



The specific relationship between disgust and interest: Relevance during biology class dissections and gender differences

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ABSTRACT

This investigation examined trajectories of interest and disgust related to a biology dissection class. Three hundred and two secondary students completed ratings of disgust sensitivity and individual interest in the topic of the heart approximately one week before a dissection class. States of disgust and interest were recorded before, during, and after the dissection, and again four weeks later. Overall, girls expressed higher disgust sensitivity than boys, but showed similar levels of individual interest in the heart topic. Individual interest was negatively related to feelings of disgust prior to and during the dissection while feelings of disgust at the beginning of the class negatively predicted students' interest during the dissection. These findings extend knowledge of the interactive influences of students' affective experiences during a specific curriculum task and provide a complementary perspective to research findings on emotions relating to achievement outcomes.

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1. Introduction

In the last decade research programs have increasingly drawn attention to the important role of emotions in students' learning. Adolescents experience a wide range of emotions in learning settings, ranging from anxiety, boredom and anger to enjoyment of learning, hope and pride (Pekrun, Goetz, Titz, & Perry, 2002). Pekrun's control-value theory of achievement emotions posits that emotions can influence cognitive resources, motivation, use of strategies and self-regulation. Other researchers focus on the role of metacognitive feelings (Efklides, 2006), emotional well-being and regulation within self-regulation (Boekaerts & Cascallar, 2006), and the affective character of students' on-task experiences (Ainley, 2007).

Acknowledging a range of meanings for terms like affect, feeling, and emotion, Carver and Harmon-Jones (2009) suggest that "Affect is generally used to imply a hedonic experience, a sense of valence, a subjective sense of positivity or negativity arising from an event. When many use the word emotion, it is with that sense in mind" (p. 183). In this investigation focus is on the affective experience aspect of emotion. We investigate the relations between disgust and interest at the level of predispositions and as transient on-task states.

The role of predispositions in the development of on-task affective experience is important for science education, especially biology education, where curriculum content involves experiences that may prompt strong negative and positive feelings, for example, touching dead animal parts in dissections. From the theoretical perspective, dissections offer an opportunity to investigate the interplay of potentially conflicting feelings such as disgust and interest (Maloney, 2002) both at the level of on-task affective experience and as general predispositions. From the practical perspective, knowledge of how students respond to curriculum contents associated with negative emotions is crucial for science educators since such learning experiences are an essential part of science curricula (e.g., National Association of Biology Teachers [NABT], 2008). These considerations gave rise to questions concerning how affective experiences function in an important science learning context: Can disgust and interest co-occur? Do levels of disgust and interest change over time? Do disgust and interest influence each other across the course of a dissection? Are there gender differences in students' experiences of disgust and interest?

1.1. Disgust and interest

1.1.1. Disgust

Disgust does not feature in the current attention to emotions in education. Pekrun's (Pekrun et al., 2002) data on emotions students

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reported in academic settings did not yield any reports of disgust. More recently Pekrun and colleagues (Pekrun, Frenzel, Goetz, & Perry, 2007) have argued for a distinction between activity and outcome emotions and point out that activity emotions have been neglected in achievement emotion research. However, there are researchers whose work relates to achievement activities who report evidence of students experiencing disgust; for example, activities such as dissections where students handle animal parts (Maloney, 2002), or handling invertebrates, soils or swamp water as part of environmental education activities (Bixler & Floyd, 1999). The content of reading texts from history or social studies can also prompt feelings of disgust, for example, when reading about eating disorders (Ainley, Corrigan, & Richardson, 2005).

Within the broader lexicon of emotions disgust is conceptualized as a negative basic emotion with distinct cognitive, physiological and behavioral dimensions (Izard, 2007). Disgust describes revulsion at the prospect of incorporation of an offensive object (Haidt, McCauley, & Rozin, 1994). Disgust is elicited by death and decay but can also be triggered by moral issues. Disgust involves turning away from the offensive viewpoint. As a predisposition disgust has been researched as disgust sensitivity, a predisposition to experience disgust in response to a variety of aversive stimuli, and at the level of immediate affective experience, feelings of disgust.

At the experiential level there is evidence that, simultaneously, a disgusting stimulus can trigger unconscious attraction or even open fascination (Rimé, Delfosse, & Corsini, 2005) and this prompted our investigation into whether disgust and interest co-occur in educational contexts.

