two types of involvement that give rise to empathy responses in art. The first involves representation, when a spectator might dredge up memories of previous emotional experience. The other is best understood as a tendency to imitate kinaesthetically the movements of others, which in turn leads the imitator to enjoy a similar emotional experience to that of the person imitated (Kreitler & Kreitler, 1972). The latter suggestion is in line with the simulation hypothesis which posits that the production of emotional non-verbal (facial) expressions and other somatovisceral responses are related to changes in

2. According to Osgood (1952) "words represent things because they produce some replica (not mere association) of the actual behaviour toward these things, as a mediation process". This "representational mediated process" occurs on a more complex level than sensation or perception. It mirrors not what the word is, nor what we think it should be, but what it signifies.

3. This aspect of communicability for Werner and Kaplan (1963) is more pronounced through certain kinds of material such as line-drawings which demonstrate and communicate in a tangibly intersubjective way the motor-affective and perceptual dynamic properties of the referent.

emotional experience. Such a mechanism, although it may still require triggering of conceptual knowledge, would simulate in the observer the state of the person visually perceived, by evoking the motor representations suited to performing the same action (e.g., Adolphs, 2002; Gallese, 2005).

Emotional experiences (that is, the phenomenal or embodied aspects of an emotional state) are composed of multiple interdependent structural processes (Frijda & Mesquita, 1998) in mutual regulation over time and in continuous coordination with the environment, as coordinated embedded feedback from all classes of processes and systems, accompanied with a "feeling tone" (Kagan, 1978). As such, emotional experiences being context-specific self-organize into a series of more or less stable patterns that yield a large number of minor variations (Camras, 2000). In this sense, emotions allow navigation in a vast network of relationships (including the dynamic relationship between person and object in aesthetic experience) forming ways of experiencing communion and estrangement (Fogel & Thelen, 1987). Thus, emotional communication (verbal or non-verbal) should involve a coordinated, however not invariant, process of pattern formation in terms of perception as well as expression production (Frijda & Mesquita, 1998; see also Camras, 2000; Feldman-Barrett, 2006).

In fact, psychologists have long debated whether emotions are universal versus whether they vary by culture (for an extended discussion on the universality and cultural specificity of emotion recognition and expression see Elfenbein & Ambady, 2002). For example, Matsumoto, Kastri, and Kooken (1999) argued that the process of learning to control emotions, both their expression and perception, is highly dependant on cultural factors (for a critical review see Russell, 1994). Besides that, variability in emotional experience may also be attributed to language and in-group advantages attributed to in-group familiarity as compared to outsiders (Elfenbein & Ambady, 2002). In this sense, the meanings and uses of emotion words and the structures of emotional experiences are products of locally created interpretative systems (Oatley, 1992; Shweder & Haidt, 2000). As a consequence, there is a rich literature on cross-cultural emotion recognition and expression that raises further fundamental questions for emotional communication in art–that is, whether any feeling coordination would be established between painters and spectators intra-culturally or (with even more difficulty) cross-culturally.

Much of the evidence considered in the debate about the universality of emotion recognition, intra-culturally and cross-culturally, is based on the

emotion recognition in still photographs of facial expression (e.g., Ekman 1971). However, emotions are often conveyed via multiple channels of non-verbal communication (de Gelder, Pourtois, & Weiskrantz, 2002). Yet, little is known in relation to bodily expressions or gestures that convey emotional information and the underlying processes that sustain bodily communication of emotion in the service of adaptive action or social or art communication (de Gelder, Snyder, Greve, Gerald, & Hadjikhani, 2004; Dittrich, Troscianko, Lea, & Morgan, 1996). Fortunately, there has been challenging, although relatively sparse in comparison, research examining emotion recognition from channels other than still facial photographs, including dynamic, expressive channels of communication (Edwards, 1998; Wehrle, Kaiser, Schmidt, & Scherer, 2000). For example, the cross-cultural comparison of vocal expressions has been studied by Scherer and Zentner (2001). There is also research concentrating specifically on the recognition of emotion from stylized dance movements –coming from point-light displays (Ditrich et al., 1996) or live displays performed by dancers (de Gelder et al., 2004). This type of research introduces the role of velocity (kinematics: space and speed) or expressive stylistic elements in the perceived-experienced affect (Paterson, Pollick, & Sanford, 2001).

Another source for understanding emotional expressions in humans is coming from research focusing on the dimensions of the psychological space of experienced or perceived affect (e.g., Feldman, 1995). However, there is little consistent evidence for a sort of categorical organization in subjective emotion experience (for a discussion see Feldman-Barrett, 2006). The evidence suggests that a simple linear ordering is not sufficient to depict the similarities and differences in the reports of subjective experiences. The circumplex model of emotions (Russell, 1994) holds that emotional experiences can be decomposed into broad primitive affective dimensions such as pleasure-displeasure and activation that form not discrete categories but a continuum. Additionally, psychological properties may be fundamental to emotion perception and, therefore, relevant for anchoring the affective circumplex. Such properties are dominance (Russell et al., 2003; see also Osgood, 1959), interpersonal relation (Mesquita & Markus, 2004), and desirability (e.g., Barrett, 1996; see also Berlyne, 1974). Although these models were established to capture one's own experience (perceptual) of affect, there is recent evidence suggesting that experience-action, emotion and perception interact when observing another person's actions (Decety & Grezes, 1999; Rizzolati, Fadiga, Gallece, & Foggassi, 1996).

