Confusion and Interest: The Role of Knowledge Emotions in Aesthetic Experience

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Abstract:

What makes something confusing? Confusion is a common response to challenging, abstract, and complex works, but it has received little attention in psychology. Based on appraisal theories of emotion, I suggest that confusion and interest have different positions in a two-dimensional appraisal space: interesting things stem from appraisals of high novelty and high comprehensibility, and confusing things stem from appraisals of high novelty and low comprehensibility. Two studies—a multilevel correlational study and an experiment that manipulated comprehensibility—found support for this appraisal model. Confusion and interest are thus close relatives in the family of knowledge emotions. Keywords: aesthetics, emotion, confusion, interest, appraisal theories

Article:

According to my students, psychology professors are an irascible, fickle, and nefarious bunch. Of the many cruel things that psychology professors do, requiring undergraduates to visit the campus museum is among the cruelest. (My friends who work in the campus museum assure me that disaffected grumbling and disgruntled sighs carry well in the high-ceilinged rooms.) Many students see a museum trip as punishment, particularly if a brief paper is involved. And these papers are revealing—students usually write about being irked and perplexed, about not understanding what the big deal is, about not getting it. What does aesthetics research have to say about this kind of experience?

Unfortunately, confusion is a typical response to the arts. Given the beleaguered state of contemporary art education, many people lack the training and knowledge needed to understand challenging and abstract works, such

as modern painting, experimental music, or contemporary literature. Just as curiosity breeds knowledge, confusion breeds ignorance. When confused, people usually withdraw and spend their brainpower on something else. But if we know what confusion is, what it does, and how it works, we may be able to make art less confusing and to turn confusion into an educational tool.

The present research examines confusion by comparing it with interest, a widely-studied emotion. What makes things confusing or interesting? Why do confusing things—such as complex books, obscure movies, or tricky ideas—sometimes become interesting? Of the knowledge emotions, interest has probably received the most attention, both in mainstream emotion research (e.g., Izard, 1977; Silvia, 2008b) and in empirical aesthetics (Berlyne, 1974; Silvia, 2005b). Confusion, in contrast, has received little attention in any area of psychology, apart from a preliminary study of facial expressions (Rozin & Cohen, 2003) and comments on that work (e.g., Ellsworth, 2003; Hess, 2003; Keltner & Shiota, 2003). In this article, two studies examine the cognitive appraisals that predict confusion and that cause experience to shift from confusion to interest.

Confusion and Interest as Knowledge Emotions

One way to simplify the sprawling world of emotion is to classify emotions into families, such as *positive emotions* (Fredrickson, 1998), *moral emotions* (Rozin, Lowery, Imada, & Haidt, 1999), and *self-conscious emotions* (Tracy & Robbins, 2007). Confusion and interest fit into a family of *knowledge emotions*, along with the emotions of surprise and awe (Keltner & Haidt, 2003; Koneĉni, 2005; Ludden, Schifferstein, & Hekkert, 2009). The knowledge emotions are caused by people's beliefs about their own thoughts and knowledge, and these emotions stem from goals associated with learning. Just as people have goals associated with achievement and safety, people have goals associated with knowing, thinking, and understanding. People can appraise how events in the world impinge upon those goals, and they can assess their resources related to meeting them.

The notion of confusion as an emotion is unseemly, if not scandalous, to many emotion psychologists. Researchers in the basic emotions tradition, for example, propose that there are only a handful of basic emotions (Ekman, 1992). To join this list, an emotion must pass a high hurdle (e.g., cross-cultural and developmental evidence), and confusion clearly doesn't pass it. Researchers in other traditions, such as the

appraisal tradition, are more open to new emotions. The most extreme view, suggested by Scherer (2001; Ellsworth & Scherer, 2003), is that each

point in the *n*-dimensional appraisal space has an associated emotion. Most of the emotions are too subtle, complex, or uncommon to appear in natural language, but they presumably exist nevertheless.

