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Structural and dynamic aspects of interest development: theoretical considerations from an ontogenetic perspective

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Abstract

Empirical research on the development of individual interests is mostly concerned with the analysis of developmental trends in groups or populations. However, there is a distinct lack of theoretical constructs that describe and explain interest development from the perspective of the growing individual. This article presents a collection of theoretical concepts and models that can be used to describe and explore structural and dynamic aspects of interest development from an ontogenetic research perspective. Basic ideas of an educational-psychological conceptualization of interest are outlined that—contrary to many other conceptualizations in this field—is based on a dynamic theory of personality. Such an approach provides an opportunity to analyze and reconstruct the manifold interrelations between the changing structure of a person's pattern of interests and the developing personal "self during ontogenesis. Exemplary selected theoretical models and ideas are presented, including the question of general stages during the course of interest development from childhood to early adulthood, models to describe and theoretically reconstruct structural changes in an individual's pattern of personal interests over a longer period of time, ideas of how to conceptualize the transition from situational to individual interest, and theoretical considerations about the structure and function of the psychological regulation-system that is assumed to be responsible for establishing and stabilizing motivational preferences. Although these concepts and considerations are not yet integrated into a coherent ontogenetic theory, they may serve as a basis for a theoretical discussion on how to achieve this aim.

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1. Introduction

Over the past decades, educational research has increasingly studied the influence of interest on learning and development in various educational settings. According to a proposal made by Krapp, Hidi, and Renninger (1992), most researchers differentiate between situational interest and individual or personal interest. The empirical findings show that learning motivation based on interest tends to have many positive effects on the process and the results of learning. Both individual interest and situational interest (or text-based interest) have a profound facilitative effect on cognitive functioning and learning (Hidi, 1990). In a large number of studies, substantial positive correlations were found between different indicators of interest and different learning outcome criteria (Schiefele, Krapp, & Winteler, 1992). Most of the results on the positive influence of interest in learning and achievement are from correlational studies. There are also, however, several results from experimental studies which support the generally positive evaluation of learning motivation based on interest. The findings of empirical research have been reviewed comprehensively from different theoretical perspectives (e.g., Alexander, Kulikowich, & Jetton, 1994; Alexander & Murphy, 1998; Baumert & Köller, 1998; Hidi, 1990; Hidi & Berndorff, 1998; Krapp, 1992; Krapp et al., 1992; Renninger 1990, 1992, 2000; Schiefele, 1996a, 1998, 2001; Prenzel, 1998). Although there are several contradictory results, especially with respect to the impact of interest on achievement and learning in mathematics at the secondary level (Köller, 1998; Köller, Baumert, & Schnabel, 2000), the conclusion seems to be justified that an interest-triggered learning activity leads to better learning results, especially with respect to qualitative criteria (e.g., a higher degree of deep-level learning).

The finding has important educational implications; it suggests ways to improve the quality of learning in schools and other educational settings (e.g., college, university or vocational training), especially with respect to lifelong learning. Theories and results from this line of research can be used to show that it is worth fostering interest-triggered learning in school and elsewhere, but they do not say very much about how this goal can be achieved. Theories and concepts are therefore needed about the genesis and further development of subject-related interests. Which factors, for example, are responsible for arousing a new interest in a current situation? How can this situational interest be sustained for a longer period of time in order to create a sufficiently stable willingness to occupy oneself with something new? Under which conditions is it reasonable to expect that such a longer-lasting situational interest will become a new thematic focal point in the interest profile of the developing personality?

These questions concern both *actual-genetic* and *ontogenetic* aspects of interest development. Actual-genetic approaches describe and explain the emergence/appearance of a "working interest" in an actual situation. From the perspective of motivation research, this aspect refers to the question of how an individual becomes motivated to occupy him/herself in an activity in a certain way. This process is sometimes characterized as "development" of a situational interest or as "actualization" of an already existing personal interest (Krapp et al., 1992). Here, the concept

of development is used in the meaning of a rather short-term process which describes the actual-genetic changes of a person's interactions with his or her learning environment. The *ontogenetic* perspective is more general. It refers to longer-lasting changes in the structure of an individual's pattern of traits or characteristics which can be interpreted as more or less stable "dispositions" for thinking and acting in a certain way. Ontogenetic analyses of interest development describe and explain the emergence, stabilization and change of individual interests.

There are many research approaches that investigate specific aspects of these developmental processes at both levels of analysis. But there are hardly any attempts to integrate the empirical findings on the basis of an overarching theory of interest development (Krapp, Renninger, & Hoffmann, 1998). As in other fields of empirical research, the researchers' main effort is often to explore and test a specific hypothesis and not so much to discuss and develop components of a general theory. Theory development, however, is an important goal because practitioners who are the ultimate users of empirical research need more than just a collection of unconnected "interesting" empirical findings. In the long run, the aim of psychological research must be the development of coherent and convincing theories that provide an integrated picture of structural and functional principles in a certain field. In the field of interest development, such a theory is not yet in sight. Nevertheless, we should start a discussion about how this goal could be reached. What kinds of theoretical concepts are necessary to inform educational practice in an adequate manner? Is it possible to explicate general psychological principles that can describe and explain certain aspects of interest development? Does it make sense to integrate theoretical constructs and/or functional hypotheses from other fields of psychological research?

This paper proposes to supply a basis for such a theoretical discussion. What I am going to present are theoretical considerations about selected structural and dynamic aspects of interest development. The main focus is on *intraindividual* changes and not so much on developmental trends in groups or populations. Since any concept of interest is characterized by its content-specificity, a developmental theory must be able to explain why a person develops an interest in a certain domain but not in another one, or why an existing interest is changed or abandoned entirely. A central point in this paper deals with the question of how and under what conditions a relatively lasting individual interest grows out of an interest that has been triggered in a specific situation and can thus been characterized as "situational interest". In the following section I will first outline the basic ideas of an educational-psychological conceptualization of interest, which not only describes criteria for the operationalization (measurement) of this theoretical construct, but also makes statements about the central role of interest in the process of human growth and the functional relations between a person's pattern of interest and the development of a person's self-system or identity. Although these kinds of questions are rarely brought into the focus of empirical research, they are central for a comprehensive ontogenetic interpretation of interest development.

2. An educational-psychological conceptualization of interest

In recent theories, interest is mostly understood as a phenomenon that emerges from an individual's interaction with his or her environment. This postulate is also a starting point of a theoretical approach that has been variously discussed under the label "person-object theory of interest" (POI). The central ideas are based on work by H. Schiefele and colleagues in the 1970s and 1980s (Schiefele, 1974, 1981; Schiefele, Krapp, Prenzel, Heiland, & Kasten, 1983; Prenzel, Krapp, & Schiefele, 1986; Krapp, 1989) and have been further developed by Prenzel (1988, 1992), Krapp (1992, 1993, 1999, 2002), U. Schiefele (1991, 1996a, 1999, 2001) and others (e.g., Fink 1989, 1991).