As regards affect in art, research in music suggests that musical sounds may inherently trigger emotional meanings or represent emotional states (Krumhansl, 2002; Scherer & Zentner, 2001). Furthermore, analysis of music and dance suggests that temporal organization operates both in music and dance, as well as in tempo, melodic and choreographic gestures revealing the high degree of symmetry and regularity between these two art forms. Such analysis indicates, on the whole, that both music and dance share a non-accidental relationship and can express similar emotional qualities (Krumhansl, 2002). Cross-cultural studies suggest the idea that music draws on the common psychological principles of expectation, but that musical cultures shape these principles in unique ways (Krumhansl et al., 2000).

However, little is known about expressive hand-drawn line-drawings, gestural articulatory patterns (de Gelder et al., 2004), or dynamic structural pictorial elements in visual art as possible candidates for understanding communication and cultural variability of emotion and more specifically communication in the arts. Besides that, expressive, non-semantically laden, hand-drawings, conveying or embodying information about perceived velocity (kinematics) and force dynamics (Paterson et al., 2001) may provide a possible exploratory research tool for studying human emotion communication.

Our theoretical stand

Our approach is highly inspired by Takahashi's (1995) research on pictorial perception, although Takahashi does not relate in particular his work to the emotional expression perception and does not focus on inter- or intra-cultural variation between words and drawings as representations of emotional states. Following the literature in the psychology of art, it could be hypothesized that art expression and pictorial perception, unlike language, are primary symbolic activities through which concepts, particularly emotional ones and inexplicable in words, can be communicated. However, this is not an argument with which the psychology of emotion would agree, as in-group and cross-cultural variation in the perception of emotional expression is found. As a consequence, despite the hypothesis on the communication of artistic meanings through emotional experience, some variation is expected for both inter- and intra-cultural groups. From this point of view, our research is highly explorative in nature.

Following this line of thought, the present study was designed to elucidate artistic communication as related to emotion expression and expression perception intra-culturally, across artists and non-artists, and cross-culturally. In particular, the aim of the study was to explore the role of visual (expressive) perception in obtaining and communicating various forms of emotional meaning when non-representational drawings created by artists are involved. This implies that we focus on hand-drawn dynamic linedrawings, made by art students so as to embody their experience of particular emotions and to transform any "imagined-experiential" cues into the language of line. Specifically, "what it is like to feel a particular emotion" in a recalled or imagined emotional experience as it unfolds.

Thus, the starting point of our research was the identification of the actual meanings assigned to various drawing elements in an artistic production and in a perception task (Experiment 1). Accordingly, the aim of the study was to determine (a) how far Greek painters and spectators from Greece and Canada are in accord as to the referential and expressive properties of line-drawings; and (b) how perceptual, emotional and conceptual structures are interrelated in the understanding of pictorial meaning (Experiment 2). For the latter issue, the drawings involved were contrasted to what is communicated when words denoting or referring to the same emotional states are involved. In Expriment 2 our focus was on the quality of the subjective experience (either of the recalled or of the perceptual experience of the drawings), as indexed by semantic differentials rather than by a recognition task as in Experiment 1.

Research design

In Experiment 1, a pair of tasks was designed to assess the above issues as well as to form a large pool of expressive stimuli to be used for experimental purposes. The first task was the *production* task, in which art students were asked to depict their embodied-action representations (subjective emotional experiences) of certain emotional states (subtle emotion experiences related to eighteen different emotions) in a non-representational manner. The second task was the *perception-comprehension* task of these drawings. In this task a larger group of art students looked at the previously produced drawings/depictions and were asked to choose the ones that better conveyed in their structures the expressive-experiential components of the emotion that they presumably depicted. The drawings that were chosen

as the best depictions of the relevant emotion in this task made up our stimulus material for the Experiment 2 of our study.

In Experiment 2, we explored in parallel and in juxtaposition how spectators (art students and university students) judged, against semantic differentials, on the one hand, the drawings, and on the other hand, the words used as the expressive labels of the depicted emotion.

In this article, we focus in particular on the subjective experience of two emotions, that is, *joy*, a positive emotion, and *fear*, a negative emotion, for a more detailed investigation of the intra-cultural (in-group advantage) or cross-cultural variability of emotional expression perception. We do not extensively deal with other aspects of expressive perception involved in the line-drawings task.

EXPERIMENT 1

Method

Participants. The participants in the first experiment were 20 Greek art students (11 women and 9 men) at the Department of Fine Arts of University of Athens, Greece (for the production task) and 45 Greek art students (22 women and 23 men) from the same university (for the perception task). Age in both samples ranged from 17 to 67 years old.

Procedure - Tasks. The *production task* was similar to that employed by Takahashi (1995). Participants were given three A3 sheets of papers divided into six sections, each labelled with a word that represented one of eighteen, either more distinctive or more subtle, emotional experiences of related emotional states: *anger*, *happiness*, *joy*, *love*, *passionate love*, *cheeriness*, *fear*, *sadness*, *sorrow*, *compassion*, *surprise*, *tranquillity*, *disgust*, *guilt*, *shame*, *pride*, *jealousy*, and *interestingness*. The participants' task was made more concrete by emphasizing the following points: first, participants were asked to draw non-representational drawings. In this way we tried to secure that structural dynamic elements (expression) are independent of representational content. Participants were also encouraged to focus on feeling states and not to puzzle over the contents that their drawings literally possess. The following instructions were given:

> 1. Make a drawing that represents to you what the word of the emotion (expressive label) stands for as you are forming the subjective experience of it. Use a pencil; you are free to use it anyway you wish.
>
> 2. Try to depict, without any predetermined idea how that drawing should look like. There is no right, wrong or bad drawing. There is only one definite restriction: you must not draw any pictures of objects, or use any known symbols at all–no stars, no question marks, no lighting. Use only the language of lines: fast, slow, dark, smooth, rough, broken, or you can fill a whole section with lines.