This is a debate that aesthetics researchers can sidestep. Confusion is an interesting experience, and it is worth understanding what causes confusion and what confusion does. In this sense, declaring confusion an emotion, a cognitive state, or a metacognitive attribution doesn't make it less relevant to understanding people's experience of challenging and unfamiliar art. Like awe, beauty, chills, and surprise, confusion is aesthetically interesting regardless of how we classify it.

Nevertheless, the small body of work on confusion suggests that it is worth exploring confusion's emotional nature further. Modern emotion theories define emotions in terms of their components, such as experiential, expressive, physiological, cognitive, and behavioral components (Scherer, 2001). Confusion has a valenced experiential quality: it's a familiar experience that people can describe. Furthermore, facial expressions of confusion are common and easy to recognize. In their study of emotional expressions in everyday contexts, Rozin and Cohen (2003) found that confusion was one of the most commonly observed expressions. Later work showed that it was easy for raters to identify confused states based on facial expressions, using the Facial Action Coding System (Craig, D'Mello, Witherspoon, & Graesser, 2008). Confusion's expression was first discussed by Darwin (1872/1998) in the context of barriers to cognitive goals: "A man may be absorbed in the deepest thought, and his brow will remain smooth until he encounters some obstacle in his train of reasoning, or is interrupted by some disturbance, and then a frown passes like a shadow over his brow" (p. 220). In short, there's enough work on confusion's emotional qualities to motivate more research.

An Appraisal Approach to Confusion and Interest

An emotion's cognitive component is usually defined as its *appraisal structure*, the set of appraisals that bring about the emotion (Lazarus, 1991; Scherer, 2001). Appraisals are evaluations of how events in the

world relate to one's goals, values, knowledge, and abilities. The province of appraisal theories, appraisals are viewed as both the causes of an emotion and as a means of describing and classifying an emotion.

Appraisal research on interest illustrates what an appraisal approach to emotion looks like. Research has found evidence for two appraisals, both metacognitive. For interest, people are appraising how new information fits with what they know and expect (a novelty–complexity appraisal) and whether they can understand the new, complex thing (a coping potential appraisal). Many studies have shown that people find things interesting when they appraise them as both new and complex and as comprehensible (see Silvia, 2006b, 2008b). Figure 1 illustrates this appraisal structure as a two-dimensional appraisal space. Interest's appraisal structure is both a model of interest's causes and a way of classifying interest: it is similar to emotions that involve appraisals of novelty (e.g., surprise) and to emotions that involve appraisals of coping potential (e.g., fear/anxiety).

To date, no appraisal research has examined confusion. Nevertheless, past writing suggests that confusion may share interest's appraisal space. Ellsworth (2003) speculated that confusion may stem from appraisals of uncertainty, an appraisal dimension in the Smith and Ellsworth (1985) appraisal model. Uncertainty is part of a family of variables that includes novelty, complexity, conflict, and unfamiliarity (Berlyne, 1960). In fact, Berlyne (1960) speculated that confusion results from information that evokes more than one concept and thus creates cognitive conflict. Like interest, then, confusion may involve an appraisal of high novelty–complexity. Keltner and Shiota (2003) suggested that "confusion is the feeling that the environment is giving insufficient or contradictory information" (p. 89); this resembles the appraisal of one's ability to understand. Interest and confusion may thus share the same appraisal space: they are probably similar in some respects (i.e., appraisals of high novelty–complexity) and different in others (i.e., appraisals of high vs. low comprehensibility).

Figure 1 depicts predictions that could be made about the appraisal structure of confusion. First, confusion may entail only high novelty, reflecting a state of uncertainty. Second, confusion may entail only low comprehension, reflecting an inability to understand. And third, confusion may share interest's appraisal two-dimensional appraisal space, albeit with a different value on the comprehensibility dimension: confusion may stem from appraising something as novel and as hard to understand.