2.1. Interest and the development of the human personality

Contrary to many other approaches, POI is more strongly directed towards a view of ontogenetic development that takes into account the reciprocal relations between the changing structure of an individual's longer-lasting *personal interests* and the establishing of a stable personality structure. Behind all of this are the metatheoretical premises which have already played a prominent role in the preliminary outline for an educationally fitting interest theory (Schiefele, 1974; Schiefele, Hausser, & Schneider, 1979; Schiefele et al., 1983). Thus, it is postulated that it is not sufficient to describe and explain the motivational aspects of single "learning episodes" (Boekaerts 1997, 1999), but it is also necessary to describe and explain the role of motivation in the course of lifelong human development.

In order to be able to reconstruct the motivation process from an ontogenetic perspective, a developmental theory of interest has to make statements about the structure and development of the *human personality.* POI uses an approach to personality that describes and explains motivational aspects of the developing person not only with respect to individual differences but, even more importantly, with respect to functional relations and general "laws" of human development (Krapp, 2002). A personality theory that considers these aspects of human development has to consider the fact that the person is aware of himself or herself, and that the "object" of this awareness is some sort of representation of the individual's personal *"self* (Hannover 1997, 1998; Fend, 1994; Deci, 1998; Ryan 1991, 1993). The self can be seen as the central area of an individual's structure of personality, it represents a person's identity. Under normal circumstances, the different components of the self represent a unified structure: a mentally healthy person lives in relative harmony with his or her attitudes, goals and accumulated capacities and knowledge structures.

2.2. *Interest as a specific person-object relationship*

In accordance with the ideas of Lewin (1936), Nuttin (1984), Oerter (1995), Deci & Ryan (1985, 1991), Renninger (1992) and many others, it has been postulated" that the individual, as a potential source of action, and the environment, as the object of action, constitute a bipolar unit. Therefore, the interest construct is conceptualized

as a relational concept. An interest represents a more or less enduring specific relationship between a person and an object in his or her "life-space" (Lebensraum; cf. Lewin, 1936). Within the entirety of available/possible PO-relationships a person will develop a closer relationship only to a few objects (or object areas) for a longer period of time. Under certain conditions such a relationship will become a genuine personal interest. Unlike many other motivational constructs, interest is always directed at certain contents or objects. Thus, content-specificity is one central characteristic of the interest construct.

An *object of interest* can refer to concrete things (Csikszentmihalyi & Rochberg-Halton, 1981), a topic, an abstract idea, or any other content of the cognitively represented life-space. With a view to the processes of (intentional) learning and the development of the personality, the person's *"epistemic interests"* play an especially centralized role. They induce a person to acquire new knowledge and competencies related to these areas (cf. Renninger, Ewen, & Lasher, 2002). The definition of interest proposed by Schiefele and Rheinberg (1997) explicitly refers to only epistemic interests. In their view, the construct of individual interest should only refer to knowledge domains and not to activities or events. According to Renninger (1990, 2000) and Schiefele and Rheinberg (1997), it is possible to think of interest as a specific part of the network of knowledge stored in long-term memory.

In principle, every area of a person's knowledge can sooner or later become the object of a situational or personal interest. Furthermore, the contents of an individual's pattern of interest is to a high degree individualistic. This, however, does not mean that all interests are totally idiosyncratic. On the contrary, many object areas of interest in school (or other educational settings) are standardized to a high degree through the entirety of contents, activities and events in a certain subject or a certain field of academic or professional training. For example, in empirical studies about the development of and the effect on scholastic achievement, the "object" of interest under consideration is usually defined by a certain school subject. Thus, one speaks of an interest in physics, in mathematics or in biology. Hoffmann (2002) points out that a subject-related interest can have two different meanings: first, to have an interest in the learning content of the subject—this would be a pure epistemic interest. Second, to have an interest in the whole arrangement of teaching, learning and acting in the field of a certain school subject. In addition to content, certain other components and qualities of subject-related activities (e.g., experimenting and solving mathematical equations as part of the subject physics, or debating in language arts) are also important. In empirical studies about the role of interest in text learning, authors often use the term *"topic interest"*, which can either refer to a short-term situational interest (Hidi & McLaren, 1990, 1991; Hidi, 2000) or to an individual interest in the sense of a longer-term willingness to confront a certain thematic area (Schiefele, 1996b; Schiefele & Krapp, 1996).

2.3. Level of analysis (situational and individual interest)

Conceptualizing interest as an interactive relation between an individual and certain aspects of his/her life-space makes it possible to study the conditions for and

effects on interest from various research perspectives. Two typical levels of analysis can be differentiated (cf. Krapp, 1999, 2000; Krapp et al., 1992; Schiefele, 1996a, 2001). On the first level, interest refers to the dispositional (or "habitual") structure of an individual. Here, interest is interpreted as a relatively stable tendency to occupy oneself with an object of interest. On this level, one usually speaks of *individual* or *personal interest* (cf. Renninger, 1990, 1992; Renninger et al., 2002). On the second level, interest refers to current engagements. It describes a state or an ongoing process during an actual learning activity. This is the case when we observe the learning behavior of a student and characterize his or her motivational state as "being interested". According to Hidi (2000), this "psychological state" involves focused attention, increased cognitive functioning, persistence, and affective involvement.

A "working" interest can be caused either by an already existing dispositional interest *(personal interest)* or by the special conditions of a teaching or learning situation ("interestingness"). An interest that is caused primarily by external factors is called a *situational interest* (Hidi & Baird, 1988; Hidi & Anderson, 1992; Hidi & Berndorff, 1998; Krapp et al., 1992). A situational interest, thus, represents a more immediate affective reaction that may or may not last (Hidi, 1990, 2000; Hidi & Harackiewicz, 2001).

2.4. General characteristics of the interest construct

Independent of whether interest is examined on the level of dispositional personality structures or on the level of current processes, the specificity of this concept can be more closely characterized by a series of theoretically derived features. The most important characteristics refer to one's values and feelings. Seen from a more cognitive perspective, an interest is composed of value-related and feeling-related valences (or valence beliefs; Schiefele, 1991, 1999, 2001; Krapp, 1992, 1993). The *value-related valences* refer to the assumption that an interest has the quality of personal significance. The question here is how these value components are anchored psychologically, that is, how the different degrees of value attachment and the corresponding change over time can be described. As indicated above, POI prefers a personality theory interpretation. In accordance with earlier as well as more recent theories about personality development (cf. Allport, 1961; Fend 1991, 1994; Deci & Ryan, 1985) it is assumed that a person's individual interests are closely related to his or her self-system (cf. Hannover 1997,1998; Todt, 1978; Renninger, 1992). From such a theoretical perspective, the fact of positive evaluation results from a person's experienced relevance and the degree of identification with the object of interest. The person feels subjectively affected because it has a more or less stable relevance for his or her sense of self. Therefore, in POI the value component of an interest is also referred to by using the concept of *"self-intentionality"* to make it clear that the goals and intentions related to the object area of a (developed) individual interest are compatible with the attitudes, expectations and values a person has identified with, thus belonging to his or her self-system. We will come back to this point later and find that there are close theoretical cross-connections to most recent theories

about "personal goals" (Pervin, 1989; Brunstein & Maier, 1993; Brunstein, Maier, & Schultheiss, 1999).