Then, an example was given in order to make clear that the participants should focus on feeling states. The example was as follows:

> Read the word "joy". Think back to the last time you really felt such a feeling. Feel within yourself what it was like. Imagine you are experiencing this emotion again, that it flows first from deep inside, then into your arm, down into your hand and into the pencil, emerging from the point of the pencil in such a way that the marks give shape to your embodied experience.

The procedure of the *perception task* and the methodological manipulation were to a great extent similar to those employed by Takahashi (1995). High-quality photocopies of the black-and-white line drawings that were produced in the production task were made. The 20 drawings of each expressive label were arranged in random order on a sheet of paper. Participants were given a booklet of eighteen randomly arranged pages. They were asked to look at the drawings and for each expressive label select and rank three to five drawings that best communicated that emotional content to them. They were also encouraged to stop and start later on, if they become tired. The following instructions were given:

> There are 360 drawings (20x18) on 18 sheets of paper. The drawings were drawn to express the artists' subjective experience about what the word (expressive label) at the top stands for. Choose the five drawings that seem to represent the emotion as it feels to you (a choice of fewer than five –no fewer than three– drawings is allowed). You must not choose on the basis of their validity as visual symbols but rather on the basis of whether you can best re-experience the content of each expressive label.

Rank the five drawings in the order of the degree of a congruence of feeling from 5 (most congruent) to 1 (least congruent).

Results - Discussion

The drawings produced by the participants in the production task were non-representational and to a high degree abstract, not communicating at the level of recognizable visual symbols (i.e., a star) that may be shared by many people. There was considerable variation among the drawings, although there were some common trends. For example, drawings depicting negative emotion of fear were more heavily textured, whereas drawings depicting the positive emotion of joy were the most abstract; however, both categories of drawings shared contrasting structural properties, e.g., repetition of lines either curving in a slower manner producing a smoother texture, or angular and curving lines juxtaposed in rough intensity implying a shorter duration of the moving action and tighter force dynamics. Two professional Greek artists were used as judges for the extraction of structural information from the drawings. Based on the judges' analysis, the drawings of *joy* and *fear*, shown in Figure 1, suggest that some structural elements such as texture (e.g., rounded smooth texture for joy) or the rhythm of motion in space (e.g., repetition of thick, jagged pointed forms for fear) may matter more than shape.

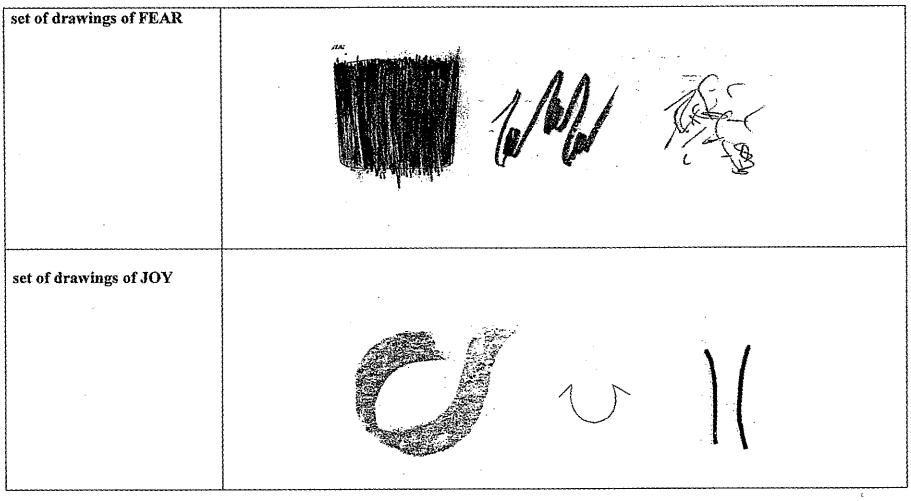

Figure 1. Pencil drawings of Fear and Joy, that gained the top sympathy of participants for each expressive label

Overall the participants in the perception task were remarkably consistent in their responses to the various drawings. The majority of the participants selected only a few drawings as most representative: two or three drawings for each expressive label-emotion separately were chosen by more than 52% of the participants. In the case of fear, the top three selected drawings are shown in Figure 1. The percentage of frequency of selection was 68%, 43%, 41%, for the first (from the left) to the third. In the case of joy, the percentage of frequency of selection was 61%, 42%, 39%, for the first (from the left) to the third (see Figure 1). All other drawings were less frequently selected and some (11 for fear and 8 for joy) were not selected at all.

Based on the common elements of the drawings selected it could be assumed that one of the factors determining the communicability of drawings in expressive perception is the structure of visual forms, in the sense that some visual structures may evoke a shared 'intuition' or a shared congruence of emotional patterns on which the meaning of the drawing is communicated (Arnheim, 1974; Takahashi, 1995). However, these rather implicit structural features (such as heavy lines, the direction, the form, the movement, etc.) have to be further elucidated since, despite the fact that artists have an interest in sharing with others the fruits of their expressive activities, there is too often a gap between what is being sent and what is being perceived. This may explain why some drawings had very low selection rate. Hence, the question about the communicability meaning in art is still open. To further investigate whether the congruence found between the artists as producers of the drawings and artists as spectators was due to intra-cultural factors (such as shared meaning and symbols conveyed through formal training in art schools) or due to cultural factors common to both art students and ordinary people (artist vs. non-artists), as well as to people from another culture, we conducted Experiment 2.