The Present Research

The present research examined the appraisal space of confusion and interest. Experiment 1 examined the within-person relationships between the two appraisals and the two emotions. Experiment 2 examined whether manipulating appraisals of comprehensibility causes a shift from confusion to interest. Taken together, the studies provide information about confusion, a neglected knowledge emotion, and illustrate relationships between confusion and interest.

Experiment 1

Does confusion covary naturally with appraisals? In Experiment 1, people viewed images and provided ratings of interest, confusion, and appraisals for each picture. This design allowed an estimate of the typical within-person relationships between the appraisals and the emotions.

Method

Participants

Sixty-one people—48 women and 13 men—enrolled in General Psychology at the University of North Carolina at Greensboro (UNCG) participated as a part of a research option. Gender effects weren't estimated because of the small number of men in the sample.

Procedure

People participated in small groups. The experimenter explained that the study was about people's impressions of different kinds of art. People viewed 14 black-and-white pictures taken from books and journals of experimental visual art: the artists were Reed Altemus, Marcia Arrieta, Christian Burgaud, David Chirot, Jim Leftwich, Gustave Morin, Spencer Selby, and Andrew Topel. Most of the pictures have been used in past research on interest (Silvia, 2005a, 2005c, 2006a, 2008a).

After viewing each image, people completed 7-point semantic-differential scales. These scales measured feelings of interest (*interesting–uninteresting, boring–exciting*) and confusion (*confusing–clear, perplexing–obvious*) and the appraisals of novelty–complexity (*simple–complex, unfamiliar –familiar, common–unusual*) and comprehensibility (*comprehensible–incomprehensible, easy to understand–hard to understand*). Similar items have been used in past research (see Silvia, 2005a; Turner & Silvia, 2006).

Results and Discussion

The experimental design has a multilevel structure: responses to the 14 pictures are nested within 61 people. The interdependence of the scores violates assumptions of conventional regression models. The extent of nesting is shown by intraclass correlations (ICC), which describe the percent of variance in the outcome at the between-person level. The ICCs were .162 for interest and .070 for confusion, which indicate that most of the variance in interest (83.8%) and in confusion (93%) is at the within-person level, the level of appraisal ratings. This is a good sign because the study hopes to explain variance in interest and confusion with people's within- person appraisal ratings.

The relationships between appraisals and emotions were estimated with a multivariate multilevel model (Heck & Thomas, 2009; Skrondal & Rabe-Hesketh, 2004). Appraisals of novelty–complexity and comprehensibility were the Level 1 predictors, and interest and confusion were the outcomes. The Level 1 predictors were centered at each person's mean (i.e., group-mean centered), and their effects were modeled as random. The model was estimated with Mplus 5.2, using maximum-likelihood estimation with robust standard errors. Figure 2 shows the model and the unstandardized effects.

Both appraisals predicted both emotions. Within-person variation in interest was significantly associated with variation in novelty–complexity (b = .448, SE _ .061, p < .0001) and in comprehensibility (b = .402, SE _ .046, p < .0001): interesting pictures were rated as complex and comprehensible. Within-person variation in confusion was significantly associated with variation in novelty–complexity (b = .293, SE _ .046, p < .0001) and in comprehensibility (b = - .473, SE _ .041, p < .0001): confusing pictures were rated as complex but incomprehensible. The results thus show that confusion and interest have the same two-dimensional appraisal space.

Experiment 2

In the face of novel events, changes in comprehension should cause changes in confusion and interest. Experiment 2 thus manipulated appraisals of comprehensibility; to simplify the design, complexity was held constant at a high level. People read two complex poems by the same author. For the first poem, everyone simply read the poem and rated feelings of confusion and interest afterward. Prior to reading the second poem, however, half of the people received information that would help them understand the poem,

whereas the other half simply read the poem. The clue about the poem's meaning ought to reduce confusion and increase interest.

