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Profiles of ability, effort, and difficulty: Relationships with worldviews, motivation and adjustment☆

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Abstract

Adopting a person-centered approach, we profiled 5th and 6th grade children's (152 boys and 161 girls) school-related beliefs about perceived task difficulty and agency beliefs in ability and effort. Five clusters were compared across key learning-related dimensions encompassing underlying worldviews (means–ends beliefs, normative difficulty, nature of ability), motivation (intrinsic, identified, introjected, and extrinsic), and adjustment (achievement and well-being): *Agentic* (high ability, high effort, low difficulty), *Strivers* (above average ability, high effort, high difficulty), *Normative* (average ability, effort and difficulty), *Disengaged* (low ability, low effort, average difficulty) and *Challenged* (low ability, low effort, high difficulty). The findings suggest that difficulty, perceived either as challenge or obstacle, plays an important role for the belief profiles, and that relationships with worldviews and motivation are indicative of adaptation and maladaptation.

Keywords: Ability; Effort; Difficulty; Agency; Adaptation; Motivation; Worldview; Person approach

1. Introduction

Across childhood and adolescence, individuals form concepts of their ability, their effort, and how difficult tasks are. Nicholls (1984) suggested that children learn to estimate their own ability by gauging how difficult a task is for them, how much effort they put forth, and how difficult tasks seem for others. Although the complex relations between ability, effort, and difficulty have been studied by a number of scholars using a variable-centered approach (e.g., Heckhausen, 1991; Nicholls, 1984; Nicholls & Miller, 1984), the inter-relations among these three constituents of competence have not been investigated fully in a holistic way.

As a first step in this direction, the primary goal of this study is to identify possible profiles in students' agency beliefs in ability, effort, and perceived task difficulty by applying a person-centered approach (Bergman, 1998; Bergman & Magnusson, 1997; Bergman, Magnusson, & El-Khouri, 2003; Niemivirta, 2002). For two reasons, we

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expected qualitatively different and meaningful profiles to emerge, in which the synergistic nature of ability, effort, and personal difficulty would be non-linearly manifested. First, as has been pointed out by Bergman (1998) a key tenet of the person-centered approach is that configurations of variables can be meaningfully linked with one another in ways that are not revealed by linear examination. Specifically, cluster analysis can reveal unique subgroups of individuals with different sets of coherent, meaningful, and predictive profiles. Because traditional linear modeling approaches assume sample homogeneity, the presence of subgroups is often obscured. Cluster analysis, on the other hand, is specifically geared toward identifying heterogeneity among individuals.

Second, previous studies of competence and motivation have (a) been conducted in the laboratory using level of difficulty as an independent variable (for a review, see Heckhausen, 1991), (b) relied on researcher-defined splits in the variables of interest (Henderson & Dweck, 1990), or (c) conducted cluster analysis on motivational variables underlying achievement-related beliefs and behavior (Meece & Holt, 1993; Niemivirta, 1998, 2002; Valle et al., 2003). For the present study, we chose task difficulty and agency beliefs about ability and effort as our clustering variables because of their pivotal role in educational attainment and their central position in the work of Nicholls (1984; Nicholls & Miller, 1984), as well as in the action-control theoretical model (Heckhausen, 1991; Heider, 1958; Little, 1998; Malmberg, Wanner, & Little, 2007; Skinner, Zimmer-Gembeck, & Connell, 1998). To understand the nature of the emergent subgroups, we examined profile differences on three sets of interlinked variables: (a) *worldviews*, including means–ends beliefs (Little & Lopez, 1997), beliefs about the malleability of ability (Dweck, 1986; Henderson & Dweck, 1990; Stipek & Gralinski, 1996), and perceived normative difficulty (how difficult it is for others), (b) *motivation* (Reeve, Deci, & Ryan, 2004; Ryan, 1995; Ryan & Deci, 2000; Walls & Little, 2005), and (c) *school adjustment* (achievement and well-being; Walls & Little, 2005). In the following, we focus our literature review on theoretical assumptions and empirical findings that warrant the clustering of competence (agency) beliefs in ability, effort, and perceived difficulty.