EXPERIMENT 2

Experiment 2 was designed to explore the effect of the dynamic structural elements of the drawings that were selected in Experiment 1 on a broader, non-artist audience. The purpose of Experiment 2 was to determine (a) whether the non-representational depictions of the two emotional experiences consistently convey different meanings to the spectators when they are judged on certain affective and perceptual dimensions; and (b)

whether these differences in meaning are associated with differences in the respective word concepts. For this purpose, two classes of materials, words and drawings were used: the words, namely, the expressive labels, and the respective drawings were selected from Experiment 1. However, in this experiment the drawings were not accompanied by their expressive labels (words) which might have facilitated the emergent congruence in the rating of the drawings found in Experiment 1.

Method

Stimuli. The 24 non-representational drawings produced by the Greek art students for the eight emotional states (three for each emotional state) were used in this experiment. High-quality photocopies of the drawings were produced. For each emotional state, the three drawings produced under the same expressive label (word) and ranked as most effectively communicating the emotion at hand, were arranged on a sheet of paper–the expressive labels were not shown; they were arranged separately on 8 sheets of paper, respectively. The expressive labels were either in Greek or in English for the two cultural samples; two bilingual judges were used for checking the translation from Greek to English. All together the 16 sheets of paper were randomly arranged in booklet form. However, as in Experiment 1, we shall focus here only on two emotions: joy and fear (for the respective drawings see Figure 1).

Participants. A total of 27 university students (14 Greek: 10 women and 4 men; 13 Canadian: 8 women and 5 men) from the University of Crete (Greece) and the Toronto University (Ontario Institute for Studies in Education, Canada), respectively; and a total of 30 art students (20 Greek: 10 women and 10 men; 10 Canadian: 8 women and 2 men) from the Department of Fine Arts of University of Athens (Greece) and York University of Arts (Toronto, Canada), respectively, served as participants. Age ranged from 17 to 59 years old.

Procedure - Scales. To index the symbolic meaning of the stimulus materials (drawings and words) a form comprising 11 scales of semantic differentials was constructed (see Table 1 for relevant information). Bipolar adjective scales were chosen to represent, in part, the factors of Evaluation, Potency and Activity previously found in factor analyses of various stimuli (Osgood, 1959) and in part to reflect dimensions that seemed appropriate for the evaluation of visual patterns (Takahashi, 1995). All scales were translated from Greek into English and back; two bilingual judges were

also used for checking the translations from Greek to English and vice versa. A seven-point rating scale between opposing evaluative adjectives for response was used, where the score '1' was assigned to the one pole (e.g., pleasant) and the score '7' to the opposing one (e.g., unpleasant). Scales were randomized in direction. The 11 seven-point scales were also randomized as to their order of presentation.

Booklets of 17 pages were prepared with an example on the first page. On the remaining 16 pages the 11 rating scales were presented with a word or three drawings appearing on the top of each page. The instructions paralleled those used by Takahashi (1995). The instructions were as follows:

> Throughout this booklet you will find a word or three drawings printed at the top of each page, and 11 descriptive scales. Please judge the word or the drawings on the basis of your subjective experience (as a recalled and re-experienced emotion for the words, or as how you feel when looking at them for the drawings). Please judge on your first impression of the stimulus; do not puzzle over individual items for long periods. It is your first-fresh impression that we want.
>
> You are to rate the stimulus on each of the 11 bipolar adjectives on a 7-point scale. Sometimes you may feel as though you have had the same item before on the test. This will not be the case; every item is different. Do not look back and forth throughout the test booklet. Also, do not try to remember how you marked similar items earlier in the test. Mark each item based on a separate and independent judgement. Work at a fairly high speed without worrying about accuracy.

Results

The analysis of the results was conducted in three phases designed to explore and demonstrate any emerging intra- (artists/non-artists) or intercultural (Greek/Canadians) variability. Also, in order to identify possible correspondence between the responses on the words and those on the drawings.

Inter- and intra-cultural variability. We employed Multivariate Analysis of Variance on the 11 scales of semantic differentials for words and drawings, separately. The independent variables were culture (Greek-Canadians) and artists/non-artists. Preliminary analysis showed that sex showed no significant multivariate effects or interactions across all analyses performed.

Joy. For the word *joy* a significant multivariate effect (the multivariate F

statistics provided are based on the Pillai's trace criterion) was obtained for culture, $F(11, 43) = 7.16, p < .001$, partial $\eta^2 = .65$, showing that culture affects significantly the 11 dependent variables on the semantic differential scales. Pairwise comparisons based on the Bonferonni criterion revealed significant differences across cultures for five scales at $p < .001$ (sharp-blunt, excitable-calm, dynamic-static, strong-weak, and slow-rapid), and for two scales at $p < .05$ (open-closed and light-heavy). These differences indicate that Canadians conceptualize joy as more dynamic, sharper, excitable and as a strong feeling. Significant multivariate effect was also found for artists/non-artists, $F(11, 43) = 3.46, p < .005$, partial $\eta^2 = .47$, showing that being artist affects significantly the 11 dependent variables of the semantic differential scales for the word *joy*. Pairwise comparisons revealed significant differences between artists/non-artists groups for two scales, at $p < .05$ (open-closed, dynamic-static), indicating that art-students conceptualize the experience of joy as less open (however, still open) and more dynamic than non-artists; there was no significant interaction between culture and artists/non-artists for the word *joy*.

