



ELSEVIER

Learning and Instruction 15 (2005) 161–171

Learning and
Instruction

www.elsevier.com/locate/learninstruc

Commentary

Studying the development of learning and task motivation

Jacquelynne S. Eccles*

*Institute for Research on Women and Gender, Gender and Achievement Research Program,
University of Michigan, 204 South State Street, 1251 Lane Hall, Ann Arbor, MI 48109 1290, USA*

Abstract

This commentary focuses on the papers by Nurmi and Aunola and by Spinath and Spinath. I discuss the difficulty in testing the hypothesis that ability self concepts influence developmental changes in learning and task motivation. I point to the following concerns: (1) the difficulty in conceptualizing and then measuring these concepts well; (2) the likely reciprocal relations among the key constructs (i.e., learning and task motivation, self-concepts of abilities, feelings of efficacy, and actual performance); (3) the difficulty in finding the “right” lagged time frame for testing the hypothesis; (4) the need to take into account the developmental changes associated with all of the relevant constructs in designing our studies; (5) the need to take into account individual differences in both the course of developmental changes on each of the relevant constructs and the nature of the relations among the constructs; and (6) the importance of person-centered approaches.

© 2005 Elsevier Ltd. All rights reserved.

My charge was to discuss developmental changes in learning motivation. Since this topic was most central to the papers by Nurmi and Aunola, and Spinath and Spinath, I focus my comments on these two papers because they address most centrally the issue of developmental changes in school-related learning motivation. Due to the

* Tel.: +1 734 763 3552; fax: +1 734 936 7370.

E-mail address: jeccles@umich.edu

theoretical centrality of efficacy beliefs in all major theories of learning motivation, both pay particular attention to the potential causal influence of competence self-perceptions on developmental changes in learning motivation. Both papers do a wonderful job of placing their work within several different theoretical perspectives and justifying both theoretically and empirically the proposed causal priority of efficacy beliefs in predicting change in learning motivation. Both also do a wonderful job locating their definitions of learning motivation in the range of currently popular school motivation theories. Let me say at the outset, I enjoyed reading and studying these two papers very much. They challenged my own views on both the fundamental nature of both efficacy and learning motivation beliefs and on the relations between these two sets of motivational constructs. Finally, they made me think very hard once again about the nature of developmental processes in this domain and how they may change with maturation and exposure to school experiences.

The Spinath and Spinath paper assesses the relation between competence self-perceptions and learning motivation during the elementary school years using a longitudinal, variable-centered approach. These authors ask the question: “Do competence self-perceptions causally predict changes in learning motivation over the early elementary school years?” The Nurmi and Aunola paper focuses on changes in individuals’ profiles of task motivation across different subject areas over the early elementary school years. They assess the relation of concurrent and lagged subject-matter-specific competence self-perceptions to changes in children’s membership in one of four across-subject matter motivational clusters (those who place high value on math, reading and writing; those who value math more than the other two subjects; those who value math less than the other two subjects; and those who show low interest across all three subject areas). I was particularly grateful to be able to look at two papers with these contrasting methodological approaches. We need to see more of such comparative approaches.

The results from both of these studies are fascinating. Both provide solid evidence of change in learning motivation over the elementary school years. Both show reasonable concurrent relations between ability self-concepts and learning motivation assessed primarily in terms of interest in and enjoyment of school learning tasks. Both use sound methodologies firmly grounded in efficacy and ability self-concept research traditions. Unfortunately, neither report very much support for the hypothesized lagged predictive impact of ability self-concepts on subsequent learning or task motivation once initial levels of motivation are included in the models. I am sure this was a surprise to the authors; it certainly was to me. But we have also had difficulty finding strong support for this hypothesis in our own longitudinal studies. The strongest support we have found was reported by Jacobs and her colleagues (Jacobs *et al.*, 2002), as noted by Spinath and Spinath.

What are we to conclude from these findings? To be absolutely honest, I am not sure. But given the centrality of this hypothesis to the fields of efficacy and motivation, I focus much of my discussion on this uncertainty. I also make suggestions regarding what kinds of studies are needed to reach more definitive conclusions about the relations among ability self-concepts, learning or task motivation, and developmental changes in actual competence.