Method

Participants and Design

Fifty people (29 women, 21 men) participated as part of a research option. Four nonnative English speakers were excluded, yielding a final sample of 46 people. Each person was randomly assigned to one of two between-person conditions: *no information* or *extra information.*

Procedure

People participated in small groups. The experimenter explained that the study was about people's impressions of different kinds of writing. People expected to read some poems and to rate them on different dimensions. The poems were taken from *The Life of Haifisch*, a book of abstract poems by Scott MacLeod (1999). For the first poem, all participants received the following information:

> The following page has a poem by Scott MacLeod. Please read it, see how you feel about it, and then give your impressions and reactions on the following pages. This poem is titled *The Whitest Parts of the Body*, and it's from his book *The Life of Haifisch.*

They then read the poem, which is obscure, abstract, and complex. The first stanza, for example, is

> such daring against men
> with a throat so big
> separated by a hundred years full of
> misfortune: the bloody flux. taken by a fit of
> madness prone to eating human flesh and
> measured, in due course, by naturalists.

Afterward, people rated their feelings of interest and confusion. Interest was measured with *I found the poem interesting*; confusion was measured with *I found this poem confusing.* The items were completed using 7-point scales (1 = *strongly disagree*, 7 = *strongly agree*).

The manipulation of extra information appeared after everyone had read and rated the first poem. The next page in the packet provided information about the second poem. People in the *Extra Information* condition read

> The following page has another poem by Scott MacLeod, called *A Widespread and Popular Notion*, from the same collection of poems. This poem, like the last poem, is about killer sharks.

The final sentence, which provides a clue to the poem's meaning, was not provided to people in the *No Information* condition. Everyone then read the poem: like the first poem, it is obscure and complex. The first stanza, for example, is

> how absurd this idea is
>
> often more swift or agile
>
> with an air of seeming regret.

Afterward, people rated their feelings of interest and confusion, using the same items.

Results and Discussion

The design combines a within-person variable (Time: First Poem vs. Second Poem) and a between-person variable (Extra Information: No vs. Yes), and it has two outcomes (interest and confusion). Consistent with the mixed design, the intraclass correlations for interest (.157) and confusion (.114) indicated some interdependence in the scores. A multivariate multilevel model was thus used to estimate the effects. In this model, interest and confusion scores were treated as simultaneous outcomes that were predicted by the two independent variables. As in Experiment 1, the model was estimated with Mplus 5.2, using MLR estimation, which provides unstandardized regression effects. No effects for gender were found, so it isn't discussed further.

Did providing information about the poem affect confusion and interest? For interest, the multilevel model found non-significant main effects for time (b = .413, p = .13) and extra information (b = .180, p = .59) but a significant interaction between them (b = 1.474, p = .006). For confusion, the multilevel model found a main effect for time (b = -1.739, p < .001), no main effect of extra information (b = .157, p = .63), and a significant interaction between them (b = - 1.807, p < .001).

Within-person comparisons clarify the patterns of these interactions, which represent how the information about the poem's meaning affected interest and confusion. People in the no-information group

responded similarly to the poems: they found the second poem equally interesting (b = -.291, p = .45) and less confusing (b = -.875, p = .018) than the first poem. People in the extra-information group, in contrast, benefitted from the clue: they found the second poem significantly more interesting (b = 1.182, p = .002) and significantly less confusing (b = -2.682, p < .001) than the first poem.

Experiment 2 thus extends the evidence for the appraisal space of interest and confusion. If these emotions differ primarily in the appraisal of comprehensibility, then increasing this appraisal should shift experience from interest to confusion. Manipulating people's ability to understand a complex poem—in the form of a clue about the poem's broader meaning—made the poetry less confusing and more interesting, thus providing an experimental replication of Experiment 1's correlational findings.

