

The Four-Phase Model of Interest Development

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Building on and extending existing research, this article proposes a 4-phase model of interest development. The model describes 4 phases in the development and deepening of learner interest: triggered situational interest, maintained situational interest, emerging (less-developed) individual interest, and well-developed individual interest. Affective as well as cognitive factors are considered. Educational implications of the proposed model are identified.

The level of a person's interest has repeatedly been found to be a powerful influence on learning. Specifically, interest has been found to influence:

- Attention (Ainley, Hidi, & Berndorff, 2002; Hidi, 1995; Hidi, Renninger, & Krapp, 2004; McDaniel, Waddill, Finstad, & Bourg, 2000; Renninger & Wozniak, 1985; U. Schiefele, 1998).
- Goals (Harackiewicz, Barron, Tauer, Carter, & Elliot, 2000; Harackiewicz & Durik, 2003; Pintrich & Zusho, 2002; Sansone & Smith, 2000; Senko & Harackiewicz, 2002).
- Levels of learning (Alexander, 1997; Alexander & Murphy, 1998; Harackiewicz, Barron, Tauer, & Elliot, 2002; Hoffmann, 2002; Koeller, Baumert, & Schnable, 2001; Krapp & Fink, 1992; Renninger, 1989, 1990; Renninger, Ewen, & Lasher, 2002; Renninger & Hidi, 2002; Sadoski, 2001; U. Schiefele, 1999; U. Schiefele & Krapp, 1996; Schraw & Dennison, 1994; Wade, Buxton, & Kelly, 1999).

Even though interest has been recognized as an important condition for learning, educators continue to wrestle with the difficulties of working with academically unmotivated students (Hidi & Harackiewicz, 2000). They do not have a clear understanding of their potential role in helping students to develop interest. In fact, teachers often think that students either have or do not have interest, and might not recognize that they could make a significant contribution to the development of students' academic interest (Lipstein & Renninger,

2006). Such misconceptions are likely to owe their origin to vocational interest research that shows the stability of existing interests (cf. Roberts & DelVecchio, 2000). Findings from the large-scale group surveys of vocational interest research can be misunderstood to suggest that if interest is not present, it cannot develop. Such studies simply record the presence of interest; they do not address whether, how, and why interests develop or how individual interest—a relatively enduring predisposition to reengage particular contents over time—can be encouraged to develop. The desire to reengage content over time to problem solve and seek answers to questions is a necessity for all students, if equal access to learning is to be achieved.

In this article, we propose a four-phase model of interest development and suggest its potential for supporting educational intervention. Interest is a psychological state that, in later phases of development, is also a predisposition to reengage content that applies to in-school and out-of-school learning and to young and old alike. Although we are not addressing the physiological correlates of interest in this text, they are acknowledged. The Four-Phase Model of Interest Development builds on and extends empirical studies of interest and learning.¹ In proposing this model, we draw on the ways in which researchers have measured interest and characterize their studies as describing early or late phases in the emergence of interest.

The model is described in full later in this article. Here, basic characteristics of the four-phase model are overviewed

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¹It should be noted that this model extends and further details a three-phase model of interest on which we collaborated with Krapp (2002).

briefly. The first phase of interest development is a triggered situational interest. If sustained, this first phase evolves into the second phase, a maintained situational interest. The third phase, which is characterized by an emerging (or less-well developed) individual interest,² may develop out of the second phase. The third phase of interest development can then lead to the fourth phase, a well-developed individual interest.

Each phase of interest is characterized by varying amounts of affect, knowledge, and value. The length and character of a given phase is likely to be influenced by individual experience, temperament, and genetic predisposition. The four phases are considered to be sequential and distinct, and represent a form of cumulative, progressive development in cases where interest is supported and sustained, either through the efforts of others or because of challenges or opportunity that a person sees in a task. However, without support from others, any phase of interest development can become dormant, regress to a previous phase, or disappear altogether (Renninger, 2000; Renninger & Hidi, 2002; Renninger, Sansone, & Smith, 2004). The proposed model (a) provides a description of how interest can develop and deepen, (b) points to the need for researchers to identify the phase of interest that they are investigating and the impact of their methods on the way in which they interpret and report their findings, and (c) suggests ways in which educators could support students to develop interest for particular content.

Before providing further detail about the proposed model, we review background information on the conceptualization and measurement of interest as a motivational variable. This review is based on articles, chapters, and books in the educational, cognitive, and social psychological literatures that have implications for understanding the dynamics of interest development; WebSpirs was used to identify relevant resources.

BACKGROUND

Interest as a motivational variable refers to the psychological state of engaging or the predisposition to reengage with particular classes of objects, events, or ideas over time. Here, these classes of objects, events, or ideas are termed content.

There are at least three ways in which interest can be distinguished from other motivational variables. First, interest includes both affective and cognitive components as separate but interacting systems (Hidi & Berndorff, 1998; Hidi & Harackiewicz, 2000; Hidi et al., 2004; Krapp, 2000, 2002; Rathunde, 1998; Renninger, 1989, 1990, 2000), a position

supported by neuroscientific research (LeDoux, 2000a, 2000b; Panksepp, 1998, 2003; Panksepp & Moskal, in press) and distinct from cognitive evaluation approaches to motivation (Hidi, 2003; Hidi et al., 2004).³ Typically, the affective component of interest describes positive emotions accompanying engagement, whereas the cognitive component refers to perceptual and representational activities related to engagement. However, even though interest has a highly energizing positive affective character, it can also be operative in many affectively negative situations (Panksepp, 2003). In each of the four phases of interest, the roles of affect and cognition vary.

Second, both the affective and cognitive components of interest have biological roots (Hidi, 2003). Neuroscientific research on approach circuits in the brain (e.g., Davidson, 2000) and on seeking behavior (e.g., Panksepp, 1998, 2000; Panksepp & Moskal, in press) indicate that interested activity has a biological foundation in all mammals. Panksepp and his colleagues specifically argued that the seeking system is an evolutionary and genetically ingrained emotional brain system. It is a biological foundation of the psychological state of interest in the sense that the person is engaged physically, cognitively, or symbolically with the object of his or her interest.

Third, interest is the outcome of an interaction between a person and a particular content (Hidi & Baird, 1986; Krapp, 2000; Renninger & Wozniak, 1985; H. Schiefele, Krapp, Prenzel, Heiland, & Kasten, 1983). The potential for interest is in the person but the content and the environment define the direction of interest and contribute to its development. Thus, other individuals, the organization of the environment, and a person's own efforts, such as self-regulation, can support interest development (Renninger, 2000; Renninger & Hidi, 2002; Renninger et al., 2004; Sansone & Smith, 2000; Sansone, Weir, Harpster, & Morgan, 1992; Schraw & Dennison, 1994). This means that interest is always content specific and not a predisposition that applies across all activities (Krapp, 2000; Krapp & Fink, 1992; Renninger, 1989, 1990, 2000). Even those students who are highly motivated to achieve generally have interest(s) only for a discrete set of specific content areas (Renninger et al., 2002). Moreover, if a person has an emerging or a well-developed individual inter-

²Elsewhere, emerging individual interest has been discussed and studied as less developed individual interest as compared to a well-developed individual interest (Renninger, 2000). The label was changed to acknowledge that in terms of interest development, a less developed individual interest is an emerging individual interest.