But even more importantly, both of these studies, as well as the other papers in this special issue, raise several more fundamental questions: Why do population level means in learning motivation decline with age and the passage through school? How typical is this decline at the individual level, i.e., how many children and which children experience this decline? What accounts for the individual differences in these developmental patterns? And what can be done in the schools to prevent these developmental declines in learning or task motivation? The papers in this special issue begin to address these questions. The authors of each of the papers raise and do a marvelous job of discussing these fundamental questions in both their introduction and discussion sections. Many important hypotheses are offered. They also note the difficulty involved in testing many of these exciting hypotheses using ecologically valid designs. Nonetheless, the authors of each of the papers have helped to chart a course for future research — a course that is worth pursuing despite its difficulty.

I believe that there are several key issues that must be considered if we are to understand developmental changes in motivation for school-related learning. First, we need to get as complete a picture as possible of the nature of the developmental changes we seek to understand. Second, we need to understand the nature of individual differences in these developmental trends. Third, we need to understand the psychological and social influences on both the general developmental trends and the individual differences in these developmental trends. Both of these articles help to move our field forward on one or more of these questions. I focus my discussion of these three fundamental issues, relating my comments on each of the articles to this discussion.

1. What is developing?

The authors of both of these papers begin with a discussion of how they conceptualize their dependent measures. Spinath and Spinath define learning motivation in terms of a general orientation to liking school learning tasks and wanting to learn and understand new things in school. They ground this operational definition in theories of intrinsic motivation and learning/mastery (as opposed to performance) goals. I agree that this component of task value is likely to be the most central particularly during the elementary school years, when children are not yet expert at regulating their own behaviors to learn things they do not particularly enjoy doing. Like Harter (1998), Spinath and Spinath define academic competence beliefs in terms of a general belief about how good one is at doing school work and how easy it is for one to learn new things at school. Unfortunately, with the exception of the year 1 competence beliefs for the youngest children, the six-month, across-time stabilities for both of these constructs is very high — making it very difficult to reliably test any lagged causal relation between these two constructs using population, variable-centered level of analysis. Thus, they had set themselves a difficult methodological task to test their main hypothesis.

Nurmi and Aunola define task motivation in terms of children's liking of three different school subjects (reading, writing, and math); thus they adopt a domain-specific operationalization of task motivation. Similarly, they define competence self-perceptions in terms of domain-specific abilities. Finally, they assess this self-perception in terms of the children's view of their ability relative to other children in their class. The six-month test–retest reliabilities of these scores are low to moderate (0.34–0.52) perhaps because social comparative self assessments are difficult at this age and the majority of the children are likely to report quite high scores. Most interestingly, Nurmi and Aunola then do a cluster analysis on the task motivation scores to create different groups of children based on within-person profiles of task motivation scores across the three subject areas.

Thus even at the operational definition level, there are major difference between these two studies — one defines learning motivation at a general level, the other defines motivation at a domain-specific level; one uses a variable-centered approach and one uses a person-centered approach focused on typologies of motivational profiles. These differences in design relate directly to the fundamental question: what is developing? Should we be looking at developmental changes in a general orientation to learning at school or at developmental changes in the emergences of differentiated motivational patterns across various subject areas? The answer to this question is critical for understanding the exact nature of the commonly reported developmental decline in learning motivation. We find the same declines in our studies and have been quite puzzled by the question of how general are these declines. Two questions come to mind. First, how common is the decline: does it occur for most children or do some children remain high while others decline as they gain more information about their abilities from their school performance? Both sets of authors do a nice job of discussing these options.

Second, how general across different subject matters is the decline at the level of the individual? I believe that the very fact that Nurmi and Aunola could reliably measure domain-specific task motivation and then create clusters based on patterns of responses across these different domains raises a question about the utility of a general view of school-based learning motivation; this preference is certainly evident in my own work, which has always focused on domain-specific beliefs.

But I am also sympathetic to the idea that there may be a general component to learning motivation — something like the g-factor in intelligence. Certainly, such a view is inherent in the Harter's conceptualization of ability self-perceptions and Marsh and his colleagues' notion of higher order factors related to ability self-concepts (Marsh, 1990, 2004; Marsh & Ayotte, 2003; Marsh, Craven, & Debus, 1998). A key issue is whether this general component extends beyond “book-learning” to the full range of possible learning settings. How is the kind of school-related general learning motivation assessed by Spinath and Spinath related to White's and Harter's notion of more general effectance motivation or young children's supposedly “insatiable desire to learn”? Or are Spinath and Spinath already picking up on a domain-specific type of learning motivation — one related to school learning as opposed to learning in a variety of other kinds of skills and knowledge domains?