General Discussion

Psychology doesn't know much about the knowledge emotions. Charles Darwin (1872/1998), in his classic book on emotional expression, discussed states of astonishment, amazement, meditation, and abstraction. But despite this distinguished start, research on knowledge emotions—awe, interest, surprise, and confusion, labeled "epistemological emotions" by Keltner and Shiota (2003)—languished for nearly a hundred years. The present research explored confusion as a response to unusual visual art and poetry. From an appraisal perspective, confusion can be construed in terms of the appraisals that predict it. Appraisal spaces can depict an emotion's ostensible causes and illustrate how different emotions—such as confusion and interest—are related.

The evidence from two studies suggests that confusion and interest share a two- dimensional appraisal space, shown in Figure 1: they both involve appraisals of novelty–complexity and of comprehensibility, but they differ in whether people's ability to understand the event is low (confusion) or high (interest). In Experiment 1, interest and confusion in response to visual art and to poetry were distinguished by their within-person relationships with comprehensibility. In Experiment 2, readers who received a clue to a poem's meaning found it more interesting and less confusing. The evidence appears across two domains (visual art and poetry) and in both correlational and experimental designs, so the appraisal evidence appears to be robust.

I should emphasize that the within-person effects represent more than mere correlations between the appraisals and the emotions. First, within-person models avoid the between-person confounds that plague typical correlational designs. In Experiment 1, for example, each person had 14 scores for each predictor and outcome but only one score for gender, intelligence, openness to experience, and every other between-person variable. Because the one between- person score is invariant across the 14 within-person scores, it obviously cannot explain the covariance of the 14 appraisal scores with the 14 emotion scores. This robustness to the classic third-variable problem is a major appeal of multilevel designs.

Second, the within-person effects represent coefficients within a model that has multiple predictors and multiple outcomes, so the effects are estimated in light of the covariance between the predictors and the covariance between the outcomes. Experiment 1's design is correlational, but the statistical analysis imposes a model structure on the data. Unlike a matrix of simple correlations, these effects cannot simply be interpreted in isolation or flipped in direction. For example, making confusion a predictor and coping potential an outcome will not yield similar effects.

Exploring Islands of Aesthetic Experience

The present research is part of my ongoing interest in unusual aesthetic states (Silvia, 2009). Empirical aesthetics emphasizes subtle feelings of pleasure, consistent with its roots in philosophical aesthetics. Mild, sublime feelings are important, and many contemporary theories explain these feelings well (e.g., Hagtvedt, Hagtvedt, & Patrick, 2008; Leder, Belke, Oeberst, & Augustin, 2004; Martindale, Moore, & West, 1988; Whitfield, 2009). But people have a wide range of aesthetic experiences, and theories of aesthetic pleasure do not always explain unusual states well. Some unusual states are well-known in other fields but haven't attracted the attention of aesthetics researchers; emotions such as anger (Silvia & Brown, 2007), disgust (Cooper & Silvia, 2009), and surprise (Ludden et al., 2009) are good examples. Other unusual states are complicated human experiences that are hard to pin down, such as aesthetic chills (McCrae, 2007), the experience of beauty (Armstrong & Detweiler-Bedell, 2008), and feelings of awe, thrills, and being moved (Konecni, 2005). A grand theory of aesthetic experience, one that unifies these different theories and effects, may not be possible, but I imagine that aesthetics research will eventually build bridges between these islands of research.

Putting Confusion to Work

All emotions have a behavioral tug—they incline people to broad classes of actions (Frijda, Kuipers, & ter Schure, 1989). In this functional sense, interest and confusion are opposites. Interest motivates learning, exploring, seeking information, and engaging with new things (Silvia, 2006b); confusion presumably motivates withdrawing, avoiding, and shifting to something different. This makes confusion a problem for educators, who want to promote engagement instead of avoidance. Nevertheless, confusion presents an educational opportunity for art educators.