³Motivational theories that address learning are based on cognitive frameworks that focus on thought, feelings, and belief (Meyer & Turner, 2002). These theories describe affect and knowledge as outcomes, rather than mediators, of cognition. In achievement goal theory, for example, achievement goals are considered to influence affective reactions to engagement (Ames, 1992; Dweck & Leggett, 1988). In self-efficacy theory (Bandura, 1977, 1982, 1997; Zimmerman, 2000a, 2000b), an individual's beliefs about his or her ability to produce successful outcomes and attain identified goals have been described as critical to increasing achievement motivation and performance. In task value theory (Eccles et al., 1983; Wigfield & Eccles, 1992, 2002), student motivation is described as resulting from beliefs and expectations about activity. In self-determination theory (Deci & Ryan, 1985, 2000; Ryan & Deci, 2000), a person's ability to satisfy basic psychological needs is a function of his or her valued outcomes, or goals.

est for content (e.g., facilitation), then related new content, opportunities, or challenge provides additional ideas and could be said to trigger the psychological state of interest—although the psychological state that is triggered would be related to the developing predisposition (Renninger, 2000).

Two types of interest have been the primary focus of educational research to date: situational and individual interest (e.g., Alexander, Kulikowich, & Schulze, 1994; Hidi, 1990, 2000; Krapp, 2000; Krapp, Hidi, & Renninger, 1992; Renninger, 1990, 2000; Schraw & Lehman, 2001).⁴ Situational interest refers to focused attention and the affective reaction that is triggered in the moment by environmental stimuli, which may or may not last over time (Hidi, 1990; Hidi & Baird, 1986), whereas individual interest refers to a person's relatively enduring predisposition to reengage particular content over time as well as to the immediate psychological state when this predisposition has been activated (Krapp & Fink, 1992; Renninger, 2000; Renninger & Wozniak, 1985).

When a person who picks up a magazine in a waiting room fixates on an article about which he or she knows very little, his or her interest has been triggered by the situation. Situational interest is always motivating. It can be initiated by something in the environment such as the magazine in the waiting room, a text about baseball that a teacher gives a child (Bergin, 1999), or mathematics software that students with little interest for mathematics are willing to explore (Renninger et al., 2004). However, individuals also may respond to the affordances of the environment due to a genetic predisposition (Carson, 2002) or prior experience. For example, a child with an ear for music may rivet to the opportunity to learn how to play a piano (Suzuki, 1983). Similarly, a person with a background in mathematics can become interested in technology because it allows an enhanced pursuit of mathematical questions (Renninger & Shumar, 2002, 2004).

If the person who picks up the magazine recognizes the relevance of the article to a topic that he or she has been trying to understand for some time and feels a surge of excitement, this person can also be said to have an individual interest for that topic. Like situational interest, individual interest is always motivating; it builds on what a person perceives, cognitively represents to oneself, and considers as possibilities for activity (Renninger, 1990, 2000). As such, individual interest is internally driven, although not exclusively so. A person with an individual interest can also experience situational interest given appropriate levels of environmental

stimuli (Renninger & Hidi, 2002; also see discussions in Bergin, 1999; Hidi & Harackiewicz, 2000).

Although the terms situational and individual interest were first used to distinguish between the ways in which researchers identified and measured interest (Hidi & Baird, 1986, 1988; Krapp et al., 1992; Renninger, 1990), this distinction has since been verified empirically (e.g., Ainley et al., 2002; Harackiewicz et al., 2002; Mitchell, 1993; Renninger & Hidi, 2002).

Situational interest has been shown to positively influence cognitive performance such as reading comprehension (Alexander & Jetton, 1996; Hidi, 1990; Hidi & Baird, 1988) and work with computers (Azevedo, 2004; Cordova & Lepper, 1996; Cognition and Technology Group at Vanderbilt, 1997; diSessa, 2000; Edelson & Joseph, 2004; Lepper & Cordova, 1992). In addition, situational interest has been shown to narrow inferencing (McDaniel et al., 2000), focus attention (Hidi, 1995; McDaniel et al., 2000), enable integration of information with prior knowledge (Kintsch, 1980), and enhance levels of learning (Mitchell, 1993; Schraw, Bruning, & Svoboda, 1995; Schraw & Dennison, 1994; Wade, 1992; Wade & Adams, 1990).

Similarly, individual interest has been found to have a positive impact on attention, recognition, and recall (Renninger & Wozniak, 1985); persistence and effort (Krapp & Lewalter, 2001; Prenzel, 1992; Renninger & Hidi, 2002; Renninger & Leckrone, 1991); academic motivation (Ainley, 1998; Alexander & Murphy, 1998; Harackiewicz & Durik, 2003; U. Schiefele, 2001); and levels of learning (Renninger et al., 2002; Renninger & Hidi, 2002; U. Schiefele, 1999; U. Schiefele & Krapp, 1996). In addition, the positive affect associated with the levels of interest generated from both situational and individual factors has been found to contribute to cognitive performance (Ainley et al., 2002; Krapp, 2002b).

THE DEVELOPMENT AND DEEPENING OF INTEREST: THE FOUR-PHASE MODEL OF INTEREST DEVELOPMENT

Both situational interest and individual interest have been described as consisting of two phases. In situational interest, these involve a phase in which interest is triggered and a subsequent phase in which interest is maintained (Bergin, 1999; Harackiewicz et al., 2000; Hidi, 2000; Hidi & Baird, 1986; Hidi & Harackiewicz, 2000; Mitchell, 1993). In individual interest, the two phases include an emerging individual interest and well-developed individual interest (Renninger, 2000). The proposed four-phase model integrates these conceptualizations.

The four-phase model of interest development describes phases of situational and individual interest in terms of both affective and cognitive processes. It also identifies situational interest as providing a basis for an emerging individual interest. Building on the work of researchers who have suggested

⁴A number of additional terms have also been used in the interest literature; for example, topic interest, intrinsic interest, and personal interest (see discussions in Hidi, 2000; Renninger 2000). Although the labels are different, an emphasis on a particular relation between affect and cognition characterizes each term, and each one can be understood in terms of situational or individual interest. For purposes of this article, review of the interest literature that includes these additional terms is mapped to situational or individual interest.

that situational interest supports the development of individual interest (e.g., Alexander, 1997, 2004; Alexander & Jetton, 1996; Hidi & Anderson, 1992; Hidi & Berndorff, 1998; Krapp, 2002b; Renninger, 2000; Renninger & Hidi, 2002; Schraw & Lehman, 2001; Silvia, 2001), the four-phase model describes early phases of interest development as primarily consisting of focused attention and positive feelings. As such, it provides a rationale for identifying early phases of interest development in terms of affect or liking. In contrast, because the later phases consist of positive feelings as well as both stored value and knowledge, it is suggested that interest in these phases should be assessed by indicators of stored knowledge and repeated engagement, in addition to positive feelings (Renninger, 1989, 1990, 1998b).

