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Empirical study

Interest development: Arousing situational interest affects the growth trajectory of individual interest

Jerome I. Rotgans [a,*], Henk G. Schmidt [b]

[a] Nanyang Technological University, Singapore
[b] Erasmus University Rotterdam, The Netherlands

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ABSTRACT

Interest has become a central topic in the educational-psychology literature and Hidi and Renninger's (2006) four-phase model of interest development is its most recent manifestation. However, this model presently enjoys only limited empirical support. To contribute to our understanding of how individual interest in a subject develops in learners, two studies were conducted with primary school science students. The first study (N = 187) tested the assumption that repeated arousal of situational interest affects the growth of individual interest. Latent growth curve modeling was applied and the results suggest that the arousal of situational interest has a positive effect on the development of individual interest and significantly influences its growth trajectory. The second study tested the assumption that engaging students with interest-provoking didactic stimuli, such as problems, is critical to triggering situational interest and increasing individual interest. To test this assumption, four classes of primary school students (N = 129) were randomly assigned to two conditions in a quasi-experimental setup. The treatment condition received four situational-interest-inducing science problems as part of a course whereas the control condition did not, all other things being equal. The results of latent growth curve modeling revealed that only the group receiving problems experienced repeated arousal of situational interest and its related growth in individual interest. Implications for, and amendments to, the four-phase model of interest development are proposed.

1. Introduction

Interest in interest research is growing in educational psychology (Ainley, 2006; Hidi, 2006; Krapp, 1999; Schraw & Lehman, 2001). One of the possible explanations for this surge in curiosity is that interest is a construct that oddly seems to manifest itself through two quite different identities. Interest is sometimes considered a semi-stable construct representing the dispositional tendencies of a person to engage with a subject over time, or, alternatively, a transient phenomenon that is temporarily aroused by contextual stimuli in the learning situation. The latter is referred to as *situational* interest, whereas the former is generally referred to as personal or *individual* interest (Bergin, 1999; Hidi, 2006; Schraw, Flowerday, & Lehman, 2001; Schraw & Lehman, 2001). Of particular importance is the question how interest develops from fleeting situational interest into stable individual interest (Hidi, 2006; Hidi & Renninger, 2006). An answer to this question is useful because if more would be known about the mechanism of interest development, teachers would be in a better position to influence students' interest in subjects for which many have little affinity.

A model describing how individual, stable, interest emerges out of situational interest was proposed by Hidi and Renninger (2006). According to Hidi and Renninger, interest develops over four sequential phases. The first phase is called "triggered situational interest" and entails that a person's situational interest for a particular topic can be sparked by presenting features such as novelty or surprising information (Renninger & Hidi, 2016). These features can be induced by activities of the teacher or presented by means of texts or other learning resources. The second phase is referred to as "maintained situational interest." The third phase marks a transition to individual interest and is referred to as "emerging individual interest." This phase is characterized by a dispositional internalization of a person's interest for the topic in question and a tendency to seek out more frequent engagements with the topic without much external support. According to Hidi and Renninger, the last phase is referred to as "well-developed individual interest"

* Corresponding author at: Nanyang Technological University, Lee Kong Chian School of Medicine, Novena Campus HQ, 11 Mandalay Road, Singapore 308232, Singapore.
E-mail address: rotgans@gmail.com (J.I. Rotgans).

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and signifies a person's deep-seated interest for the topic, manifesting itself by a dispositional tendency to reengage with the topic over longer periods of time and without external support.

Skimming through the interest literature published after the Hidi and Renninger article appeared in 2006, it seems that there is hardly any paper that does not refer to the four-phase model of interest development in one way or the other. Looking at the model more closely it is easy to see why. The model suggests that (a) situational interest can be aroused in students and that (b) maintained situational interest leads to changes in a student's dispositional preference and liking for a particular school subject. Hence, if a student does not like science initially, a teacher's focus on the triggering of situational interest may in the long run lead to an increase in individual interest in the particular topic, possibly even influencing future course selection and career choice. Some researchers believe that the arousal of situational interest by appropriate precipitating events, such as puzzles or problems, is hard-wired and therefore—in principle—affecting every individual (Berlyne, 1954, 1962, 1978; Kang, Scharmann, Kang, & Noh, 2010; Kang et al., 2009; Loewenstein, 1994; Rotgans & Schmidt, 2014b). Thus, in theory at least, every student's interest can be aroused for any subject and may subsequently (if reinforced) lead to the development of a long-lasting dispositional interest for the subject. Needless to say, if this is indeed true, it has significant implications for education.