For the drawing of *joy*, a significant multivariate effect was obtained for culture, $F(11, 43) = 3.52, p < .005$, partial $\eta^2 = .47$. No significant main effect was found for artists/non-artists; also, there was no significant interaction between culture and artists/non-artists for the drawing of *joy*. Pairwise comparisons revealed significant differences across cultures for three scales, at $p < .005$ (simple-complex, soft-hard, and smooth-rough), and for one scale, at $p < .05$ (light-heavy). The differences showed that Greeks perceived the drawings as less soft, as lighter, and rather rough as compared to Canadians.

Fear. For the word *fear*, a significant multivariate effect was obtained for culture, $F(11, 43) = 2.39, p < .05$, partial $\eta^2 = .38$, showing that culture affects significantly the 11 dependent variables of the semantic differential scales. No significant main effect was found for artists/non-artists; also no significant interaction effect was obtained between culture and artists/non-artists. Pairwise comparisons revealed significant differences between cultures for one scale at $p < .01$ (strong-weak), and for three scales at $p < .05$ (light-heavy, soft-hard, and smooth-rough), indicating that Greeks conceptualize fear as a stronger experience, however less rough and heavy as compared to Canadians. A significant difference across groups was also revealed for the scale of simple-complex, indicating that artists conceptualize fear as a more complex experience than non-artists, $F(1, 53) = 6.73, p < .05$, partial $\eta^2 = .11$.

For the drawing of *fear*, no significant main effects were obtained for

culture, or for artists/non-artists. There was no significant interaction either. No significant differences were found across cultures for the 11 scales of semantic differentials on pairwise comparisons for culture, although Canadian non-artists perceived the drawings of fear as rather blunt than sharp, whereas all other groups perceived them as quite sharp, $F(1, 51) = 4.96, p < .05$, partial $\eta^2 = .09$. These findings suggest that there is a pattern in the drawing of *fear* that is common across cultures and groups. This pattern may have to do specifically with fear because it is a strong negative emotion.

Meaning variability between words and drawwings. We also applied a series of repeated measures MANOVAs with within-subjects variable the type of stimulus. We applied the MANOVAs on all the 11 semantic differential scales (the between-subjects variables were culture and artists/non-artists) in order to explore any difference between responses to the words and to the drawings, for each emotion separately. For *joy*, a multivariate effect for culture (between-subjects variable) was again obtained, $F(11, 43) = 6.87, p < .001$, partial $\eta^2 = .64$, indicating that cultures showed many and highly significant differential patterns of response to the word and to the drawings. Planned contrasts ANOVAs showed that Greeks conceptualized joy as calm and perceived the drawings also as calm. Canadians conceptualized joy as excitable and perceived the drawings as calm. No main effect for artists/non-artists was revealed. Tests of within-subjects contrasts showed significant differences for joy between the word and the drawing, at $p < .001$, for five scales (pleasant-unpleasant, light-heavy, soft-hard, and smooth-rough, and strong-weak).

For *fear* no multivariate effect for culture or group was obtained, indicating that neither culture nor group differed significantly as regards the responses to words and drawings. Tests of within-subjects contrasts comparing words with drawings showed significant differences, at $p < .05$, for five scales (pleasant-unpleasant, light-heavy, simple-complex, soft-hard, and sharp-blunt).

These results suggest that neither for joy nor for fear was there strict parallelism in the responses to the 11 scales of semantic differentials as regards the two types of stimuli (words and drawings). There was some congruence of meaning between words and drawings for *fear*, especially for scales reflecting potency or activity (i.e., excitable, dynamic, strong, smooth, heavy), that also holds cross-culturally. This particular finding indicates a stronger congruence of feeling across the word and the drawings for *fear* (see also descriptive statistics in Table 1). Across all groups the word and the drawings for *fear,* were conceptualized and perceived as unpleasant, closed and hard, excitable, dynamic and rough.

Table 1. Mean scores and standard deviations for the Greek and Canadian sample for the word and the drawing stimuli of Joy and Fear

	Joy								Fear							
	Greeks				Canadians				Greeks				Canadians			
	Word		Drawing		Word		Drawings		Word		Drawing		Word		Drawing	
Semantic differentials*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
1. pleasant-unpleasant	1.44	.71	2.76	1.56	1.26	.45	2.22	1.20	6.15	1.10	4.50	1.74	6.71	.65	4.81	1.91
2. open-closed	2.21	1.53	2.35	1.53	1.30	.56	2.04	1.38	5.00	2.16	4.59	2.20	5.62	2.10	4.81	1.86
3. light-heavy	1.94	1.45	3.29	1.83	1.17	.39	2.22	1.38	5.62	1.99	5.10	1.90	6.62	.81	5.71	1.15
4. simple-complex	2.82	2.19	3.29	1.78	2.52	1.93	2.09	1.16	4.91	1.97	3.76	1.92	5.33	2.33	4.33	2.24
5. soft-hard	2.03	1.31	3.65	2.04	1.78	.95	2.13	1.25	5.41	1.76	4.47	2.27	6.38	1.24	5.62	1.43
6. sharp-blunt	6.09	1.05	5.03	1.73	4.04	1.30	5.22	1.70	3.15	1.92	3.65	1.87	2.90	2.68	4.38	2.11
7. smooth-rough	1.94	1.41	4.12	1.78	1.91	.95	2.04	1.26	5.18	1.70	5.21	1.66	6.29	1.38	5.29	1.31
8. excitable-calm	5.44	2.12	4.32	2.12	2.43	1.43	4.87	2.07	2.06	1.57	2.00	1.23	1.76	1.26	2.43	1.63
9. dynamic-static	4.26	1.96	3.50	1.88	2.30	1.52	3.78	1.95	3.26	2.15	2.00	1.46	2.24	1.89	2.76	1.87
10. strong-weak	3.18	1.86	3.29	1.83	1.91	.79	3.61	1.62	2.06	1.59	2.32	1.53	3.38	2.60	2.33	1.46
11. slow-rapid	2.65	1.76	3.18	1.73	4.61	1.70	2.78	1.73	4.44	2.19	5.41	2.00	5.29	2.22	4.90	2.19