Importantly, differing levels of effort, self-efficacy, goal setting, and ability to self-regulate behavior have been found to characterize each phase of interest, and changes in these variables occur when interest develops or recedes (Lipstein & Renninger, *in press*; Renninger & Hidi, 2002). As Lipstein and Renninger (2006) reported, the portrait of students who only have a triggered situational interest for writing indicates that they feel like they expend a lot of effort even if they have worked only a short amount of time. They also have little self-efficacy about their abilities to write, a discrete set of goals for themselves as writers as they simply want to get assigned writing tasks done, and may be scaffolded by the presence of a topic of interest to persevere to write. This portrait varies from those of students in other phases of interest. For example, the students with an emerging individual interest also feel as though they expend a lot of effort but they also spend a lot of time working on their writing. They have a high level of self-efficacy about their abilities to write, have ambitious goals for themselves as writers, and also find themselves scaffolded by the presence of a topic of interest.

A review of the existing empirical literature suggests the following as characteristics of each of the four phases of interest development. First, we define the phase. This is followed by description, information about the type of support that a person in this phase of interest typically needs, the way in which educational or instructional conditions might contribute to the development of interest, and the developmental progression related to this phase of development.

Phase 1: Triggered Situational Interest

Triggered situational interest refers to a psychological state of interest that results from short-term changes in affective and cognitive processing (Hidi & Baird, 1986, 1988; Mitchell, 1993):

1. Triggered situational interest can be sparked by environmental or text features such as incongruous, surprising information; character identification or personal relevance; and intensity (Anderson, Shirey, Wilson, & Fielding, 1987; Garner, Brown, Sanders, & Menke, 1992; Garner, Gillingham, &

White, 1989; Hidi & Baird, 1986, 1988; Renninger & Hidi, 2002; Sadoski, 2001).

2. Triggered situational interest is typically, but not exclusively, externally supported (Bloom, 1985; Sloboda, 1990; Sosniak, 1990).

3. Instructional conditions or learning environments that include group work, puzzles, computers, and so on have been found to trigger situational interest (Cordova & Lepper, 1996; Hidi & Baird, 1988; Hidi, Weiss, Berndorff, & Nolan, 1998; Lepper & Cordova, 1992; Mitchell, 1993; Sloboda & Davidson, 1995).

4. Triggered situational interest may be a precursor to the predisposition to reengage particular content over time as in more developed phases of interest (Renninger & Hidi, 2002; Renninger et al., 2004).

Phase 2: Maintained Situational Interest

Maintained situational interest refers to a psychological state of interest that is subsequent to a triggered state, involves focused attention and persistence over an extended episode in time, and/or reoccurs and again persists:

1. Situational interest is held and sustained through meaningfulness of tasks and/or personal involvement (Harackiewicz et al., 2000; Mitchell, 1993).

2. A maintained situational interest is typically, but not exclusively, externally supported (Renninger & Hidi, 2002; Sansone & Morgan, 1992; Sansone et al., 1992; Schraw & Dennison, 1994; Wolters, 1998).

3. Instructional conditions or learning environments provide meaningful and personally involving activities, such as project-based learning, cooperative group work, and one-on-one tutoring, can contribute to the maintenance of situational interest (Hidi et al., 1998; Hoffmann, 2002; Mitchell, 1993; Renninger et al., 2004; Schraw & Dennison, 1994; Sloboda & Davidson, 1995).

4. A maintained situational interest may or may not be a precursor to the development of a predisposition to reengage particular content over time as in more developed forms of interest (Harackiewicz et al., 2000; Hidi & Baird, 1988; Lipstein & Renninger, 2006; Mitchell, 1993).

Phase 3: Emerging Individual Interest

Emerging individual interest refers to a psychological state of interest as well as to the beginning phases of a relatively enduring predisposition to seek repeated reengagement with particular classes of content over time:

1. Emerging individual interest is characterized by positive feelings, stored knowledge, and stored value (Bloom, 1985; Renninger, 1989, 1990, 2000; Renninger & Wozniak, 1985). Based on previous engagement, the student values the opportunity to reengage tasks related to his or her emerging

individual interest and will opt to do these if given a choice (Bloom, 1985; Flowerday & Schraw, 2003; Katz, Kanat-Maymon, & Assor, 2003; Renninger & Hidi, 2002; Renninger & Shumar, 2002). The student begins to regularly generate his or her own “curiosity” questions about the content of an emerging individual interest (Renninger, 1990; Renninger & Shumar, 2002). As an outcome of such curiosity questions or self-set challenges, students may redefine and exceed task demands in their work with an emerging individual interest (Lipstein & Renninger, 2006; Renninger, Boone, Luft, & Alejandre, in press; Renninger & Hidi, 2002; Renninger et al., 2004). The student is likely to be resourceful when conditions do not immediately allow a question about content of emerging individual interest to be answered (Lipstein & Renninger, 2006; Renninger & Hidi, 2002; Renninger & Shumar, 2002). An emerging individual interest can enable a person to anticipate subsequent steps in processing work with content (Renninger & Hidi, 2002) and produce effort that feels effortless (Lipstein & Renninger, 2006; Renninger & Hidi, 2002; Renninger et al., 2004).

2. An emerging individual interest is typically but not exclusively self-generated (Cobb, 2004; Nolan, 2006; Renninger & Shumar, 2004; Sosniak, 1990). An emerging individual interest requires some external support, in the form of models or others such as peers, experts, and so on; such support can contribute to increased understanding (Heath & Roach, 1999; Krapp & Lewalter, 2001; Renninger, 2000; Renninger et al., in press) and be presented in the form of tasks or environments that challenge and provide opportunity (Nolan, 2006; Pressick-Kilborn & Walker, 2002; Renninger, 2000; Renninger & Shumar, 2002, 2004). A learner with emerging individual interest also may need encouragement from others to persevere when confronted with difficulty (Bloom, 1985; Carey, Kleiner, Porch, Farris, & Burns, 2002; Renninger & Shumar, 2002; Sosniak, 1990).

3. Instructional conditions or the learning environment can enable the development of an emerging individual interest (Hannover, 1998; Hoffmann, 2002; Krapp & Lewalter, 2001; Lipstein & Renninger, 2006; Pressick-Kilborn & Walker, 2002; Renninger et al., 2004; Renninger & Shumar, 2002, 2004).

4. An emerging individual interest may or may not lead to well-developed individual interest (Bloom, 1985; Lipstein & Renninger, 2006; Sloboda, 1990).

Phase 4: Well-Developed Individual Interest

Well-developed individual interest refers to the psychological state of interest as well as to a relatively enduring predisposition to reengage with particular classes of content over time:

1. A well-developed individual interest is characterized by positive feelings, and more stored knowledge and more stored value for particular content than for other activity including emerging individual interest (Renninger, 1989, 1990,

2000; Renninger et al., 2002; Renninger & Wozniak, 1985). Based on previous engagement, the student values the opportunity to reengage tasks for which he or she has a well-developed individual interest and will opt to pursue these if given a choice (Renninger, 1989, 1990; Renninger & Hidi, 2002; Renninger & Leckrone, 1991; Renninger et al., 2004). A well-developed individual interest may result in a student generating and seeking answers to curiosity questions (Lipstein & Renninger, 2006; Renninger & Hidi, 2002).⁵ The student is likely to be resourceful when conditions do not immediately allow a question concerning a well-developed individual interest to be answered (Renninger & Hidi, 2002; Renninger & Shumar, 2002). A well-developed individual interest enables a person to anticipate subsequent steps in processing work with content (Renninger & Hidi, 2002). Well-developed individual interest produces effort that feels effortless (Lipstein & Renninger, 2006; Renninger & Hidi, 2002; Renninger et al., 2004). A well-developed individual interest enables a person to sustain long-term constructive and creative endeavors (Izard & Ackerman, 2000; Tomkins, 1962) and generates more types and deeper levels of strategies for work with tasks (Alexander & Murphy, 1998; Renninger, 1990; U. Schiefele & Krapp, 1996). A well-developed individual interest leads a student to consider both the context and content of a task in the process of problem solution or passage comprehension (Renninger et al., 2002). Well-developed individual interest promotes self-regulation (Lipstein & Renninger, 2006; Renninger et al., 2004; Sansone & Smith, 2000).