This discussion raises the more general issue of what is actually developing and how should we best measure it? My colleague Allan Wigfield and I discussed this developmental issue in great detail in our chapter on achievement motivation in the *Handbook of Child Psychology* (Eccles, Wigfield, & Schiefele, 1998). In that chapter, we pointed out the need to distinguish between studying mean level differences on specific measures and studying developmental changes in the nature and complexity of the constructs themselves. Like Spinath and Spinath, we concluded that there is a general trend for all types of indicators of school-based motivation to decline across school grades. Our own work certainly shows this trend. In addition, however, we also find developmental changes in the variance around these group means, in the relations among domain-specific indicators of both ability self concepts and various measures of task valuing (liking, perceived importance, and utility), and in the relation of many different indicators of domain-specific motivational constructs to actual performance.

Each of these developmental changes is in need of much more extensive theoretical and empirical analysis before we will fully understand, even at a descriptive level, what is developing in terms of each individual construct — much less the nature of development across the various constructs and causal interconnections among various motivational constructs such as ability self perceptions, subjective task valuing, learning and task motivation, activity engagement, and actual competence. For example, let us just consider Spinath and Spinath's definition of learning motivation. We do not yet know if all children begin with a very general learning motivation that applies to all learning situations. We also do not know if this general learning motivation remains general over time or becomes more differentiated as children mature and actually have experience with various activities. We do not even know if it remains general for some children and becomes more differentiated for others. Finally, we need to know if children maintain both a general learning motivational orientation and develop a set of more domain-specific learning motivational orientations, as well as, how these two motivational systems, if they exist, articulate with each other. All of these are key questions to our full understanding of what is actually developing.

Knowing more about these issues is critical for interpreting the null findings from both of these articles. For example, does the impact of successful mastery experiences in some activity domains sustain a general learning motivation or do differential rates of success and failure experiences in different activity domains lead to a differentiation of the general learning motivation into domain specific desires to learn based on differential histories of enjoyment and actual competence? If the latter is true, then it would be very unlikely that one would find a longitudinal causal association between general competence self assessments and general learning motivation. Instead the link between ability self assessments to learning motivation ought to be at a domain-specific level and there ought to be across-domain internal comparison processes operating as well (as hypothesized by Marsh and his colleagues, see Marsh, 2004).

Directly related to these issues is the question of the accuracy of ability self perceptions. In their discussion, Spinath and Spinath ask whether “declining

learning motivation is an inevitable consequence of children's increasingly realistic self-perceptions". This conclusion raises several questions. First, as noted above, I am not sure how general the decline in learning motivation actually is. If the decline in the mean scores really reflects the differentiation of learning motivation into more domain-specific motivational systems, then what looks like a general decline could reflect a decline in some domains, an increase in other domains, and no decline in still other domains. If children are getting more accurate in their self assessments and if they in fact find learning easier and more enjoyable in some domains than others and are using this information to form more accurate ability self assessments, then increasing accuracy should lead to apparent declines on measures of general learning motivation as the children aggregate their domain-specific learning motivations across domains to arrive at a composite self assessment. This type of process is quite consistent with Spinath and Spinath discussion of the developmental inevitability of a decline in learning motivation. However, because they focused on a general level of learning motivation, it is not clear if this is what they had in mind. Do they conceptualize learning motivation as a higher order factor that integrates domain-specific beliefs or drives domain-specific beliefs? Or do they conceptualize general learning motivation as an independent system that is only loosely related to domain-specific learning motivation? What are the developmental processes underlying changes over time in both of these motivational systems?