1.1.2. Interest

Just as disgust can be distinguished as a predisposition or as immediate affective experience, there are two separate interest constructs; situational and individual interest (Hidi & Renninger, 2006; Krapp, 2005). Situational interest is triggered by specific environmental conditions and involves focused attention and affect, usually positive but sometimes negative (Hidi & Harackiewicz, 2000). Silvia (Turner & Silvia, 2006) proposed a model positing interest as a response to novelty and complexity under circumstances where the individual appraises themselves as being competent to deal with the new event. Other researchers have focused on the dynamics of the immediate on-task state of interest (Ainley, 2007; Krapp, 2005; Thoman, Sansone, & Pasupathi, 2007) provides the impulse to explore and to take in new information (Fredrickson, 2004). At the level of predisposition, individual interest represents a relatively enduring predisposition to reengage with particular content over time and is characterized by positive feelings, stored value and knowledge (Hidi & Renninger, 2006). Others (e.g., Schiefele & Krapp, 1996) define individual interest in terms of value-related valences and feeling-related valences. We expected that interest as a predisposition would be associated with students' positive on-task affective experience (interest) when dissecting animal organs.

1.1.3. Co-occurrence of disgust and interest

In general, positive emotions facilitate approach behavior and aversive stimuli prompt withdrawal (Watson, Wiese, Vaidya, & Tellegen, 1999) and the assumption is made that negative and positive emotional states are incompatible. However, as Carver and Harmon-Jones (2009) have shown, aversive stimuli may arouse strong anger resulting in approach. Earlier, Diener and Iran-Nejad (1986) suggested that negative and positive emotional responses can co-occur when moderate intensities of feeling are aroused, but are mutually exclusive when intensities are high. Based on research measuring responses to movies, Larsen, McGraw, and Cacioppo (2001) suggest that co-occurrence of negative and positive affect

is more likely in emotionally complex situations while Hemenover and Schimmack (2007) reported evidence of open fascination with disgusting objects in responses to a humorous but disgusting film clip. Evidence from students reading about eating disorders indicated students felt disgust and interest simultaneously (Ainley et al., 2005). The range of evidence suggests that characteristics of the situation are crucial for the pattern of affective experience.

In the current investigation co-occurrence of disgust and interest was investigated by exploring relations between levels of disgust and interest as on-task affective experience when students were introduced to their first dissection in a biology class.

1.2. Disgust and interest trajectories

Changes in students' task-related experiences of disgust and interest, were monitored as they proceeded through the dissection. Previous studies monitoring disgust during an intervention found evidence of habituation to the offensive stimuli. For example, Rozin (2008) reported habituation effects with medical students dissecting a cadaver suggesting that the intensity of the disgust experience for students may decrease as they become more familiar with body parts. However, it is not known whether habituation can be expected across a single biology class dissection.

On the other hand, reports of change in students' interest across the duration of an educational intervention show ambiguous results. For example, Randler and Bogner (2007) surveyed students' interest prior, during and after a unit on an aquatic ecosystem and found that students' interest in the topic significantly decreased. Hidi, Berndorff, and Ainley (2002) showed that an intervention program on argument writing enhanced students' interest in writing. Therefore, it is likely that both topic and nature of the experience may be decisive for the trajectory of interest. With respect to dissection experiences, students report finding them "interesting", "exciting" and "amazing" (Maloney, 2002) and students who have dissected animal organs report higher interest in dissections than students without such experience (Holstermann, Grube, & Bögeholz, 2010). Therefore, we expected that interest in dissections would be enhanced through experiencing the dissection of an animal organ.

1.3. The interactive effects of disgust and interest during the dissection

Negative affect both at the predisposition level and at the experiential level is usually assumed to be detrimental for students' intrinsic motivation and incompatible with positive feelings such as enjoyment and interest, and negative correlations in study situations generally support this assumption. High disgust sensitivity has been described as an intrapersonal barrier to the development of interest and positive attitudes toward initially disgusting objects (Bixler & Floyd, 1999). On the other hand it has also been shown that negative aspects of an object can trigger attention and interest (Hidi & Harackiewicz, 2000). Using pictures as affective stimuli, Patrick and Lavoro (1997) found that when the level of affect aroused was relatively mild, participants reported elevated interest in response to both pleasant and unpleasant pictures. However, when the pictures aroused stronger feelings, high interest was only reported for the pleasant pictures. Therefore, to explore the interactive effects of disgust and interest, the current investigation monitored students' experience of disgust and of interest at a number of points across the dissection experience.

1.4. Gender differences in disgust and interest

Researchers have shown that women tend to be more disgust sensitive than men (Haidt et al., 1994; Quigley, Sherman, &

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