2. A well-developed individual interest is typically but not exclusively self-generated (Bloom, 1985; Nolan, 2006; Pressick-Kilborn & Walker, 2002; Renninger et al., 2002; Renninger et al., 2004; Renninger & Shumar, 2004; Sloboda, 1990). Well-developed individual interest may also benefit from external support; support in the form of models or others such as peers, experts, and so on also can contribute to increased understanding (Csikszentmihalyi, Rathunde, & Whalen, 1993; Renninger, 2000). A learner with well-developed individual interest will persevere to work, or address a question, even in the face of frustration (Fink, 1998; Prenzel, 1992; Renninger & Hidi, 2002; Renninger & Leckrone, 1991).

3. Instructional conditions or the learning environment can facilitate the development and deepening of well-developed individual interest by providing opportunities that include interaction and challenge that leads to knowledge building (Renninger & Hidi, 2002; Renninger & Shumar, 2002; Sloboda, 1990).

Considered sequentially and from a developmental perspective, the characteristics of each phase of interest may be considered mediators of subsequent development and the

⁵Curiosity questions refer to the type of verbal or nonverbal questioning that a learner generates in the process of organizing and accommodating new information (Renninger, 2000; see also Lindfors, 1987).

deepening of interest as well as outcomes of previous development. Most of the research on interest to date has been descriptive. Only a few studies have been conducted that have addressed the development of interest over time (e.g., Fink, 1998; Gisbert, 1998; Krapp & Fink, 1992; Krapp & Lewalter, 2001; Renninger & Leckrone, 1991), or provide evidence of causal relationships among phases of interest. Mitchell (1993), for example, demonstrated that although group work, puzzles, and computers would trigger adolescent students' interest in math, only personal involvement and the meaningfulness of tasks maintain their interest over time. Harackiewicz et al. (2000) further demonstrated that factors that maintained college student interest were better predictors of continuing interest than were factors that only triggered their interest. More recently, Harackiewicz et al. (2002) replicated these findings and distinguished interest from students' goals and performance. Further work that establishes the predictive validity of the proposed four phases of interest development and examines the relations among them is the next needed step for interest research.

Case Illustration

The following case illustration provides an example of how the four phases of interest development appear to be linked:

Julia is in her last term of college. While nervously waiting for a medical appointment, she picks up and flips through a magazine. Her attention is drawn to an article about a man who is an engineer and who recently gave up his partnership in a successful consulting practice to become a facilitator. A facilitator is a person who tries to help people or groups resolve conflicts before they go to litigation. Julia likes the idea of working with people and wants to read more even though she has never heard of the occupation of facilitator before now. Meanwhile, she is called to meet the doctor. She carefully marks the page she is reading and leaves the magazine on the table. Following her appointment, she goes back to the table, finds the magazine, and sits down to finish reading the article.

Julia's case is an illustration of triggered and maintained situational interest. Her situational interest was triggered by encountering the presence of a new concept—facilitation. It was maintained through her desire to seek more information from the article and her ability to identify with the sense of possibility that facilitation could represent (Alexander, 2004; Hannover, 1998; Krapp, 2002b; Markus & Nurius, 1986). Julia wanted to learn more about facilitation. Although previously she did not consider the possibility of becoming a facilitator, Julia concluded that maybe she could do this type of job after reading a portion of the article, or that maybe she could recommend the job to others. Presumably, Julia recognized that she had qualities that are critical to the type of ne-

gotiations in which facilitators engage and that she might enjoy this type of work. It should be noted that although in the example of Julia, the topic of facilitation is self-relevant, this aspect of a topic or content is not a necessary condition for interest development. Instead, Julia might have found an article about dinosaurs, become interested in the topic, and through continued engagement, developed an individual interest for dinosaurs.

The article she found about facilitation, and the sense of possibility it suggested, maintained Julia's situational interest.

Once she returns to reading the article, Julia makes notes and decides to follow up on what she has read. She makes plans to go to the library, search the Internet, and talk to her advisor about her options.

Even though she had little, if any, knowledge about facilitation prior to reading the article, she did have knowledge of related information such as different types of jobs that involve helping people, including helping others settle their differences. It is likely that this type of related information (Pressik-Kilbourn & Walker, 2002; Renninger & Shumar, 2002) combined with the concreteness of the content (Sadoski, 2001) initially triggered her interest and rendered the article accessible, despite Julia's lack of background knowledge on the topic. It is also likely that it was this combination of related prior knowledge and text characteristics that enabled her to sustain her situational interest for the content of the article (Harackiewicz et al., 2000; Mitchell, 1993).

Certainly, as Julia gained more knowledge and repeatedly sought out opportunities to reengage with ideas about facilitation, her sense of possibility was confirmed. She continued to hold positive feelings, and her valuing of the facilitator role increased. Julia's efforts to find more information about this type of job and her identification with its possibility suggest that through repeated engagement or magnification, as referred to by Silvia (2001), an individual interest for facilitation was emerging.

Given repeated engagement over time, it is likely that Julia's interest for facilitation could evolve into a well-developed interest. A well-developed interest would be characterized by her continued effort to learn about facilitation, positive feelings about facilitation, and increased valuing for the concept relative to the other content with which she is involved (Renninger, 2000). In fact, it could be expected that she would persevere to think about and pursue a career in facilitation despite confusing or negative experiences (Ainley, 2002; Prenzel, 1992; Renninger, 2000; Renninger & Hidi, 2002).

The case of John provides a contrast to that of Julia.

A few days later, John, another student who is also waiting to see a doctor, picks up the same magazine. He flips through the pages, stopping at the same article,

and reads intently until he hears his name called. In contrast to Julia, however, John does not finish the article. Once John is called in to meet with the doctor, his reading is interrupted, and his triggered situational interest for the article ceases. John, like Julia, picked up the magazine and initially felt some curiosity about what a facilitator might do. Because he exerted no effort to learn more about facilitation or to finish reading the article after meeting with the doctor, in his situation the triggered situational interest is not maintained.

As these examples demonstrate, once situational interest has been elicited, it can last for short or long periods of time. If an interest is maintained over time through repeated engagements and a person begins to identify with the content in question (Hannover, 1998; Jetton & Alexander, 2001), he or she can be described as having an emerging individual interest. Julia's interest, for example, was triggered, and she became resourceful about finding information and seeking support for learning more about facilitation.

However, as illustrated by the cases of Julia and John, only some situational interests develop into individual interests, and only some individual interests become well developed. Moreover, it is important to acknowledge that although situational interest represents the initial phases of the development of individual interest, there are multiple possibilities for the person with an existing individual interest to experience related situational interests (Bergin, 1999; Renninger & Hidi, 2002; Renninger & Shumar, 2002).