By reflecting on their emotions, people can use their feelings for information and can modify the emotion–action link. A common example is from anger management, which (among other things) encourages people to think about what their angry feelings mean instead of merely feeling mad. For confusion, people can be encouraged to think about the fact that they feel confused.[1] (The facial expression of confusion—a puzzled look familiar to all instructors—can help teachers identify the perplexed.) If people learn that confusion is a signal that something is awry cognitively, then they can use it as information about the effectiveness of their learning strategies. People can thus use confusion as a signal that they need to shift their tactics—such as ask for help, consult experts, reread basic sources, or take a break—instead of as a signal to give up and shift to something else. By turning confusion into a constructive signal, psychologists can have a clean conscience when they force their students to visit the dreaded campus museum.

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Author Note

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Footnote

1. As an aside, reflecting on feelings of confusion turns the metacognitive state of confusion into a meta-metacognitive state: people are thinking about what they were thinking about their thoughts. (I find this a bit confusing.)

Figure 1. An appraisal space for confusion and interest.

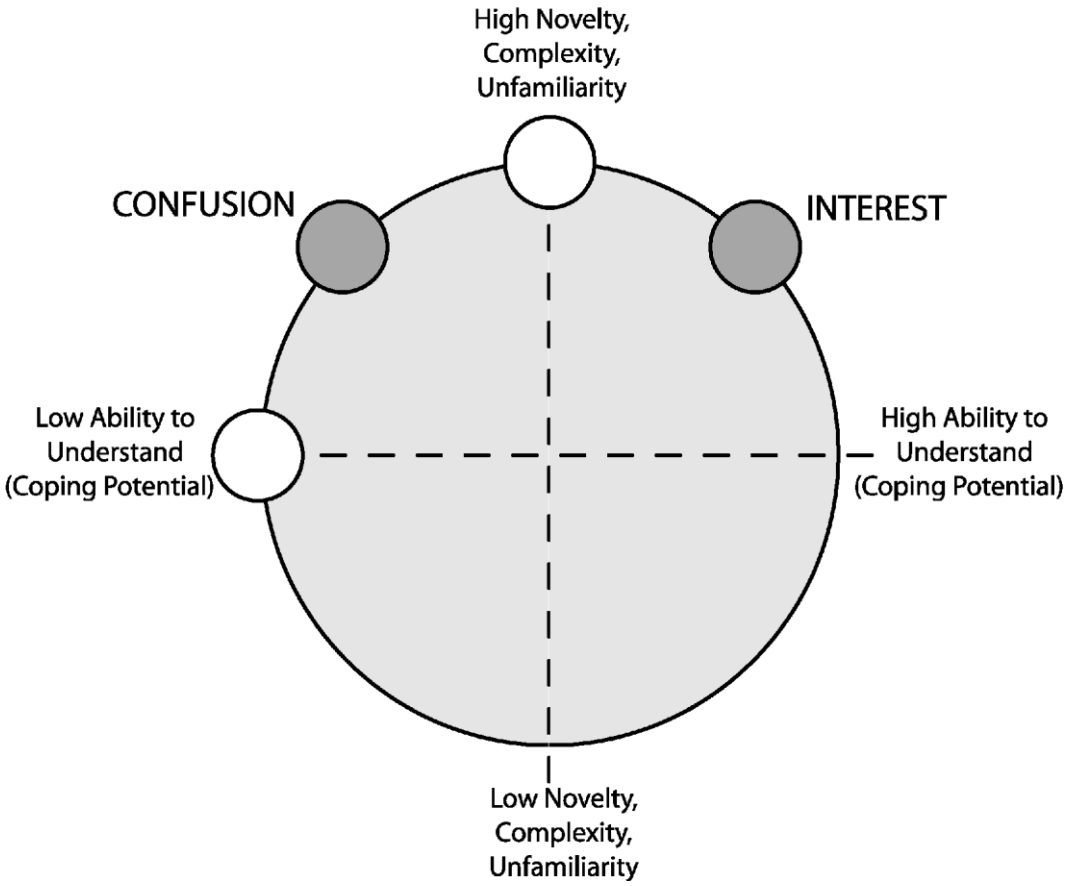

Figure 2. Within-person effects of the appraisals on confusion and interest: Experiment 1.