The *feeling-related valences* refer to positive experiential states while being engaged in an interest-based activity. According to Prenzel (1988), Schiefele (1992) and Schiefele and Krapp (1996), feelings of enjoyment, involvement and stimulation are seen as most typical for an interest-based activity. This, of course, does not exclude the occurrence of negative experiential qualities being found in the actual process of an interest-based activity (e.g., feelings of pressure through increased efforts). Yet, on the whole, most aspects of an interest-triggered action are connected with positive emotional experiences. Under extremely congenial conditions, *flow* may be experienced (Csikszentmihalyi 1975, 1990), a state which has also been characterized as "optimal experience" (Csikszentmihalyi & Csikszentmihalyi, 1988). In a person's cognitive-emotional representation system these states and experiences that precede, accompany or follow an interest-triggered activity are stored as positive feeling-related valence beliefs (Schiefele 1992, 1999; Schiefele & Rheinberg, 1997).

Taken together, interest-based interactions with the environment are characterized by optimal experiential modes that combine positive cognitive qualities (e.g., thoughts on meaningful goals) and positive affective qualities (e.g., "good mood"; cf. Rathunde, 1998). The assumption that an interest is characterized be a close combination of emotional and value-oriented components is quite close to the concept of "undivided interest" or "serious play" which is used by Rathunde (1993, 1998) and Rathunde and Csikszentmihalyi (1993) to describe an optimal mode of task engagement. Dewey (1913) had already characterized an interest as an "undivided activity" in which no contradiction is experienced between the assessment of personal importance of an action and positive emotional evaluations of the activity itself. From my point of view, this is one of the reasons why an interest-based action (including knowledge acquisition in the area of interest) has the quality of *intrinsic motivation:* there is no gap between what a person has to do in a specific situation and what the person wishes (or likes) to do.

The intrinsic nature of an interest also plays an important role in more cognitive-oriented approaches to interest (cf. Schiefele & Rheinberg, 1997; Schiefele, 1999). From this perspective the intrinsic quality results from the fact that both value-related and feeling-related valences are directly related to the object of interest, and are not based on the relation of this object-domain to other domains (or future events). For example, if a student associates mathematics with high personal significance because knowledge in this domain helps him or her to achieve good grades and/or a prestigious job, then one would not speak of interest.

3. Components of an ontogenetic theory of interest development

Since Herbart (1806), educational theorists have always maintained the importance of motivational dispositions and demanded to foster the development of lasting (educationally valuable) interests in school, which are seen as a supraordinate goal of education (Dewey, 1913; H. Schiefele, 1981; Wittemöller-Förster, 1993). It is also

assumed that stable and satisfactory interest-based relations to freely selected object areas in the "life-space" of a person are an important basis for human growth and mental health (H. Schiefele, 1986). In order to be able to support the actual-genetic and ontogenetic processes of interest development, educational applicable theoretical knowledge is necessary. Related research has to clarify different questions. Some refer to the entirety of students to be taught and are mainly descriptive (e.g., "how does the average interest in physics change during secondary level and are there major differences between boys and girls?"); others refer to the conditions or "causes" of interest development and aim at explanations for the individual case (e.g., "why does a once highly interested student now contribute much less to class and seem to give up his interest in a certain subject?"). Most empirical research approaches in the past few years have been concerned mainly with the analyses of general development trends in the area of school-related interests. Descriptive studies about the changes in average interest in a certain subject over a longer period of time provide important information about what is going on in certain age-groups or populations of students. But from these findings one cannot directly draw conclusions about psychological regularities and principles that characterize the process of interest development at the level of intraindividual changes. This second type of questions has been much less investigated.

3.1. Descriptive analyses of general developmental trends in populations

Cross-sectional and longitudinal studies with students at different grade levels explore general developmental trends in a student population. Although there are some serious methodological problems (e.g., the changing content in a certain scholastic or academic subject area which does not allow the use of exactly the same instruments over many years), the entirety of available empirical results from various research approaches provides a rather differentiated and assertive picture (cf. Gardner 1985, 1998). For example, the results clearly show that the *average interest* in any subject tends to decrease at all levels of the school system. This is in accord with results in other areas of research about learning motivation which also found that as children get older, their task-value beliefs or attitudes toward school in general and toward specific subject areas tend to deteriorate (Anderman & Maehr, 1994; Eccles & Wigfield, 1992). This negative trend has already been observed in elementary school (Helmke, 1993). The drop in interest is even clearer at secondary level (Gardner, 1985, 1998; Travers, 1978; Baumert & Keller, 1998; Prenzel, 1998; Todt, 1990). The trend towards a decrease is mainly to be found in mathematics, physics and chemistry and is less evident in biology (Todt, 1978; Todt & Schreiber, 1998; Eccles & Wigfield, 1992; L6we, 1987). Furthermore, the negative developmental slope in the area of science-related interests is much more evident among girls than among boys (Kubli, 1987; Hoffmann, Häußler, & Peters-Haft, 1997; cf. Hoffmann, this issue).

Several studies have tried to differentiate the developmental trajectories according to a subject's topic areas, context conditions, school type or gender. On closer observation, considerable differences and sometimes even contrary trends can be found.

Todt, Arbinger, Seitz, and Wildgrube (1974) found in the area of biology interest that the attractiveness of zoological and botanical topics decreases for girls; at the same time there is a clear increase in interest in mankind and ecology. This type of differential effect can also be observed in other subjects, physics for example, or sociology/political science (Todt & Schreiber, 1998; Birnstengel, 1989). In a longitudinal study about the development of physics interest in fifth- to tenth-grade students (Hoffmann, Lehrke, & Todt, 1985; Häußler, 1987), various areas of physics (e.g. optics, mechanics or radioactivity) were taken into consideration as well as contexts within which each of the physics themes were taught in class (e.g., in the context of scientific argumentation, proving the validity of a scientific hypothesis or in the context of practically important problem solutions, which require basic knowledge in physics). When analyzing the general (global) developmental trajectories, again a continually negative trend can be found, especially with girls. However, very different development trends can be observed when the analysis is broken down to certain topic areas and/or contexts (cf. Hoffmann, this issue). In lessons where physics is taught primarily as a scientific endeavour (proving the validity of a general physical laws), neither girls nor boys judge the contents of this subject as being very attractive. On the other hand, both genders show a very strong interest when the contents of the lessons and the way physics is taught can be related to their own world of experience. Girls react especially sensitively to this kind of contextual integration.