The likelihood that Julia would develop a well-developed interest for facilitation and that John would not, is signaled by Julia's return to the article following the interview and John's departure (Renninger, 1989, 1990; Renninger & Leckrone, 1991). At that point in time, Julia could have simply left the office, as John did. However, the interest that was triggered by the new information (the article about facilitation) was maintained and she wanted to finish reading the article (Dewey, 1913; Hidi & Baird, 1986; Mitchell, 1993). As Julia gathered more information about facilitation, her positive affect was sustained, and her knowledge continued to develop. It is possible that she reflected on facilitation in terms of its utility as a source of a job (Wigfield, 1994; Wigfield & Eccles, 1992, 2002), which may have further supported her positive feelings and added to its value (Eccles et al., 1983). It is also possible that her situational interest for facilitation was maintained by her identification with the details of what facilitators do (Hannover, 1998), her feelings of self-efficacy (Bandura, 1977; Zimmerman, 2000a, 2000b), and her sense of possibility (Markus & Nurius, 1986). Julia's search for additional information and her self-regulation of her own activity suggest that she had begun to develop a formative relation with facilitation (Boekaerts & Niemivirta, 2000; Sansone & Smith, 2000). This type of relation characterizes individual interest.

What Would Disprove the Four-Phase Model of Interest Development?

In this section of this article, three potential challenges to the validity of the model are identified and addressed: Can individual interest develop without situational interest? Can well-developed individual interest deepen or broaden without continued engagement or support? Can instances of well-developed interest be identified in people without substantial related knowledge?

First, if individual interest can be shown to develop without any prior triggering and maintenance of situational interest, this would disconfirm the sequential relation among the four phases of interest development. As the preceding discussion suggests, available research data indicate that a person needs to be exposed to or to have some minimal level of knowledge of a content area for interest to be triggered. Even if one has a genetic predisposition for a particular activity, he or she needs to have models, instruction, and opportunity relevant to that activity for interest to be triggered and to develop. There are no data suggesting that individual interest emerges without first being experienced as a situational interest.⁶

Second, if well-developed individual interest for a particular content were to continue to deepen or broaden despite lack of repeated engagement, then the need for continuous exposure or support to sustain and deepen interest would be disconfirmed. Strong evidence exists that engagement and support sustains and deepens interest for content (e.g., Csikszentmihalyi et al., 1993; Renninger, 2000; Renninger & Hidi, 2002; Renninger et al., 2004). At this point, there is no evidence that continued and deepened interest occurs without continued engagement or support. Julia's interest cannot continue to deepen or broaden if she does not find further information about facilitation online, in the library, or through talking with others. In fact, her interest would be likely to wane or become dormant (Renninger, 2000). An essential component of the four-phase model is that support and opportunities to pursue interest-related questions are necessary for each phase of interest. Without these, regression to a previous phase of interest can be expected to occur.

Third, if instances of well-developed interest could be identified in people without substantial related knowledge, this would disconfirm that individual interest includes a knowledge component. To date, there is no evidence that suggests that this situation exists. Although Alexander, Jetton, and Kulikowich (1995) assessed interest and knowledge as distinct variables, their findings—which confirm that levels of individual interest and domain knowledge are highly corre-

⁶This is not to say, however, that individual interest, once developed, cannot exist without situational interest being present. For example, individual interest for a topic can help students persevere through boring presentations or texts (Hidi & Harackiewicz, 2000).

lated—provide support for a four-phase model of interest development.

What Have Been Alternate Approaches to Interest Development?

Among the few alternate approaches to interest development, the most cohesive presentations are the model of domain learning (Alexander, 1997, 2004), person–object theory of interest (Krapp, 1999, 2002a, 2002b; H. Schiefele et al., 1983), and the psychology of constructive capriciousness (Silvia, 2001). The four-phase model of interest development builds on aspects of these approaches. It also differs from each.

Model of domain learning. Alexander’s (1997, 2004) model of domain learning (MDL) describes interest development in relation to a person’s developing expertise in academic domains. Interest is discussed as paralleling strategy development and processing and knowledge acquisition. Also, it is discussed as serving to “spark further exploration or maintain learner investment when subsequent difficulties are encountered” (Alexander, 2004, p. 289). Like the four-phase model, both situational and individual interests are included in discussions of the role of interest in the MDL. In addition, the MDL considers situational interest to precede the development of individual interest and to have more significance in early phases of domain learning (Alexander, 1997). However, unlike the four-phase model, once individual interest is developed, situational interest does not cooccur with individual interest.

As a model of expertise development, the MDL focuses on the development of domain-specific expertise. Alexander (2004) suggested that most students can move from acclimation to competence in a domain; however, she also suggested that K–12 teachers cannot expect to support students in developing expertise, due to their age and phase of instruction. The MDL specifies stages of individual expertise development (and of concurrent interest development). Alexander suggested that the final stage of expertise is only reached after high school and that the stages of the MDL are sequential and irreversible. If a person is an expert, then he or she has an individual interest for the subject matter domain.

This set of propositions differs from The Four-Phase Model of Interest Development, which makes several distinctions:

1. Interest exists in the interaction between the person and his or her environment (e.g., the subject matter to be learned).
2. Even young children can be identified as having individual interest.
3. Phases of interest development are subject to reversals if there is no opportunity for repeated engagement or support for this interaction is not present.

4. It is possible for a person to have expertise without also having a well-developed individual interest for a subject matter (e.g., an x-ray technician).

In the MDL, the relation of affect and cognition is considered to be distinct across each of three identified stages of expertise development: acclimation, competence, and proficiency or expertise. However, The Four-Phase Model of Interest Development describes interest as having both cognitive and affective components across all stages. The development of the four-phase model was informed by existing differences between the models regarding the roles of affect and cognition. Of particular note is the distinction drawn in the MDL between knowledge and interest. Early work of Alexander and her colleagues had identified interest in terms of affect and measured interest in terms of liking (Alexander et al., 1995; Alexander et al., 1994). This work maps onto the early phases of the four-phase model of interest development. As Alexander (2004) pointed out, she and her colleagues recently have begun to use liking as well as participant activities with content to make distinctions between type of interest. This development in her work has parallels to the distinction between maintained and emerging individual interest in the four-phase model.

Person–object theory. The person–object theory of interest (POI) grew out of discussions among German educational psychologists in the mid-1970s. Initially, POI focused on individual interest that emerged in the interaction of the environment and the person, and its implications for pedagogy (Krapp & Fink, 1992; Prenzel, 1988, 1992; H. Schiefele et al., 1983). More recently, POI has been discussed in terms of cognitive evaluation, specifically the self-determination theory of Deci and Ryan (cf. Krapp, 2002a, 2002b, 2005; Krapp & Lewalter, 2001).

Three aspects of POI are also central to the four-phase model of interest development. These include the views that interest is (a) a specific person–object relationship, (b) content specific rather than general, and (c) associated with positive emotions. A recent POI claim that interest is composed of value-related and feeling-related valences that define and characterize interest (Krapp, 2002a, 2002b; Schiefele & Krapp, 1996; U. Schiefele, 1992, 1996, 1999) differs from findings that inform the four-phase model. In the four-phase model affect is identified as an integral part of interest engagement; together with knowledge, it is considered to inform valuing. Moreover, both affective and cognitive factors are considered to inform each phase of interest development (Ainley et al., 2002; Renninger, 1989, 1990, 2000).