Note. *A seven-point rating scale was used.

These results suggest that the meanings assigned to the word and the drawing of *fear* may also to some extent be attributed to the contents inherent in the visual-verbal synesthetic tendencies, that is, cross-modal generalized and shared affective meanings found across cultures by Osgood (1959).

Conceptual vs. perceptual structures as related to the specific "intentionality" of each emotion. To further investigate the possible structural characteristics of the conception of the emotion words and the perception of drawings for *joy* and *fear*, the 11 scale-scores on each emotion were factor-analysed. The principal component extraction method was used along with varimax rotation (Kaiser, 1958). In this way we aimed at revealing the specific "intentionality" of each of the two emotions (see Lambie & Marcel, 2002). These analyses were performed separately for each stimulus (word and drawings) in each cultural group. Although the sample size was small, across all analyses both the KMO index, ranging from 600 to 790, and the Bartlett's test of sphericity showed that factor analysis is appropriate for the data. Based on Kaiser's rule and the results of the scree test (Cattell, 1966) a three-factor solution was chosen to fit the data best across all extractions.

Joy. For joy the number of factors in each sample was set at 3 for both words and drawings in both cultures (Greek and Canadian). The three factors were expected to represent Osgood's (1959) dimensions of evaluation, potency, and activity. The factor analyses showed that the ordering of the factors, as well as their composition varied somewhat between words and drawings, and between cultures (see Table 2). Therefore, the factorial pattern resembles to some extent the Evaluation-Potency-Activity solution proposed by Osgood (1959), but there are also differentiations as regards mainly the second and the third factors.

The items loading the Evaluation factor were mostly the same in the two groups. This factor was loaded by the pleasantness scale and by some sensory-perceptual evaluative adjectives (e.g., open-closed, light-heavy, etc.) suggesting to some extent a connotative/affective framework. The Evaluation factor for drawings possibly indicates cross-modal processing, since some scales, such as smooth-rough or sharp-blunt, also loaded on this factor. Overall, the Evaluation factor was more connotative in nature for the Greeks as compared to Canadians for both stimuli (word and drawings), whereas this was the case only for the drawings of *joy* for Canadians.

For both cultures, across both stimuli, the Potency factor was loaded by items denoting aspects of force dynamics, as represented by scales such as dynamic-static, strong-weak, and excitable-calm. Finally, the Activity factor,

Table 2: Factor pattern for the 11 semantic differentials scales for joy

	Greeks						Canadians					
	Factor loadings*						Factor loadings*					
	Word			Drawing			Word			Drawing		
Semantic differentials	Factor 1	Factor 2	Factor 3	Factor 1	Factor 2	Factor 3	Factor 1	Factor 2	Factor 3	Factor 1	Factor 2	Factor 3
1. pleasant-unpleasant	.83			.60		.50		.70		.66		
2. open-closed	.90			.77		.46		.65		.80		
3. light-heavy	.89			.88				.83		.83		
4. simple-complex	.38	.39				.86			.61	.82		
5. soft-hard	.56	.63		.75					.77	.58	-.59	
6. sharp-blunt		-.67		.59							.73	
7. smooth-rough		.68		.66	-.38			.44	.68	.77		
8. excitable-calm			.58		.54		.76		.88		.38	-.80
9. dynamic-static			.88		.91		.86				.45	
10. strong-weak			.86		.80		.47		.45		.70	
11. slow-rapid		.66				.77	-.83					.80
Percentage of variance explained	32.63%	18.90%	12.85%	30.83%	19.90%	16.02%	23.41%	20.39%	12.56%	34.37%	17.04%	14.32%

Note: Factor loadings < .35 are omitted.

Table 3. Factor pattern for the 11 semantic differentials scales for fear

	Greeks						Canadians					
	Factor loadings*						Factor loadings*					
	Word			Drawing			Word			Drawing		
Semantic differentials	Factor 1	Factor 2	Factor 3	Factor 1	Factor 2	Factor 3	Factor 1	Factor 2	Factor 3	Factor 1	Factor 2	Factor 3
1. pleasant-unpleasant	.75			.73			.65			.44	.64	
2. open-closed	.70			.70			.42		.61		.76	
3. light-heavy	.58	.50	.39		.61		.83					
4. simple-complex	.45	-.58			.62	.43			.67	.57		
5. soft-hard	.80			.85			.70				.77	
6. sharp-blunt			.91	-.80				.78				.58
7. smooth-rough	.60					.87	.81				.41	-.52
8. excitable-calm		.85			.78				.64	.71		
9. dynamic-static	.47	.58			.60				.61	.70		.61
10. strong-weak		.67				-.55		.79		.72		
11. slow-rapid	-.39					.60		-.85				-.73
Percentage of variance explained	28.28%	19.92%	16.70%	31.48%	18.33%	12.19%	24.74%	21.04%	15.57%	24.62%	20.60%	12.80%

Note: Factor loadings < .35 are omitted.

as represented by the slow-rapid scale did not come out as a distinct factor in the present data. The third factor in the two culture groups and the two stimuli differed substantially and did not have a clear character. The only worth mentioning finding is that the scale slow-rapid was not associated with the excitable-calm scale in the Greek group although it was in the Canadian group. In the Greek group the slow-rapid scale was associated with the simple-complex scale denoting an Activity-Complexity factor (Table 3).