3.2. Limitations of the theoretical usefulness of these studies

One must be careful when deriving statements about actual development in individual cases. In recent interest research this problem in mostly discussed with respect to methodological implications. However, as Valsiner (1986) has shown, this is a somewhat superficial interpretation of a much more severe problem which refers to the validity and theoretical usefulness of empirical results gained in group-based developmental studies. According to Valsiner (1986) and others it is not justifiable, in principle, to draw conclusions from population data about "general laws" that can be used to describe and explain developmental processes at the intraindividual level. Even the estimation of the likelihood for the occurrence of a certain event with respect to an individual case cannot be derived directly from population data.[1]

The fact that group-related results allow no reliable conclusions about the direction and principles of interest development in the individual case can also be demonstrated empirically on the basis of results from our own longitudinal study on the development of job-related interests during a two-year vocational training of insurance salespeople (Krapp & Lewalter, 2001; Wild & Krapp, 1996; Wild, Krapp, Schreyer, & Lewalter, 1998). In this research project we studied the interest develop-

[1] This can be made clear in a prototypical way with the following example from criminal research: "If in a population (or representative sample) of delinquents, 80% of those come from broken homes, it does not necessarily follow that this particular delinquent from a broken home has an 80% chance of becoming recidivistic" (Valsiner, 1986, p. 133).

ment process in two ways: first, by means of descriptive analyses of the average level of interest in the entire sample (n=117) using data from a questionnaire; second, on the basis of individual reconstructions of specific job-related interests using data from retrospective interviews at the end of the first and of the second year of vocational training in a smaller group of randomly selected subjects from the entire sample (n=49 in the first year; n=71 in the second year). The descriptive analyses in the entire sample revealed the same negative trend found in other longitudinal studies—interest decreases markedly during the first year of training (Lewalter, Wild, & Krapp, 2001). The intraindividual analyses deliver a rather different result. Here, we find a marked positive developmental trend: in both the first and the second year of apprenticeship all subjects report—without exception—that they had discovered new areas of interest during the past year of vocational education. Thus, their profile of job-related interests showed a general increase.

The apparent contradiction disappears when one realizes that the two research strategies involve different aspects of interest development. In the first case, it is a matter of describing (and explaining) general developmental trajectories in populations, whereby interest is measured at a relatively abstract level (interest in a subject and/or all of the contents and events in vocational training). In the second case, the focus is on the description of intraindividual changes in the structure of a subject's pattern of job-related interests. The ultimate goal of this research approach is the exploration of possible general principles of interest development that govern the developmental processes in all cases. In the remainder of this paper I want to discuss a few theoretical ideas and concepts that try to describe and explain the course of interest development from such a general point of view.

3.3. The idea of general stages of interest development

Some authors question whether there is a lawful succession of typical stages in the development of interest in children and adolescents. Gottfredson (1981), for example, postulated a sequence of developmental stages from childhood to late adolescence. This model was developed primarily to describe the course of development of vocational interests. Todt (1990) started with the basic idea of this model and expanded it for educational-psychological purposes (cf. Todt, Drewes, & Heils, 1991; Todt & Schreiber, 1998). According to this theoretical perspective, the typical contents and direction of interests are determined mainly by their specific function within the wider context of ontogenesis.

In early childhood *universal interests* dominate, that is interests that are almost identical for all children at a particular level of development. Referring to Piaget's theory on the development of intelligence, Travers (1978) and Todt (1990) maintain that these early interests are closely connected to the sequence of cognitive development and serve primarily to foster and stabilize age-related cognitive strategies and general mental structures (schemata). Piaget has interpreted the functional role of a child's interests as the "affective-dynamic complement" to intelligence (Piaget, 1981): it is always an actualized interest that produces the motivational dynamics for the accommodation and assimilation processes during cognitive growth.

At the second stage (at about the age of four) an important mechanism for the reorganization of a child's pattern of interests is the beginning awareness of one's own gender and the establishment of an appropriate gender role. Referring to Kohlberg's (1967) theory, it can be postulated that in the early stages gender roles are rather stereotypical. As a consequence, all interests that do not fit into this stereotypical role are pushed to the background and will soon or later be completely eliminated. In this way, group-specific preferences for and aversions to certain objects of interest are held equally by the age-group. Todt has proposed the label *collective interests* to refer to interests of these kind.

The third stage of development usually begins between the ages of 11 and 13, when children start to become conscious of the social structure of society and place themselves and their families in this (hierarchical) structure. Identification with a subgroup or a certain social class not only determines the expectations with regard to their future position in society, but also leads to another revision of values, goals, preferences, and aversions. Again, these new orientations lead to a critical evaluation of the existing pattern of personal interests and to those PO-relations that do not fit the now accepted goals and the newly established self concept. Furthermore, the reorganization of the pattern of *personal interests* is determined by the estimations of one's own abilities and talents—which also play an important role in the manifold processes of identity-formation.

The fourth and last stage of interest development has been reached when—during adolescence—young people ask which *specific interests* characterize them as a (unique) person. Thus, a person's structure of individual interests takes on an increasingly individualized character, determining both the later path of education as well as their choice of profession (cf. Krapp, 2000).

On the basis of such a "functional" interpretation of developmental stages of interest development a number of phenomena can be explained which are typical for certain age groups and sometimes seem mysterious at first glance, for example the radical new orientation of interests during early adolescence. As in other *critical transitions* in one's life (Wapner, 1981; Krapp & Fink, 1992), the individual has to find an appropriate way to cope with the demands of the *developmental tasks* (Havinghurst, 1982) that have to be solved in the new life situation. One possibility is the adoption of a person's self system, including goals and interests that are recognized as relevant components of one's identity. The results mentioned above concerning the continual decline of school-oriented interests at secondary level can in part be due to this. When at this age the structure of individual interests becomes increasingly focused on certain points, this necessarily leads to a reduction of individual interests in other areas. On the whole, this inevitably leads to a negative trend in the average level of any subject-related interest in the student population.

3.4. Interest development as structural change

Longitudinal studies exploring general trends of interest development usually rely on fairly simple scales to measure the "amount" or "degree" of an individual's interest in a certain domain. Similar to the idea of measuring intelligence by means of

an IQ, such an interest score is interpreted as a valid measure of a more or less stable characteristic of the person. Irrespective of whether or not an interest score is made up of various partial scores, this one figure is also viewed as being a sufficiently valid indicator of the level of interest development reached by an individual. Furthermore, it is assumed that changes in the interest scores over a period of time provide an adequate picture of the *progress or decline of development.* This is, however, a questionable postulate when interest is interpreted according to the theoretical framework of POI outlined above. Developmental modifications in a person's patterns of interest refer not only to the experienced intensity of the emotional and value-related characteristics of one or more PO-relationships but also to the structure of the content of an individual's pattern of interests. These aspects of developmental growth, however, cannot be made visible by using simple measures of individual interests.