Although earlier and later work on the POI included knowledge factors (comparatively differentiated cognitive schemata of the object of interest), in subsequent related papers, the use of knowledge factors in defining and characterizing interest has been questioned. For example, Krapp (2000) suggested that using differentiated knowledge structures (high vs. low

levels of stored knowledge) to define interest raised serious theoretical and methodological problems. U. Schiefele (1996) and Krapp (1999, 2000) further suggested that the cognitive aspect of interest might only be an appropriate identifier of the interest of young children whose knowledge acquisition is mainly determined by interest. In the four-phase model, differentiated knowledge structures are a criterion of interest development in all individuals regardless of age. The four-phase model suggests, for example, that university students who share an interest for psychology, as studied by U. Schiefele and Krapp (1996), could differ in their knowledge about psychology at the onset of a course, suggesting that a sample of students whose interest was only identified based on liking might have very different knowledge bases. In support of this position, differing levels of stored knowledge and stored value have been found to impact individual interest on comprehension (Renninger et al., 2002).

The three basic psychological needs identified by Deci and Ryan (2000; see also Ryan & Deci, 2000) have been associated with the conceptualization of interest in POI (cf. Krapp, 2002a, 2002b). These include feelings of competence, autonomy, and social-relatedness, and they are described as essential to interest development. Krapp (2002a, 2002b, 2003) suggested that the predisposition to reengage a particular content of interest will only be realized if a person satisfies these needs. In the four-phase model, feelings of competence, autonomy, and social-relatedness also are considered to support students' developing and deepening interest (see Renninger & Shumar, 2002). However, rather than considering interest to be an outcome of the cognitive realization of these three basic psychological needs, the relation between a developing or deepening interest and competence, autonomy, and social relatedness is considered to be reciprocal (Hidi, 2000). Thus, for example, engaging content of interest may contribute to an increased sense of competence and autonomy. Moreover, although competence, autonomy, and social relatedness contribute to positive affect, from a developmental perspective, they are not the only determinants of interest development.

Psychology of constructive capriciousness. In his *Psychology of Constructive Capriciousness*, the social psychologist Silvia (2001) distinguished between interest and interests. Following Tomkins (1962) and Izard (1977), he characterized *interest* as a basic emotion like happiness, fear, or anger that resides in an individual. *Interests* are defined as self-sustaining motives that lead people to engage in certain idiosyncratic and person-specific activities with certain objects and ideas for their own sake. In addition, interests serve long-term goals of adaptation such as cultivating knowledge and promoting diversified skills and experience. Silvia further proposed that the emotion of interest contributes to the development of enduring interests, and magnification, repeated experience with qualitatively similar input, and is the process that initiates interest development.

Silvia's conceptualization of interest parallels that of situational interest. His definition of interests parallels the conceptualization of well-developed individual interest. Furthermore, his discussion of interests developing from interest is similar to earlier discussions of situational interest developing into individual interest (Hidi & Anderson, 1992; Hidi & Baird, 1986; Schraw & Lehman, 2001). Likewise, his discussion of the role of repeated experience as a basis of interest development is consistent with educational interest research (e.g., Alexander, 1997; Dewey, 1913; Krapp, 2000; Krapp & Fink, 1992; Krapp et al., 1992; Prenzel, 1992; Renninger, 1989, 1990; H. Schiefele et al., 1983).

However, Silvia's notion of both interest and interests is that they reside in the individual rather than in the interaction of the individual and his or her environment. This contrasts with the premises of the four-phase model in which interest is conceptualized as a psychological state or as a predisposition that emerges from, and is sustained through, interaction (Hidi et al., 2004; Krapp et al., 1992). The interactive perspective of the four-phase model of interest development allows specification and fine-tuning of conditions that support interest development and identification of those that do not. Silvia's model is also distinct from the four-phase model because it does not specify phases of interest development and it focuses on positive affect as a source of interest without addressing the role of negative affect. In addition, it does not address the possibility of either arrested development or regression from later to earlier phases of interest.

In the next sections of this article, the role of affect and cognition in the four-phase model of interest development is further considered. Following this, the implications of the four-phase model for how educators might support the development of student interest are discussed.

RESEARCH IMPLICATIONS: ISSUES OF AFFECT AND COGNITION

In summary, each phase of the four-phase model of interest development is characterized by affect and each phase also includes some form of knowledge or cognitive processing although these components are more pronounced in the later phases of interest. Once the first phase of triggered situational interest has been elicited, it can last for short or long periods of time and may provide a basis for a person to begin forming a connection to content. In the second phase of interest, maintained situational interest, a person is typically supported by the environment (others, tasks, etc.) to continue to develop a basis for connecting to content and to find ways to relate this information to other available information. In this phase, as interest is sustained, a person is also beginning to develop value for content. In the third phase of emerging individual interest, a person begins to seek repeated engagement with content, continues to reengage content with or without explicit external supports, and consolidates related knowledge. He or she be-

gins to pose curiosity questions, a process that leads to self-regulated activity, accumulation of more information, and increased valuing. In the fourth phase of well-developed individual interest, the person continues to seek repeated opportunities for reengagement. Curiosity questions, self-regulation, valuing, and the ability to attenuate frustration and sustain creative thinking inform this reengagement.

The examples of Julia and John illustrate, at least theoretically, why affect can be used to identify early stages in interest development. It is likely that as Julia and John initially focused their attention on the article, they had different affective reactions while cognitively processing the text. In this phase of interest, the minimal cognitive processing involved in reading enables and guides the affective reaction that follows. Julia's initial reading generated positive affect that led her to find the article and finish reading it. It is likely that her positive feelings persisted as she considered the personal relevance of the article and the implications of this type of job, leading to a maintained situational interest for facilitation. Moreover, her positive feelings toward the profession of facilitation continued and provided a foundation for the development of a predisposition to have interest—that is, individual interest—for facilitation. In contrast, John's affective reaction may have had a mildly positive or even a negative tone. He may have tried to find out what this odd-sounding new profession was all about, but he did not develop enough positive associations as he read. Thus, he did not choose to finish the article.

Interest research has been handicapped by the wide gaps among researchers' approaches to the study of interest and interpretation of findings (Renninger, 1998a). A central issue has been the measurement of interest. Some researchers have measured interest in terms of liking (e.g., Alexander et al., 1995; Deci, 1998; Koeller et al., 2001; Schraw & Dennison, 1994; Wigfield & Eccles, 1992; Wigfield et al., 1997). Others have operationalized their studies of interest in terms of value and feeling valences (Krapp, 1999, 2000, 2002a, 2002b; Krapp & Lewalter, 2001; U. Schiefele, 1999; U. Schiefele & Csikszentmihalyi, 1994). Yet, some others have identified interest in terms of positive feelings, stored knowledge and value, and repeated engagement (Renninger et al., 2002; Renninger & Wozniak, 1985).

Differences in approaches to measuring interest have been based on differing conceptualizations. Knowledge has been described as distinct from affect (Alexander et al., 1995; Tobias, 1994). Also, knowledge has been described as more important when studying interest among younger participants than it is for older participants (Krapp, 2000). In addition, positive feelings, stored knowledge, and stored value have been described as having complementary and coordinated roles in interest development (Renninger, 1990, 2000).