Generally speaking, the factorial patterns for the word and drawings of joy showed a fairly shared generality in the factors derived across both cultures, and a mismatch between the word and the drawings of *joy*. Similarities emerged especially for the drawings across both cultural groups, possibly indicating a rather shared perceptual space. In contrast, the factorial structure for the word *joy* was more differentiated in the two cultures. This probably suggests cultural variation and an unstable semantic frame of reference. It may also imply a fair degree of stereotyping in the conceptual structure of joy.

Fear. For fear, the extraction of factors in each cultural group was also set at three factors for both types of stimuli (words and drawings). In the case of the word *fear*, the pleasantness scale was associated with the open-closed scale and loaded on the Evaluation factor. This was stable across groups and stimuli. However, this factor was enriched in both cultures with some items from the Potency or Activity factor (e.g., smooth-rough, slow-rapid, dynamic-static for Greeks; smooth-rough for Canadians). This may suggest a lesser degree of stereotyping in the conceptual structure of the word *fear*, which probably bears more experiential/affective or connotative aspects than the word *joy*. This was found more clearly in the Greek sample than in the Canadian, suggesting that the conceptualization of *fear* is flavoured by experiential-embodied knowledge. The Potency factor was identified in both culture groups and stimuli, loaded mainly by the dynamic-static and excitable-calm scales. The Activity factor was not identified as a distinct factor (Table 3).

It is also worth noticing that across both samples the simple-complex scale made up a Complexity-Potency or Complexity-Activity factor that constituted the third factor. Moreover, for Greeks a unique factorial pattern for the word *fear* emerged highlighting the distinctiveness of the "sharpness" dimension in the conceptualization of fear. For the drawings of *fear*, the third factor in the Greek sample was mainly loaded by the smooth-rough scale, which emerged combined with perceived velocity (slow-rapid), complexity and perceived powerfulness (strong-weak). For Canadians the sharp-blunt scale was

associated with the Potency factor for the word stimulus, and with smooth-rough scale for the drawings. In general, as regards the drawings of *fear* a quite similar factorial structure in both cultures was found.

Generally speaking, the factors extracted for *fear*, for both words and drawings, seem closer to the connotative rather than to the referential aspects of meaning. However, unique clustering patterns of items can also be discerned across all the factorial solutions in the two cultures for both stimuli, suggesting also that culture and the specific "intentionality" of each emotion shape in unique ways the way people interrelate these 11 semantic differential scales in order to form relational themes–dimensions of either the conception of the emotional subjective experience or the perceptual experience of the expressive line drawings (i.e., Greeks scored heavily in the direction of strong–whereas Canadians in the neutral space, as regards the word *fear*).

GENERAL DISCUSSION

The MANOVA results, as well as to the findings of the factor analyses, for words and drawings in the two cultures, are partly consistent with Takahashi's (1995) evidence. They seem to indicate that the meanings of the words *joy* and *fear* are evaluative and sensitive to cultural variation, differentiation and stereotyping (especially for the word/expressive label of *joy*). The meanings of the drawings were judged in terms of motor-affective and sensory-perceptual relevant processes, which seem to bear broader similarities to the nature of embodied perception and cognition (this pattern is clearer for fear). These processes seem related more to tactile perception than to vision, more to rhythm (perceived regularity) and texture (coarseness and contrast; see Cho, Yang, & Hallett, 2000) than to shape, suggesting the communicative power of texture over shape. The visual system seems less adapted for expressive (embodied) perception, whereas, at the same time, it is better adapted for the perception of an object's shape–this pattern can be discerned in the relation of pleasantness to openness and complexity which is more evident for the word stimuli (Takahashi, 1995). Thus, vision in terms of the recognition of an object's shape limits embodiment at a surface level, whereas the affective or sensory-motor dimensions as reflected in the 11 semantic differential scales may have facilitated the emergence of the aforementioned pattern.

Thus, there seems to be some generality of the perceptual structures

(perceptual experience of the dynamic line-drawings of *joy* or *fear*) across cultures and groups. Features such as texture and rhythm may provide cues of affective information, which is processed by means of affective processes (Scherer & Enter, 2001; Takahashi, 1995). Aspects of rhythm and texture share a common property: they depend on the repetitive spatial or temporal structure (Edwards, 1998; Fraisse, 1981). The perceptual experience of rhythm, regularity and contrast tied up with sensorimotor conjunctions, no matter whether the perceived rhythms are created by movements or give rise to movements, results in a harmony between perception and activity that becomes a source of affectivity. Besides that, the spatio-temporal and the textural aspects of the drawings possibly created a dynamic "motor" rather than visual-static space, directly activating kinaesthetic imagery and evoking the simulation of the congruent motor schema, regardless of whether any action was executed or not (Gallese, 2005; see also Arnheim, 1974).