This methodical deficit is—at least to some degree—a result of the dominance of research approaches and (diagnostic) methods developed in the tradition of differential psychology. They are very useful to measure and explore individual differences on the basis of hypothetical constructs referring to personal traits; on the other hand, however, they have severe shortcomings with respect to the exploration of developmental processes. The primary aim of the differential research approach is to measure those aspects of behavior that allow a reliable and valid differentiation between other people and not so much to identify characteristics that allow a differentiation between the behavior of a person in different situations or at different stages of development. From the perspective of differential psychology, the most useful measure is one that provides data about stable characteristics of a person and consists of only a few highly reliable items. But such a measure is, in principle, "blind" to those aspects of personal growth that can only be detected by analyzing the changing structures within the domain of a certain trait or that refer to ongoing processes like situation-specific emotional experiences.

Also missing are conceptual models that could be used to describe ontogenetic transitions and structural changes in a person's pattern of interests. One of the few exceptions is a model developed by members of the Institute of Science Education (IPN) in Kiel, Germany. It consists of three orthogonal dimensions, and it is postulated that an individual's structure of interest in physics can be measured by using indicators from each of these dimensions (for further description of this approach, see Hoffmann, 2002). This model, however, has been used mostly for the identification of qualitatively different types of interest in physics among sixth- to tenth-grade students (Häußler, Hoffmann, Langeheine, Rost, & Sievers, 1998; Rost, Sievers, Häußler, Hoffmann, & Langeheine, 1999), and not for the reconstruction of intraindividual changes in the domain of physics-related interest objects.

Only a few research approaches have tried to explore the course of interest development with respect to structural changes within an individual's pattern of interests over a longer period of time. Using POI as a theoretical background, Kasten and Krapp (1986) conducted a longitudinal study to explore early stages of interest development in preschool and elementary school children. A broad variety of data was collected continuously over a 5-year period from a small group of children (n=12),

starting with their entry in pre-school (e.g. observations, interviews with the children and their parents and kindergarten teachers; cf. Kasten, 1991). A central aim of this study involving several case studies was to develop methodical tools and theoretical concepts for analyzing structural changes from an intraindividual research perspective (cf. Fink, 1991; Krapp & Fink, 1992). Without going into the details of the procedure we used to reconstruct an individual's pattern of interests at a certain point of time, Fig. 1 can demonstrate in a prototypical way the kind of information we gained from these structural analyses. The figure shows the result of our reconstructions for one child over four measuring points (tl-t4). The components of the central interest objects show that this child has a high preference for everything that has to do with animals, and she likes to be read to. As is often the case, we found a rather high stability of the main components in a child's pattern of interests. The picture changes, however, when we go into detail and try to reconstruct the themes, activities and topics on a more concrete level. Here we find many changes during the different stages indicated by the reconstructions at time points one to four.

A second, even more important result is that new interests of a child, as a rule, have their source in the component of an already existing interest. In this case, there was some evidence that the components "being read to", and "looking at animal books" were the beginnings of a more general interest in reading. The results, thus,

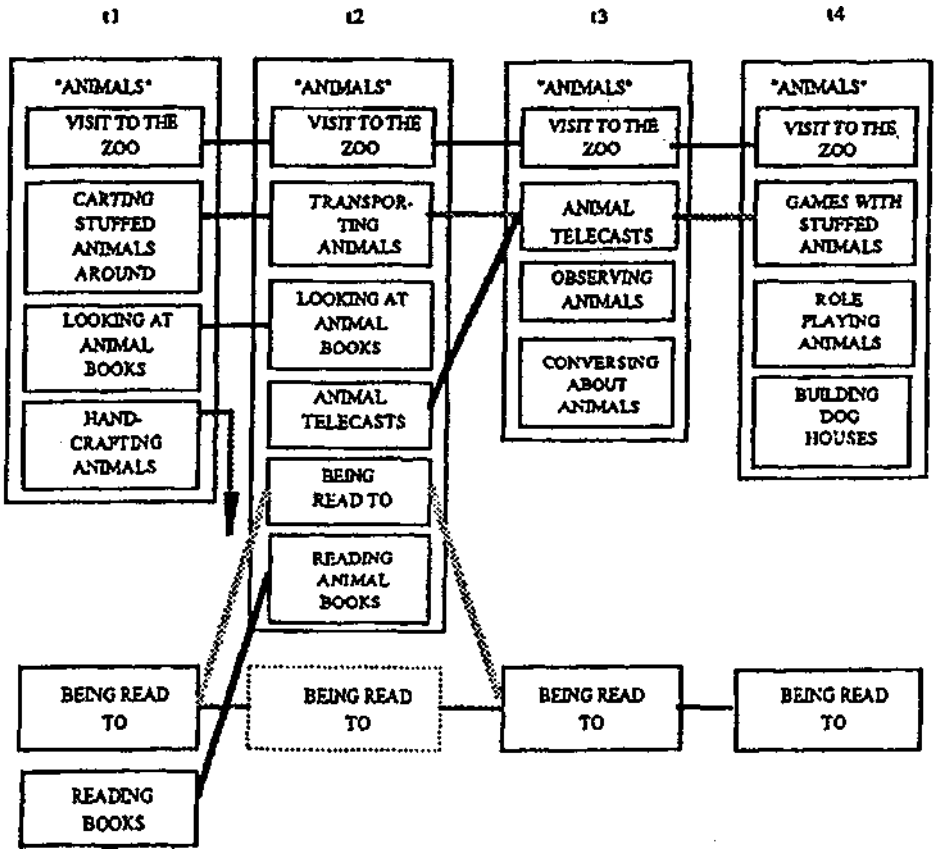

Fig. 1. Reconstruction of structural changes in an individual's pattern of interest over time (from Fink, 1991, p. 194).

confirm the general thesis that any interest has a history; it does not develop out of nowhere. Even the occurrence of a pure situational interest depends on preconditions that might result partly from our biological endowment and partly from prior experiences or already existing personal interests (cf. Hidi & Harackiewicz, 2001). Therefore, the emergence of a new interest—even a new situational interest—cannot be seen as the construction of a totally new PO-relationship. Rather, it builds upon structural and dynamic components the individual has acquired in earlier stages of his or her development.

Reconstructions of the course of development found in particular cases lead to the specification of hypothetical developmental models that offer an impression of how the occurrence and growth of an individual interest can be interpreted as specific kind of structural changes in a person's already existing pattern of interest-related PO-relationships (see Fig. 2).