Although a number of researchers have distinguished between interest and knowledge, in our conceptualization affect and value are not independent of knowledge. The very act of perceiving information about content and representing this information to oneself in a way that it is valued involves cogni-

tion and developing knowledge (Renninger, 1990, 2000). This primarily is an unreflective process (Renninger, 1989, 1990, 2000) that differs from and complements cognitive evaluation approaches to motivation and volition, including discussions of goal theory (Dweck & Leggett, 1988; Harackiewicz, et. al., 2002; Linnebrink & Pintrich, 2000; Molden & Dweck, 2002; Pintrich, 2000), task value (Eccles et al., 1983; Wigfield & Eccles, 1992, 2002; Wigfield et al., 1997), self-efficacy (Bandura, 1986; Schunk, 1981; Zimmerman, 1989, 2000b), and intrinsic motivation (Deci & Ryan, 1985, 2000; Ryan & Deci, 2000). The triggering of attention and a maintained situational interest are largely externally supported and as a result are not necessarily decisions to engage; moreover, the motive to begin asking and seeking out answers to curiosity questions, for example, also may not be a process in which a person decides to engage. Rather, a person may decide to find a book that fits with an ongoing interest (task value), read it (goal setting), learn all that he or she can about a topic (task efficacy), feel that mastering even a difficult book on the topic is possible (self-efficacy), and revel in the experience of autonomy that accompanies this decision.

The four-phase model suggests that the phase of a person's interest might predict the particulars of cognitive evaluation (see Lipstein & Renninger, 2006) and that the process of interested engagement would not necessarily be one of which the person was wholly metacognitively aware. People may make a decision to become interested in particular content, but more typically interest mediates the way in which they engage content and impacts whether and how they choose to reengage that content over time (see Ainley et al., 2002).

In early phases of interest development, affect may be used as an indicator of interest because it is an affective response that initially triggers a person's attention and because knowledge may only be minimal. If a situational interest is to be maintained, however, a person's feelings and stored valuing need to lead to reengagement over time. In later phases of interest development, as a person begins to generate curiosity questions, he or she seeks repeated engagement and has not only positive feelings but also increased stored knowledge and stored value for particular content. The further distinction between an emerging and a well-developed interest, then, includes self-regulated activity like seeking answers to curiosity questions. The person with a well-developed interest pursues further understanding independently and works to understand and learn from feedback (Lipstein & Renninger, 2006). This person is also likely to maintain positive feelings for content and persevere in the face of difficulty or frustration (see Prenzel, 1992; Renninger, 2000; Renninger & Leckrone, 1991).

Affect Is Positive (and Negative)

Although a triggered situational interest could be associated with either negative or positive affect (Hidi & Harackiewicz,

2000; Iran-Nejad, 1987), psychological and neuroscientific data underscore the importance of positive affect for interest to develop (Ainley et al., 2002; Izard & Ackerman, 2000; Panksepp, 1998, 2000; Panksepp & Moskal, 2004). Thus, even if negative feelings are initially present, supporting students to develop interest and experience positive affect can attenuate their negative feelings.

Panksepp (1998) reported that the lateral hypothalamus (LH) corridor in the brain can be stimulated to evoke sniffing in rats, what he termed “seeking” behaviors that are present when the animal is searching, or investigating. Panksepp suggested that the types of feelings that characterize the arousal of this system in humans would be described as intense interest, engaged curiosity, and eager participation. LH stimulation in humans has been found to produce feelings of invigoration, as if something very interesting and exciting is going on (cf. Heath, 1963; Panksepp, 1998). Such data suggest that minimal cognitive processing is likely to trigger situational interest, especially in early phases of interest development. They further suggest that interest is not only an outcome of cognitive evaluation.

Neuroscientific data further suggest that each phase of interest involves the same neural circuits and the same neurotransmitter (dopamine; Davidson, 2000; Panksepp, 1998; Panksepp & Moskal, 2004). Thus, the positive affect that is associated with the psychological state of situational interest is likely to be similar to that of individual interest. In fact, no neurophysiological indications of neural processes exclusive to the cognitive processing of interesting materials have been identified (Panksepp, 1998), further suggesting that both affect and cognition are involved in processing during each phase of interest development. Thus, even though it is experimentally possible to distinguish between emotional and cognitive interest (e.g., Harp & Mayer, 1997), it appears that both affect and cognition are coordinated in the development of interest (Ainley et al., 2002; Renninger, 2000).

Affect and Cognition Are Coordinated

Earlier phases of interest appear to be fueled by affect, which can be directly linked to the processes of perception and representation that lead to activity and cognition (Ainley, Corrigan, & Richardson, 2005). Later phases of interest, on the other hand, are more clearly the products of both stored valuing for reengagement and cognitive processes that support knowledge building—a person’s developing understanding of particular activities or ideas and the generation of curiosity questions (see Renninger, 2000). The process of pursuing answers to curiosity questions, for example, is accompanied by positive feelings that surface in anticipation of and work with particular content as well as feelings generated in present engagement.

Importantly, the amount of knowledge a person has about a particular content does not necessarily signal that this con-

tent is a well-developed individual interest. A person can have substantial knowledge and little interest for content (Renninger et al., 2002). Moreover, a person with an individual interest for a particular content may have less knowledge for that content than another person who does not have an interest for it (Renninger, 2000). Knowledge is not a sole component of interest, nor is affect. Interest development involves the interaction of knowledge and affect (Hidi et al., 2004; Krapp, 2002a, 2002b; Renninger, 1989, 1990, 2000), and shifts between phases of interest must include both positive feelings and opportunities for knowledge development (Renninger & Shumar, 2002).

EDUCATIONAL IMPLICATIONS

Learner engagement is an aspect of educational practice that has been described as both critical and complicated because there is a need for better detail about how “students behave, feel, and think” (Fredricks, Blumenfeld, & Paris, 2004, p. 59). Findings from studies of interest suggest that it impacts attention, goal setting, and learning strategies in ways that make it a particularly relevant variable for those focused on improving educational practice. Harackiewicz et al. (2002) reported, for example, that interest predicts college students’ choice of academic major and that interest combines with external factors to predict academic outcomes. These findings have been elegantly replicated across 7 years. Fink’s (1998) retrospective studies of prominent academics and Nobel Laureates who despite being dyslexic had outstanding academic and professional achievements are similarly provocative. Her study revealed that each of these people had a well-developed individual interest that enabled them to persist as readers despite perceptual disabilities. Of note also are Renninger et al.’s (2002) findings that 11- to 13-year-old students who had low ability based on achievement testing and a well-developed individual interest for reading or mathematics were more likely to engage the meaning or substance of the passages and the problems that they worked than were students with high ability who had less developed individual interest for these subjects.

In general, findings from studies of interest suggest that educators can (a) help students sustain attention for tasks even when tasks are challenging—this could mean either providing support so that students can experience a triggered situational interest or feedback that allows them to sustain attention so that they can generate their own curiosity questions; (b) provide opportunities for students to ask curiosity questions; and (c) select or create resources that promote problem solving and strategy generation.