At this point, it should be reminded that in the experimental tasks of the study, the drawings bear no referential correspondence to the emotional expression of fear/joy such as found in facial expression research; they encompassed only dynamic/expressive elements in their structural organization. Thus, they probably stretched a cross-modal binding which facilitates emotion contagion (see related issues on the evolutionary value of intersensory integration without semantic mediation in human communication; de Gelder et al., 2002). Stretching cross-modal processing may have functioned as facilitative of experiential functioning (Apter, 1984; Wild, Kuiken, & Schopflocher, 1995), while blocking to some degree extended semantic processing (de Gelder et al., 2004).

Hence, inter-sensory perception and cross-modal integration tied up with sensorimotor conjunctions, inducing deep affectivity (motor-affective and kinaesthetic patterns), and stretching experiential functioning, possibly constitute what authors called "expressive and physiognomic perception"– the organismic involvement of the person and the aesthetic object in a context of feeling and action (Werner & Kaplan, 1963). Expressive perception, then, seen as a condition that enabled the generality of the perceptual structures in our experiments, may also underlie a shared perceptual space in the arts (e.g., Arnheim, 1974; Takahashi, 1995), constituting a level of understanding that does not entail the explicit use of any declarative representation. This means that although participants can recognize abstract properties such as "closed" in a novel shape (which is

neither open nor closed; see patterns of *joy* and *fear*), their judgements are not based on any visual resemblance but probably on the qualitative aspects of the "embodied" experience itself when perceiving the drawing stimuli. The aforementioned issues bear some correspondence to the role of direct perception (Gibson, 1969) and intersensory processing while being engaged in the perceptual act. Gibson (1969) suggests that the extraction of emotional meaning from structural cues embedded within an expressive display is crucial to emotion perception.

Contrary to what was found in the case of drawings, generality of the conceptual structures (representations of the subjective experience of joy or fear) across cultures cannot be assumed as easily. There was evidence for interplay between stereotypic and culture-specific tendencies for both cultures that deserves further investigation. More specifically, the results revealed an interesting cross-cultural variability in relation to the conceptual representation of the subjective experience of both joy and fear. That is, there was a differentiated, culture-specific pattern with respect to the strong-weak scale, especially for fear, which to our understanding points to the direction of the socio-cognitive theories of emotions. For Canadians, the experience of fear possibly results in a feeling of self-vulnerability–not being able to cope with the stressful situation that threatens the existence of the self as an agent (see Lazarus, 1991). This suggests an instrumental frame of reference that points to the direction of self-concerns. However, for Greeks fear is affective rather than cognitive, and experiential rather than instrumental; thus, there is shift of emphasis to the "strength" and to the "quality" of the deeply felt experience (appraised stressfulness as a primary appraisal; see also related issues to Western vs. more collectivist cultures: e.g., Matsumoto et al., 1999). It could be said then, that there are some indications that culture shapes the combinations of the 11 semantic differential scales items in each emotion in unique ways (e.g., for Greeks sharpness and heaviness are principal dimensions in the conceptualization of fear). However, much more focused and detailed research is required for further clarification of these issues.

As regards the similarities of responses to the word and drawings for each emotion, one could argue that there was activation of the action mirror systems that underlie responses to both types of stimuli (de Gelder et al., 2002, 2004; Gallese, 2005). This would suggest that a synergetic relation exists between some perceptual organization and a specific word concept, which activates one's embodied knowledge about specific affective

schemata. This assumption points to the role of proprioceptive/kinaesthetic feedback in the subjective experience of fear (e.g., Hatfield, Hsee, & Costello, 1995) and the link of perception to action and emotion (de Gelder et al., 2004; Gallese, 2005) as proposed by the embodiment hypothesis (Fogel & Thelen, 1987; Jeannerod, 1993). The proposed coupling of emotion, action and perception also emphasises the role of the body-schema in emotional communication (see also emotional resonance-contagion, simulation and empathy).

Although these issues need to be further addressed in future research, it is suggested here that the link of action-perception-emotion possibly underlies the inter-cultural communicability of emotional meanings and emotional expressions. This association of action-perception-emotion functions as the missing link (or a possible answer for our research findings) to the communicability of pictures and the congruence of feeling among painters and spectators. In other words, this link may underly aspects related to the communicability and the social function of the arts. Nonetheless, this linkage, as related to our research findings, is especially important for abstract art or for the structural organization of the works of art that being non-representational, employ stylistic and dynamic/expressive pictorial elements in their structures. It can be concluded, then, that apart from possible practical contributions related to affect classification and the stimulus properties used in relevant experiments, our findings have a theoretical bearing also.

Yet, there are two issues related to the present study that warrant attention. First, the sample size in comparison to those typically employed in cross-cultural research is markedly smaller. This was due to the fact that this study focused on a specific population (art students) rather than on general population. Given that the number of analyses conducted was large, the probability of finding variations was increased, making interpretations of the findings difficult. From this point of view, the findings should be viewed as preliminary, although we must also note that in spite of the aforementioned limitations, the findings of the study generally replicated Takahashi's research findings. At the same time, few studies have investigated emotion perception of artistic non-representational drawings in general, and even fewer have explored these issues in specific cultural contexts. This is the second serious limitation of our study, standing, however, also as its possible potential. Our study provided a first approximation to how the embodied-experiential qualities of a percept

provide a basis for emotional responses to such stimuli. More generally, this direct mapping of perception onto emotion may provide an interesting conundrum for theories of emotion research.

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