The apparent decline could also reflect another developmental change. Assuming that children do some form of aggregating their domain-specific learning motivations into a single score in order to be able to fill out the questionnaire, then what may be happening is an increase in their ability to do this aggregating as they mature. When the younger children answer the question, they may focus on those aspects of school that they find most enjoyable instead of trying to generate a composite assessment. Then as they mature, they may try to aggregate their differential levels of enjoyment and interest over all of their school subjects into a "global average". We know that children are better able to aggregate information as they get older; they may also understand what is being asked on questionnaires better as they get older. If this is the case, then younger children may have a quite differentiated set of learning motivations that we are just not very good at assessing. If this is the case, then the notion of inevitability needs to be differentiated. Indeed, at the aggregate level, maturing should lead to greater accuracy at judging both one's socially relative abilities (compared to other children in the class) and one's internally relative abilities (abilities across different subject areas). Maturing should also lead to better ability to aggregate both of these types of information into a "global average". The implications of both of these types of cognitive changes for sustained engagement in the learning activities at school need more extensive study.

2. Individual differences in the nature of developmental change

Nurmi and Aunola's paper reinforces the need to look at domain specificity. It also draws attention to the need to look at individual differences in the nature of

changes in motivational beliefs across domains by focusing our attention on the movement of children from one typology of motivational beliefs to another. Thus, in this paper, what is developing is not the children's motivation on single motivational indicators for single domains but the children's profile of motivational beliefs across several domains. Looking at their results does not lead to the general conclusion that task motivation is declining across the early school years. In fact, the number of children in the low school motivation group decreases across time and the number of children in the high school motivation group remains fairly stable. There is an increase in the percentage of students in the low math motivation group (from 11.4% at the beginning of grade 1 to 24.6% at the end of the second grade) and a decrease in the percentage of students in the high math motivation groups (33.2–28%). These results suggest that the motivational changes are domain-specific and that there are substantial individual differences in the developmental nature of these patterns of change.

Nurmi and Aunola's paper also relates to the issue of a general learning motivation raised by Spinath and Spinath. Two of the clusters identified by Nurmi and Aunola might represent the end points of the type of general learning motivation being studied by Spinath and Spinath: the high and low school motivational clusters. These two groups are similar in that the children rated their task motivation either uniformly high or uniformly low for all three subject areas. The existence of these two groups raises several interesting questions. First, will the high school motivation group develop more differentiated profiles as they continue to mature or will they remain broadly interested in all school subjects? There is certainly no significant trend towards their becoming more differentiated across the two years of the current study but this is a narrow band of time. Second, when and why did the low school motivation group develop such low task motivation for all three subject areas? Third, how might these groups differ from one another and from the two more domain differentiated task motivation groups on Spinath and Spinath's measure of general learning motivation? The answer to this last question would help to address some of the concerns I raised in the previous section.

3. What influences the developmental changes in motivational beliefs?

Both papers tested the extent to which ability or competence self assessments predict changes in learning or task motivation defined in terms of enjoyment and liking. Both concluded that their data showed little evidence of such a predictive longitudinal relation and both discussed other possible influences on the developmental changes in motivation.

Spinath and Spinath concluded that they found no evidence to support this hypothesis based on the fact that an SEM model including these longitudinal paths provided no better fit to the data than an SEM model that did not include these paths. Their rationale was based on the principle of parsimony. Although parsimony is often wise, it is nonetheless true that the first SEM model fit the data just as well as the second more parsimonious model. Given the arguments I outlined above about

the general nature of their measures, I would be very cautious in interpreting their findings one way or the other. Also given the stability of both the competence and interest measures, there is not much variance available to explain in their measures. Finally, newer longitudinal techniques based on latent growth curve and modeling of the relation of change in one variable to change on a second variable might be a more sensitive test of their hypotheses. I say more later about other possible design issues that might underlie their apparent null results.

Nurmi and Aunola also assessed whether the observed motivational changes were predictable from prior levels of children's ability self perceptions and also concluded that they could find no evidence for such a longitudinal effect. Instead they, like Spinath and Spinath, found strong concurrent relations between ability self perceptions and motivational cluster membership. Interestingly, Nurmi and Aunola study also found no concurrent relations between performance on actual competence measures and motivational group membership.