More specifically, in the early phases of interest development, research suggests that positive feelings about activity and solid content knowledge are important if students are to attend to content, set goals, and learn. Sloboda and Davidson (1995), for example, used bipolar rating scales to conduct in-

interviews with 257 musicians. Their findings indicate that for musicians to persevere the most important characteristics of the students' first teacher are the ability to communicate well (friendly, chatty, encouraging) and the ability to pass on their love of music (through modeling, playing well; see similar discussions in Bloom, 1985; Sosniak, 1990). Recently, Long and Murphy (2005) combined qualitative and quantitative methods to demonstrate a similar impact of classroom teachers' own interest for subject matter and for their students on the students' interest for content. Their findings underscore the importance of teacher support of students' interest.

Because external support that is contextualized in content is particularly critical in early phases of interest development, it is during the early phases of experience that educators are most able to help students to feel positive about their emerging abilities to work with content (Eccles et al., 1993; Markus & Nurius, 1986). Positive feelings for content may be facilitated by offering choice in tasks (Flowerday & Schraw, 2003), promoting a sense of autonomy (Deci, 1992), innovative task organization, support for developing the knowledge that is needed for successful task completion, and building a sense of competence (Hidi, 2001; Hidi et al., 1998; Hoffmann & Häussler, 1998; Renninger & Hidi, 2002; Sansone & Morgan, 1992; Sansone et al., 1992; Schraw, Flowerday, & Lehman, 2001). Not surprisingly, project-based learning that includes students' work with peers or other social situations (Blumenfeld et al., 1991; Cognition and Technology Group at Vanderbilt, 1997; Deci, 1992; Hidi et al., 1998; Renninger & Hidi, 2002; Springer, 1991), computer environments that are attractive (Cordova & Lepper, 1996; Lepper & Cordova, 1992; Lepper & Henderlong, 2000), and word problems or passages that have contexts specifically addressing students' individual interests (Renninger et al., 2002) all involve teachers organizing external support for engagement. In early phases of interest development, orchestration of conditions that support a positive affective response may be critical to further interest development (i.e., materials need to be available, rides to lessons possible, opportunities to think and play with related ideas, etc.; Bloom, 1985; Csikszentmihalyi et al., 1993; Renninger, 2000; Renninger & Hidi, 2002; Renninger et al., 2004; Sloboda, 1990).

Similar to Eccles et al.'s (1993) model of stage-environment fit in which the importance of teachers' continued support of students' feelings of self-efficacy is demonstrated, students need to be supported to develop and sustain interest. It is likely that conditions that support the development of students' interests not only need to generate positive feelings but also involve a shift from more external support to more internal support as interest develops. Such conditions are suggested by Sosniak's (1990) study of the development of musical talent. Sosniak found that students who later evidenced talent spent their earliest years exploring music without the need to be particularly systematic or skilled. Typically, these musicians' initial interest stemmed from life with a family member who valued and had an interest in mu-

sic. Often they listened to music from birth and through this learned to identify pieces and composers. These musicians' first teachers were described as warm and enthusiastic people who acknowledged signs of interest and involvement.

In what Sosniak (1990) labeled a second period, these musicians' relationships to their teachers underwent a shift from one of love to respect, as this period was marked by attention to detail and skill building. The third period, however, was possibly the most difficult and most uncertain period, because the teachers supporting the musicians had difficulty when musicians' interest wavered. In this third period, the students worked on developing their ideas about themselves as musicians, their field of expertise, and how it fit into their lives. He noted that this process took place in varying ways, and at differing rates. Sloboda (1990) reported a similar trajectory of the development of student interest for music, noting also that students were incapable of experiencing interest when they felt uncomfortable or threatened.

Some students may require the verbal scaffolding of teachers or support from the way in which a task is organized, such as using their well-developed individual interests as the topics of word problems or texts (Renninger et al., 2002). Other students may respond well to cooperative project-based work that enables them to be scaffolded by the others and the task on which they work (Blumenfeld, Krajcik, Marx, & Soloway, 1994; Blumenfeld et al., 1991; Hidi et al., 1998; Marx et al., 1994). In the shift from external to internal support, however, the knowledge, or basis of information (and skills) through which the student can begin generating curiosity questions, is of importance (Renninger, 2000). Such questions enable students to connect their present understanding of content to alternative perspectives that challenge them to reconsider what they do know and to seek additional information (Renninger et al., 2004). While students are in early phases of interest development, providing them with questions to answer may be essential. However, as individual interest begins to emerge in the late phases, it is important that students also be encouraged to generate their own questions. Students need models of people seriously engaging with the questions of a discipline (Collins, Brown, & Newman, 1989; Schoenfeld, 1992). For students' interests to continue to develop, however, they also need to generate their own curiosity questions to connect their present understandings to alternative perspectives (Renninger, 2000).

Sansone and her colleagues (e.g., Sansone & Berg, 1993; Sansone & Smith, 2000; Sansone et al., 1992) have found that students in the last years of high school and college can develop a maintained situational interest for content for which they previously had few feelings or little knowledge. These students move rather rapidly from having a situational interest to having what might be identified as an emerging individual interest. They do this by identifying a reason to be interested and finding ways to enhance the likelihood of continuing to pursue the content. They regulate their own interest and enjoyment (Sansone et al., 1992; Sansone, Wiebe, & Morgan, 1999). In this situation, a student's decision to work on devel-

oping his or her knowledge is a choice and involves focused attention and effort (see Sansone & Harackiewicz, 1996).

Certainly, students with an emerging individual interest for particular content ask curiosity questions about that content. These questions can lead to acquisition of additional knowledge, consolidation and elaboration of what is understood, and persistence in the face of challenge (Alexander & Murphy, 1998; Prenzel, 1992; Renninger, 1990, 2000; Renninger & Hidi, 2002; Renninger et al., 2004; U. Schiefele & Krapp, 1996). The process of engaging content is likely to continue as long as there is support. Other people may facilitate such support, and support may be provided by the affordances of the tasks or domain in which a person works (Nolan, 2006; Pressick-Kilborn & Walker, 2002; Renninger, 2000).

Julia's case further suggests that as interest develops and direct links between Julia and facilitation are identified, her feelings of self-efficacy increase. Similar connections between interest and student feelings of self-efficacy, ability to set goals, exertion of effort, and ability to self-regulate activity are reported in Renninger and Hidi's (2002) case study of a boy's engagement with reading and writing, science, and soccer. Importantly, this boy's motivational profile differed in each of these content areas, underscoring the utility of accounting for context in discussions of research and practice. Lipstein and Renninger's (2006) study of middle school students' interest for writing further suggests that the different phases of interest described by the four-phase model consistently correspond to differing profiles of self-efficacy, effort, goal setting, strategies, and preferences for feedback.

Understanding that interest can develop and that it is not likely to develop in isolation is essential. Further articulating the contribution of interest to student learning and its relation to other motivational variables has potentially powerful implications for both classroom practice and conceptual and methodological approaches to the study of interest. Identifying conditions that will lead students of all ages to continue challenging what they assume and know, to develop and sustain their interest at various phases of development, is a critical next step for interest research in educational settings (Lipstein & Renninger, 2006; Renninger et al., 2004; Schraw & Lehman, 2001). Clarifying not only what needs to be undertaken, but how it might be done and its predictive validity, would be particularly valuable. The four-phase model should be a useful tool for such efforts.

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