The *growth model* describes the way we tend to think about the normal way of interest development. According to this concept, the successive steps of structural reorganization of a certain PO-relationship are directed towards increased differentiation. It is not only the structure of declarative and procedural knowledge that becomes more and more complex, but also the structure of the feeling-related and value-related valences that qualify certain knowledge areas as more or less central components in a person's actual structure of interests. The *"channeling model"* represents one possible way to describe and explain the emergence of a *new* topic-related interest. According to this model, the structural reorganization of a growing interest occurs through increased differentiation of one particular aspect of an already

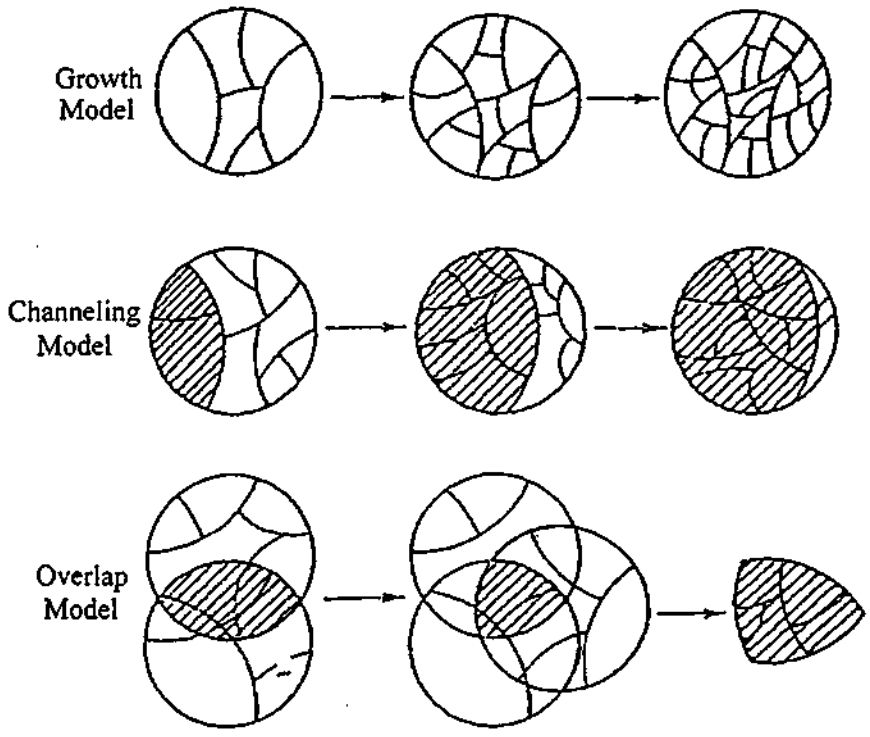

Fig. 2. Hypothetical developmental models (from Fink, 1991, p. 197).

existing PO-relationship. This component comes to be of central importance, while other parts of the actual components in this PO-relationship are excluded. This results in a topological "channeling", and after some time a thematically complete newly structured interest is established. In some respects, this model represents what Allport (1961, p. 226ff) described in his famous principle *of functional autonomy*—an activity that at first had only a peripheral meaning for the person or was only instrumental to some other end can later become a central "intrinsic motive" or interest in itself. The *"overlap model"* represents another hypothesis about the origin of a new interest. It is a result of the learner recognizing that relations can be made between various areas of interest that until then did not belong together. A developmental shift occurs when qualitatively different PO-relationships become structurally intertwined, leading to the formation or discovery of new, shared structural elements. A good example is a case study with a boy of elementary-school age who had two highly preferred activities: playing with "Fischer-Technik", a construction game, and developing computer programs on a simple basis. When he found out that he could use the computer to steer the mobiles of Fischer-Technik, he became fascinated in writing computer programs and constructing all kinds of robots. Thus, the detection of "overlapping structural components" in two areas which—until then—constituted two totally different but highly evaluated objects of interest lead to a new and long-lasting personal interest.

3.5. *The transition from situational to individual interest*

The considerations and theoretical models we have discussed so far provide some ideas of how the course of interest development can be described as structural changes during ontogenesis. However, they do not say very much about how an interest develops. Which factors are responsible for the specific direction of this development, and how can the emergence and stabilization of a relatively enduring personal interest be explained? Referring to the above-mentioned conceptual differentiation between situational and individual interests, these questions can be expressed more precisely according to the process by which externally stimulated situational interest is stabilized and maintained and finally becomes a longer-lasting personal interest (see Fig. 3).

The experience of being interested in a concrete learning situation is always the result of an interaction between personal and situational factors (Hidi & Baird, 1986; Bergin, 1999; Krapp et al., 1992). In contrast to a situation where the actualized state of interest is caused primarily by a strong and highly developed individual interest, the prototypical case of a situational interest is initiated primarily by external factors in a given learning environment (Hidi, 1990; Krapp et al., 1992; Murphy & Alexander, 2001). In school, for example, it is assumed that a situational interest is created by the interesting "composition" of a teaching situation and/or an interesting presentation of a lesson. In text-based learning a situational interest is the result of certain text characteristics (Hidi & Baird, 1986; Ainley et al., in press). Stated more generally: "situational interest is generated by particular conditions and/or objects in the environment that focus attention, and it represents an affective reaction that may

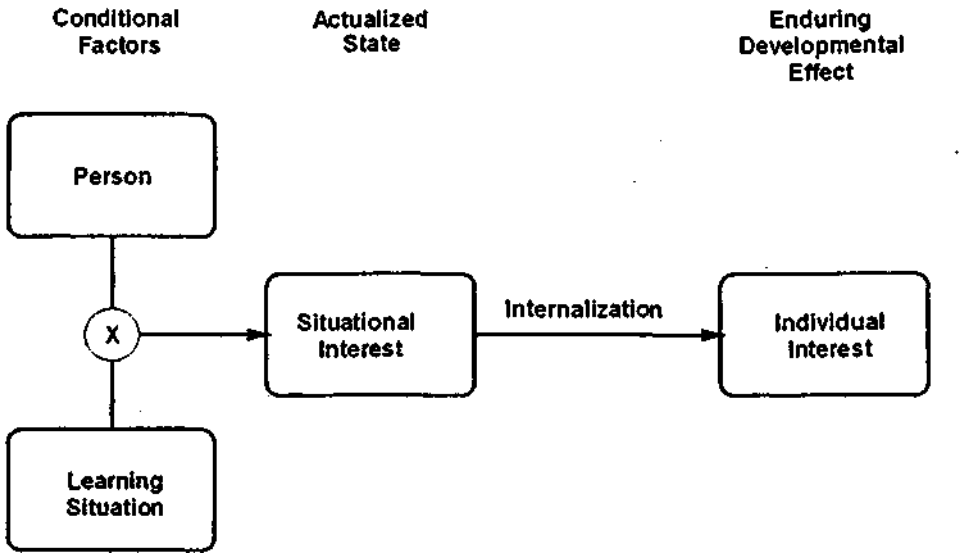

Fig. 3. The ontogenetic transition from situational to individual interest (Krapp, 1998, p. 191).

or may not last" (Hidi, 2000). The content of the learning material presented is not part of the subject area of the learner's already existing individual interests, rather the interesting factors in this specific situation "awaken" the interest for a shorter or longer period of time. Under certain conditions, a longer-lasting PO-relationship which meets the criteria of a personal interest can grow out of such a situational interest. The central psychological "mechanisms" that supports this ontogenetic transformation are *internalization* and *identification* (see below).