So what is going on? The theory underlying this prediction is that individuals should come to enjoy doing those activities at which they feel competent and in which they have experienced a sense of efficacy. The theory itself does not spell out a time frame in which these processes are likely to occur and it does not rule out the possibility of reciprocal relations among these constructs. Testing the theory empirically requires the researcher to make assumptions about the correct timing of the processes, the lack of individual differences in the directions of these effects, and the lack of reciprocal effects — all of which are problematic. Furthermore, as discussed earlier, the researcher has to make assumptions regarding the best way to measure intrinsic value/mastery motivation, feelings of competence and feelings of efficacy, as well as actual performance since this should be directly related to feelings of efficacy (i.e., should we be operationalizing the concepts at the general or domain-specific level). Finally, researchers have to make assumptions about the right age or level of expertise at which to test the hypothesized links. Since I have already discussed the measurement issue, I will focus my comments here on: the age and timing of the testing, the possibility of reciprocal effects, and the need to pay attention to individual differences.

First, let's focus on the possibility of reciprocal effects among interest/enjoyment, ability self perceptions, and actual performance. Although it seems quite likely that we will come to enjoy what we feel competent doing, it is also quite likely that we will devote more time to what we enjoy and as a result will develop greater competence as well as come to feel more competent at those things we enjoy doing. Nurmi and Aunola found some support for this suggestion in the math domain. We have found support for it across several in- and out-of-school activity domains (see Eccles et al., 1998). Thus, it seems very likely that, by their very nature, learning and task motivation, competence levels and perceived competence levels are integrally connected. We do not understand how the processes start and how they interact with each other. If learning motivation comes from feelings of competence and young children have an insatiable desire to learn (see Spinath and Spinath), then do they begin life feeling competent at everything and so willing to try almost anything? Or do they begin life with a strong general learning motivation and then acquire

feelings of competence as a result of trying and succeeding at various activities? Where do initial levels of actual and perceived competence come from? What drives initial levels of enjoyment and what leads to sustained high levels of enjoyment? What happens when children begin to experience more difficulty learning new things in some activity domains than others? How is level of difficulty experienced affectively? How much difficulty is experienced as interesting and challenging and how much is experienced as frustration and failure? When is difficulty experienced as a sense of lack of efficacy? How do these feelings change over age and how do they differ across individuals at any given age? All of these questions are central to understanding any set of relations among these constructs. They are even more central when we look at developmental changes precisely because there are both general developmental time tables and individual differences in these time tables associated with each of these concerns. Given all of these issues, it is not surprising that both articles yielded a mixed picture. Their findings clearly support the conclusion that the relations among these constructs are not going to be simple and straightforward.

The distinction between novices and experts is also critical. It seems very likely that the optimal level of difficulty for feeling efficacious will vary depending on the level of expertise. Even at the same grade level, children will differ in their level of expertise in different school subjects. Consequently, the relations among constructs studied in these two papers will likely differ across children with different levels of expertise and competence at the start of the study.

Next, we need to think hard about the timing of our assessments. Is six months the right time frame for looking at lagged relations among these constructs? If not, what is theoretically the right time frame? How does the “right” time frame differ as the developmental course for each of the constructs change and how does the “right” time frame vary as a function of individual differences linked to things like level of expertise, temperament, and cultural beliefs about the nature of abilities? For example, we know that the strength of the correlation between actual performance and perceived ability increases with age. We also know that the stability of ability self-perceptions and perceived interest value of various school subjects increase with age. We know that both actual ability and individual differences in current ability levels increase with age. We know that differential competency levels across various activities at the level of the individual increase for some but not all individuals (see Eccles et al., 1998 for review). How do we take these developmental changes into account as we design studies to test a specific hypothesis like do individual differences in ability self-concepts predict individual differences in subsequent learning or task motivation? Given all of these complexities, it is not surprising that neither Spinath and Spinath nor Nurmi and Aunola were able to find support for the basic-level hypothesis. I believe that the situation is just too complex for any single, simple hypothesis to gain very strong support across studies that themselves vary in both design and measures. But we needed to do our best to test this hypothesis before moving on to more complex hypotheses. Both of these articles provide the field a real service by having conducted very solid tests of the fundamental causal hypothesis.