Despite the intuitive logic behind the model and its general acceptance, it has been subjected to limited empirical testing. A reason for this may be that the model is underspecified in at least three ways. First, a psychological mechanism explaining under which conditions situational interest is triggered is missing, as the authors themselves agree elsewhere (Renninger & Hidi, 2011). Second, the model states that situational interest once triggered needs to be "maintained," without clearly postulating what is meant by maintenance of situational interest. Third, Hidi and Renninger provide no information about the duration of the four phases and how changes between the phases occur. Is the transition from one phase to the other a matter of weeks, of months, of years? When and how does the transition from situational interest to individual interest occur? Is this a gradual transition or, as the model seems to suggest, a rather sudden shift from state to trait? What marks the transition from emerging to well-developed individual interest?

Several researchers have made attempts to test elements of the developmental process described by Hidi and Renninger. Most studies concentrated on the influence of task characteristics on the emergence of situational interest. Tapola, Veermans, and Niemivirta (2013), for instance, demonstrated that the extent to which a task is concrete (rather than abstract) positively influences situational interest. Providing texts that contain surprising, incongruent, and unexpected information also seems to have a positive effect on situational interest (Iran-Nejad, 1987). More recently, Høgheim and Reber (2015) conducted a study to examine how example choice (having a choice which text to study) and context personalization (in which features of a text are customized to the learners' out-of-school interests) affect situational interest (see also Flowerday, Schraw, & Stevens, 2004). Both example choice and context personalization had a positive effect on triggering students' situational interest. In addition, much research effort has been invested to determine whether seductive details (information that is interesting but irrelevant to understanding a text) have a positive effect on situational interest and text comprehension. Although the findings of earlier studies were inconclusive—some suggested that seductive details have a positive effect (Schraw, 1998) whereas others suggested it has no positive effect on situational interest and learning (Garner, Gillingham, & White, 1989)—recent studies that experimentally manipulated the cognitive load participants experience during the task suggest that seductive details have a positive effect on students' situational interest and learning if cognitive load is kept low (Park, Flowerday, & Brünken, 2015; Park, Moreno, Seufert, & Brünken, 2011).

Rotgans and Schmidt have tried to tackle the mechanism underlying the arousal of situational interest (Rotgans & Schmidt, 2011b, 2014b). They have demonstrated that situational interest is *only* aroused when students lack knowledge of a topic at hand. Only when students become aware that there is a gap between what they know about a topic and what needs to be known, situational interest increases. In their view, therefore, aroused situational interest signifies a need for knowledge. However, if the need for knowledge is satisfied, for instance through instruction or self-study, situational interest necessarily decreases. A logical consequence of this theory is that situational interest cannot be "maintained," but has to be aroused repeatedly with new instructional events introduced for this purpose. This "knowledge-deprivation theory of situational interest" may be a suitable candidate explaining why precipitating events such as puzzles, classroom experiments, or problems arouse this type of interest. (See also Berlyne, 1978; Kang et al., 2009; Loewenstein, 1994.)

Others have concentrated on the relationship between situational interest and individual interest. Linnenbrink-Garcia et al. (2010), for instance, have demonstrated that the level of situational interest measured at the beginning of a course predicts the level of individual interest at the end of that course. They were however not able to demonstrate a significant relationship between what they called "maintained situational interest" and individual interest. Harackiewicz, Durik, Barron, Linnenbrink-Garcia, and Tauer (2008) conducted a longitudinal study to explore how interest develops in an introductory psychology course. Individual interest was measured as continued interest in the topic and operationalized as students' course choice after completion of the introductory course and whether they majored in psychology. Situational interest was measured at the beginning and during the course (the latter was considered "maintained" situational interest). A path model was tested and the results suggest that situational interest predicted maintained situational interest, which in turn was associated with course choice and whether students took up a major in psychology. Harackiewicz et al. (2008) interpreted the findings in light of the four-phase model and proposed that the first two situational interest measures corresponded with the first two phases in the model, course choice with the emerging individual interest phase, and majoring in psychology with the well-developed individual interest phase.

Although the above studies provide important insights in how elements of the model function, studies that tested the model in its entirety are largely missing. In addition, the studies that did examine the four-phase model more extensively, applied correlational analyses that have significant methodological limitations in exploring the actual developmental growth trajectory of interest over time. The purpose of the studies reported in the present article was twofold. First, we wished to demonstrate that individual interest increases over time, and that it does so under the influence of repeatedly aroused situational interest. To demonstrate that aroused situational interest influences individual interest it is not sufficient to correlate these variables measured at various points in time, such as Linnenbrink-Garcia et al. (2010) and Harackiewicz et al. (2008) have done. What one has to demonstrate is that aroused situational interest determines how individual interest *changes* under its influence. Latent growth curve (LGC) modeling within the structural equation framework seems an adequate approach to study such changes in particular variables over time (Duncan, Duncan, & Strycker, 2013), since it allows the researcher to directly observe the influence of situational interest on the *slope* of the growth trajectory of individual interest. If the