This process, however, is usually a multistage process which cannot be sufficiently described by the two concepts situational and individual interest. In fact, we must consider a developmental continuum between the very beginning of a situational interest, a state which might be close to the experience of curiosity, on the one hand, and a stabilized interest of a grown-up who has totally identified with the related object of interest, on the other. In order to be able to adequately illustrate the developmental processes from an actual-genetic as well as an ontogenetic point of view, a model that takes into account possible interim levels of interest genesis is necessary. This problem has been pointed out already by Dewey (1913), and it is also an important topic in the current discussions about the role of interest in teaching and learning (e.g. Hidi & Baird, 1988; Hidi, 2000; Mitchell, 1993; Krapp, 1998).

Fig. 4 represents a model which expresses the central idea of such a multistage concept. Thus, one has to differentiate between three types of interest, which, from
an ontogenetic perspective, represent three prototypical stages of interest development: (1) a situational interest awakened or triggered by external stimuli for the first time; (2) a situational interest that lasts during a certain learning phase and (3) an individual interest that represents a relatively enduring predisposition to engage a certain object-area of interest.

The first occurrence of a situational interest is primarily a matter of actual-genetic processes. From an ontogenetic perspective, the next two levels of interest development are of central importance. They include two qualitatively different steps of

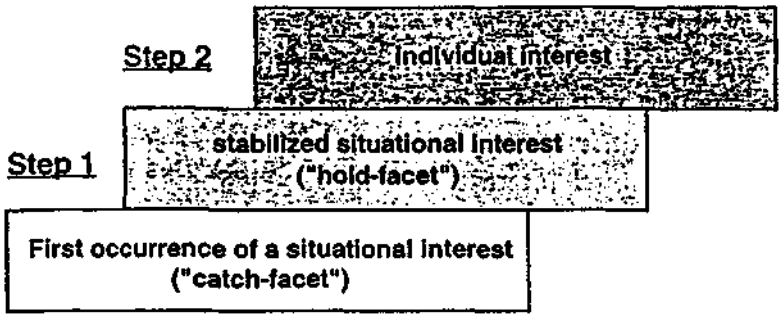

Fig. 4. Three qualitatively different levels and two ontogenetic "steps" of interest development.

interest development (Krapp, 1998): first, the shift from the transitional state of actual attraction or curiosity to a more stable motivational state which is a necessary condition for effective learning; and second, the shift from a rather stabilized situational interest to a more or less enduring individual interest.

The theoretical need for separating two levels of situational interest has been discussed recently in more detail by Mitchell (1993) and Hidi (2000). Referring to a notion of Hidi and Baird (1986, p. 191) that situational interest as a process has a durational aspect, and that besides triggering conditions there are also "conditions which ensure the continuation of interest", Mitchell (1993) has suggested differentiating between a "catch" and a "hold" facet of situational interest. The essence of catching interest lies in finding various ways to stimulate individuals' attention, whereas the essence of holding interest lies in finding ways to empower students. A stimulant is commonly defined as a variable that temporarily increases the activity of an organism. Besides the already mentioned studies on interestingness and situational interest, various research approaches dealing with curiosity and exploration (Berlyne, 1960, 1974; Keller, Schneider, & Henderson, 1994; Krapp, 1994) or "attention and arousal" (Eysenck, 1982) have provided many important insights into the conditions of catching an interest. Hidi (2000) has proposed to use the term *triggering* instead of *catching* interest, since trigger and catch are not synonymous verbs. "Triggering interest describes an initial beginning phase of the psychological state of interest in which attention is increased and arousal generated in disengaged individuals. On the other hand, catching interest suggests that the interest that individuals already experience is being diverted towards the situation" (Hidi, 2000, p. 313).

Much more important with respect to learning and instruction is the question of how to hold an interest for some period of time in order to stimulate a more or less lasting state, which can be characterized as "working interest" representing a more or less enduring state of intrinsic motivation in a single learning situation or across a sequence of situations (e.g. lessons covering a certain topic of a school subject). This is the *first step* in the proposed three-stage model of interest development. According to Mitchell (1993) the shift from "catching" to "holding" an individual's situational interest requires learning conditions that make the content of learning meaningful for students according to their actual goals and longer-lasting motives and values. It seems to me that this idea is very close to Boekaerts' notion that an effective state of learning motivation can only be expected when a student interprets

a "learning opportunity" provided by the teacher as a "meaningful learning episode". Otherwise it is perceived as mere extrinsic task-fulfillment (Boekaerts, 1999, p. 42). In contrast to the first step which can occur frequently as a person is, in principle, able to develop many different short-lasting situational interests, the *second step* from a stabilized situational interest to a longer-lasting individual interest seldom happens. According to POI, an individual interest is integrated into the structure of the individual's self-system. This means that the person has identified with the goals, actions and topics related to this interest and, therefore, will not change his or her intentions easily and develop an entirely new pattern of personal interests from one day to the next. Looking at the ontogenetic process of interest development from such a theoretical perspective, the question arises as to under which circumstances does this integration process take place. Research approaches that analyze interest development primarily from the perspective of differential psychology focus only on the description and "explanation" of interindividual differences and do not consider general psychological principles that can explain the "normal" course of ontogenesis. I have already pointed out that POI, therefore, advocates a dynamic conception of personality that provides a functional interpretation of this second step of interest development.

3.6. Interest development and the growing "self"

As mentioned above, POI postulates that within the complex structure of personality there are areas which are central to the person. They are recognized as components of the *"self* that represent a person's identity. Here, POI has adopted several postulates and hypotheses from theoretical approaches that interpret the course of human development from the perspective of a dynamic theory of personality (Fend, 1994; Deci & Ryan, 1985; Ryan, 1993; cf. Krapp, 2002). For example, it is assumed that the self is not simply a social construct or a reflection of social appraisals; rather, we are convinced that the individual has great influence on his or her own development from earliest childhood onwards. Human beings are active by nature: there is an inborn tendency to interact with the social and physical environment in a self-determined way. At a very young age, a person already tries to affect the "objects" in the social and physical environment in dependence on his or her needs and personal goals. The ongoing developmental changes lead to a continuous differentiation of the individual's structure of self, and it is only because there is an inborn propensity towards integration that this process of differentiation and reorganization does not lead to a compartmentalization of the self. Thus, the person tries to create and maintain a coherent image, a "good Gestalt" of his or her sense of self. As a consequence, he or she cannot identify completely with all thoughts, actions, tasks, and strivings, even when they are experienced as being important for the individual's wishes and future goals at the moment. With respect to an ontogenetic theory of interest development the question arises as to why a person identifies himself or herself with exactly these specific objects of interest. Which psychological principles govern the process of *internalization* that is the basis for an expanding self-system?

And what kind of regulation system is responsible for the emergence and stabilization of motivational dispositions?