4. Where do we go from here?

So what does influence learning motivation and what might better explain the developmental declines reported in so many studies? I agree with the authors of both of these articles that we need to focus more on the nature of school experiences that both facilitate interest and help to maintain a strong sense of efficacy at learning school material. I believe that the psychological processes linking interest, perceived importance, mastery motivation, perceived competence and actual competence are reciprocal in nature. I also believe that school contextual characteristics can influence each of these psychological constructs. Both Spinath and Spinath and Nurmi and Aunola show us that the relations among these constructs are complex and do not lend themselves to simple hypotheses. Spinath and Spinath, in particular, provide a very thoughtful discussion of how classroom characteristics linked to performance versus mastery goals might influence the very relations among the constructs being studied. This is a very important observation that reinforces the need to take into account the complexity of these processes in designing future studies.

Spinath and Spinath discuss several very important school factors that might be important. They point particularly to the importance of feedback practices that focus children's attention on improvement and an incremental theory of ability so that the children will continue to be optimistic about their ability to master new material. They also stress the importance of practices designed to maintain a learning goal focus rather than a social comparative performance focus. They note that such practices become less prevalent as children move through the school system and suggest this might be one source of the declines in learning motivation reported in many articles. I agree with these conclusions and applaud Spinath and Spinath for calling attention to the need for such studies.

The papers by Perels et al. and Rosendaal et al. demonstrate that we can design interventions that will influence both self-regulated learning and motivation. I would like to see such interventions adapted for, and tested in, the early elementary school years in order to determine whether we can change school experiences during these years in such a way as to maintain high levels of learning and task motivation.

I would also like to see more focus on the type of person-centered approaches used by Nurmi and Aunola so that we can learn more about the emergence of individual differences in learning motivation across various activity domains. To make wise career choices, people need to develop a differentiated picture of their competencies. We know very little about how this differentiated view of the self emerges. We know even less about its consequences for learning motivation both within school contexts and beyond school contexts across the life span.

We also know very little about individual differences in the development of either intense general or domain-specific interest. Why are some children's imagination and behavioral engagement totally captured by activities in one domain or another? Why do other children never seem to become enthralled with any particular learning domain? These questions are key to our understanding the full nature of motivated task engagement as well as to our ability to design school experiences that increase the likelihood of children becoming enthralled with some aspect of school learning.

Larson's work demonstrates that motivated intense engagement rarely occurs at school during the early, middle, and late adolescence (Larson, 2000). It does happen for some young people in out-of-school or after-school organized activity settings. We need to know more about these activity settings in order to design more "captivating" school learning experiences (see Eccles & Templeton, 2002 for some discussion of this issue).

References

- Eccles, J. S., & Templeton, J. (2002). Extracurricular and other after-school activities for youth. In W. S. Secada (Ed.), *Review of research in education*, Vol. 26 (pp. 113–180). Washington, DC: American Educational Research Association Press.
- Eccles, J. S., Wigfield, A., & Schiefele, U. (1998). Motivation. In N. Eisenberg (Ed.), *Handbook of child psychology*, Vol. 3 (5th ed.) (pp. 1017–1095). New York: Wiley.
- Harter, S. (1998). The development of self-representations. In W. Damon (Series Ed.), & Eisenberg, N. (Vol. Ed.), *Handbook of child psychology*, Vol. 3 (5th ed.) (pp. 553–617). New York: John Wiley and Sons.
- Jacobs, J. E., Hyatt, S., Osgood, W. D., Eccles, J. S., & Wigfield, A. (2002). Changes in children's self-competence and values: Gender and domain differences across grades one through twelve. *Child Development*, 73(2), 509–527.
- Larson, R. W. (2000). Toward a psychology of positive youth development. *American Psychologist*, 55(1), 170–183.
- Marsh, H. W. (1990). A multidimensional, hierarchical self-concept: theoretical and empirical justification. *Educational Psychology Review*, 2, 77–171.
- Marsh, H. W. (2004). Explaining paradoxical relations between academic self-concepts and achievements: cross-cultural generalizability of the internal/external frame of reference predictions across 26 countries. *Journal of Educational Psychology*, 96(1), 56–67.
- Marsh, H. W., & Ayotte, V. (2003). Do multiple dimensions of self-concept become more differentiated with age: the differential distinctiveness hypothesis. *Journal of Educational Psychology*, 95, 687–706.
- Marsh, H. W., Craven, R. G., & Debus, R. G. (1998). Structure, stability, and development of self-concept: a multicohort, multioccasion study. *Child Development*, 69, 1030–1053.