3.7. The concept of a dual regulation system

In accordance with theoretical paradigms discussed in other fields of psychological research referring to developmental aspects in human motivation (Brunstein et al., 1999; Heckhausen, 2000), POI postulates a psychological control system which operates at two different levels of human experience. The assumption that human behavior and thus motivation is directed by a complex system of influence factors which are found at various levels of consciousness and act in part independently from each other has been stated in many psychological theories. Freud was probably the most prominent representative of this belief. His psychodynamic theory, however, was too speculative, and behaviorists as well as cognitive researchers rejected this multilevel theory as being unscientific. In the meantime, the trend has taken a change in direction due to the influence of new research findings, e.g. in neuropsychology (cf. LeDoux, 1995). The available results appear to confirm the idea that human experience and behavior are directed by two regulation systems and that these systems are based on different psychological function principles (Spangler & Zimmermann, 1999; McClelland, Koestner, & Weinberger, 1989).

According to Brunstein et al. (1999, p. 157), the first system has a strongly biological anchor. It is based on highly generalized preferences for emotional states, and the motivational dynamics are a direct function of the quality of emotional experiences during the course of action. The tendencies to act resulting from this subconsciously working regulation system do not succumb to critical self-regulation and require no self-regulatory measures (e.g. conscious volitional controls). The second system is mainly based on decisions a person consciously makes with respect to future goals and intentions. According to Brunstein et al. (1999, p. 157), this explicit personal goal-system is closely tied to the person's self-concept and directed to fulfilling social demands which, for example, result from "developmental tasks" at hand. When realizing personal goals, difficulties usually have to be conquered and obstacles overcome. This requires the use of volitionally directed strategies of action control.

The concept of a "dual motivation system" (Brunstein et al., 1999, p. 157) concurs with the main premises of Epstein's *"cognitive-experiential self-theory"* (1990). Epstein also postulates two rather independently working control systems, a rational system and an experiential system. The rational system operates at the conscious level and is primarily guided by cognitions. The experiential system operates normally at the subconscious level and is primarily guided by emotions. It is a highly efficient system that automatically interprets reality, organizes experiences and directs behavior without conscious effort. Human behavior always operates on both levels. For our discussion, we have to recognize that the two different systems can direct the individual to two different ends. Thus, conflict between the two occurs, commonly identified as conflict "between heart and mind".

These psychological concepts about the interplay of cognitive and affective

components in the human system of action control support the hypothesis formulated in earlier papers (cf. Krapp, 1996, 1998, 2000) that the development and maintenance of personal interests are directed by two functional systems which mainly act independently of each other. According to this hypothesis, two kinds of determining factors have to be taken into account: first, cognitively represented factors, especially with respect to personal values and goals; second, feeling-related experiences during the ongoing actions which are connected to the object-area of an individual's interest. Taking the three-stage model of interest development into consideration (Fig. 4), POI postulates that both steps of interest development will only occur if both factors are experienced together in a positive way. More specifically, if a person experiences his or her actual engagements (e.g. a learning task) as personally relevant or "meaningful" because they are related to personal goals, and if the emotion-related (affective) experiences during these engagements reach a certain qualitative level of positive feedback. The basic principle of this idea is not a new one. In the tradition of Dewey's conceptualization of the developing person, such a "cognitive-affective" synthesis has been postulated repeatedly as a central condition of the emergence of a lasting or "abiding interest" (e.g. Dewey, 1913; Rathunde & Csikszentmihalyi, 1993; Rathunde, 1998).

In interest development, cognitive-rational processes play an important role, for example in deciding on special educational and professional careers. I believe that modern cognitive approaches to human motivation provide a great variety of concepts, models and research results that refer to psychological principles "working" at the "upper" level of action and motivation control. Theories in the tradition of achievement motivation that describe the process of intention-formation (Heckhausen 1989, 1991), or theories about self-regulated learning (Boekaerts, Pintrich, & Zeidner, 2000), self-concept and self-efficacy (Schunk, 1991; Bandura, 1997; Schwarzer, 1992), or the process of volitional action-control (Kuhl, 1983) contain many specific empirically tested hypotheses which specify important cognitive conditions for the evaluation of the (possible) outcomes of an action that can be based more or less on an individual's actualized interest. However, with the conceptual "tools" of cognitive motivational theories, the process of interest development cannot be described and explained comprehensively. I assume that subconscious experiences and emotionally controlled qualities of experience play at least an equally important role in addition to the consciously rational processes of longer-term goal decisions.

Following Deci and Ryan's (1985, 1991) self-determination theory (SDT) and other process-oriented concepts of motivational action control (e.g. Boekaerts, 1997; Nuttin, 1984; Epstein, 1990), a regulation system working partly autonomously beside or "beneath" the system of conscious-cognitive control can be postulated. Informational processes on this level occur mostly without conscious-reflexive control. Instead, we experience the mechanisms and feedback processes as specific emotional qualities of experience accompanying an action. In the past few years we have tried to specify those emotional experiences on the basis of the concept of "basic psychological needs". According to Nuttin's (1984) "relational theory of behavioral dynamics" and to SDT (Deci & Ryan 1985, 1991; Ryan, 1995), it is assumed that living organisms are naturally endowed with a system of primary innate and basic

biological and psychological needs. During ontogenesis, these needs become more and more integrated into the increasingly complex systems of behavior control. The power/strength of these needs is not negated, however. Besides the rather clearly defined system of primary biological needs, a less clearly definable system of primary psychological needs is postulated. Based on SDT (Ryan, 1995; Deci, 1998), three qualitatively different needs can be distinguished within this system; namely, competence, self-determination, and social relatedness. Just as the fulfillment of basic biological needs is a natural necessity, sufficient fulfillment of the three psychological needs is a necessary requirement for optimal functioning of the psychological system (Deci & Ryan, 1985; Nuttin, 1984; Ryan, 1995). The system of basic psychological needs has to be understood as a holistically working system that provides continual signals about the functional effectivity of the current person-environment interactions. With respect to interest development, the need-related qualities of experience are important because they provide permanent emotional feedback on the micro-level of behavior regulation and thus contribute to the emergence of object-related preferences or aversions. It is postulated that a person will only engage continuously in a certain area of tasks or topic-related objects if he or she assesses these engagements, on the basis of rational considerations, as sufficiently important (value-related valency) and if he or she experiences the course of interactions on the whole as positive and emotionally satisfactory (Krapp 1999, 2000; see also Deci 1992, 1998). There are a number of findings that seem to support this hypothesis. The majority of these studies were carried out with students and young adults in vocational settings (Lewalter et al., in press; Prenzel, Kramer, & Drechsel, 1998; Kleinmann, Straka, & Hinz, 1998). In a longitudinal study with apprentices we have tried to test this hypothesis directly using quantitative as well as qualitative data. The sample consisted of 117 trainees from the insurance business. The quantitative analyses are based on data from questionnaires, ESM (Experience Sampling Method) measures and observational techniques. The qualitative analyses are based on retrospective interviews with a smaller number of randomly chosen subjects from the main study. In both the quantitative and the qualitative analyses, statistically significant relations between the occurrence of positive need-related experience and different indicators of interest development could be observed in the retrospective interviews (cf. Krapp & Lewalter, 2001; Wild et al., 1998; Lewalter & Schreyer, 2000; Lewalter, Wild, & Krapp, 2001).

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