1.1. Action-theory framework

The literature on action-control beliefs defines conscious personal actions as volitional, self-regulated, and intentional (Brandtstädter, 1998; Heckhausen, 1991; Heider, 1958; Little, 1998; Little, Hawley, Henrich, & Marsland, 2002; Little, Snyder, & Wehmeyer, 2006; Malmberg, 2002; Malmberg et al., 2007; Skinner, 1995). Actions can be broken down into an *agent* (i.e., the person who carries out an act), a *means* (i.e., the resources such as effort and ability needed to attain an ends), an *end* (i.e., the goal one wishes to achieve; here, school achievement), and an appraisal of the *difficulty* of the action (i.e., the perceived degree of personal challenge; here, how difficult school work is). The agent–means relationship is defined as an *agency* belief; the self-related belief of having access to certain means (i.e., ability and effort) for reaching a desired outcome (i.e., school achievement). The means–ends relationship is defined as the beliefs the agent holds about the causal potential of the set of possible means, which reflects a person's worldview about what it takes to accomplish the goal. Generally speaking, educational contexts where individuals perceive their actions as autonomous and self-regulated (i.e., intrinsic, integrated, and identified regulation) facilitate learning, well-being, and the development of adaptive worldviews. Educational contexts where individuals perceive their actions as other-regulated, enforced, and externally caused (i.e., introjected and extrinsic regulation) foster ill-being, apathy, and maladaptive worldviews (Ryan, 1995; Ryan & Deci, 2000).

1.1.1. Agency and difficulty

School-aged children's and youths' agency beliefs in ability and effort have been systematically related with school achievement across a range of educational systems (Little, 1998; Little, Oettingen, Stetsenko, & Baltes, 1995; Skinner, 1995). However, when task difficulty has been included as a construct, it correlates weakly to moderately with competence beliefs (Malmberg et al., 2007; Schmitz & Skinner, 1993) and achievement (Ames & Archer, 1988; Nicholls & Miller, 1984). In fact, the relationship between ability and difficulty has been described as rather complex. For example, Heider (1958) defined competence (''can'') as ability minus difficulty. In experimental studies, interaction effects between competence and success-feedback conditions on the selection of subsequent task difficulty have been observed (Heckhausen, 1991; Mueller & Dweck, 1998). For example, low achievers who were given failure feedback after an easy or moderate task could either choose an easier subsequent task (to be sure to make it) or a very difficult one (to have an excuse for not passing it; for a review, see Heckhausen, 1991). The generally low correlations between

difficulty and competence dimensions and their known complex relationships suggest that clustering on these variables (effort, ability, difficulty) may be a fruitful analytic direction to follow.

Children develop concepts about ability, effort, and difficulty by discriminating between task difficulty and ability, and between effort and ability (Nicholls, 1984; Nicholls & Miller, 1984). Effort judgments can be estimated on the basis of time on task or level of fatigue upon task completion. Ability judgments, on the other hand, require more complex considerations based on clues in the context. Although young children do not reliably differentiate between ability, effort, and task difficulty, older children and adolescents generally do differentiate between effort and ability (Little & Lopez, 1997; Little, Stetsenko, & Maier, 1999) and ability begins to relate to performance as a function of effort (Nicholls & Miller, 1984). At this point, effort expenditure can be interpreted in one of two ways: either effort is a sign of low ability or it allows one to utilize ability (e.g., Hong, Chiu, Dweck, Lin, & Wan, 1999; Mueller & Dweck, 1998). At the same time, children arrive at a differentiated conception of difficulty level, where tasks are judged as more difficult if fewer members of a reference group can perform well on them (i.e., they locate themselves in the ''distribution'' of the classroom), which can cause discontent as children realize not everyone can ''be the best'' (Nicholls, 1984). The availability of social comparison opportunities with classmates and peers (Butler, 2000; Festinger, 1954), the presence of social reference norms (e.g., Rheinberg, 2001), and teacher's use of individually referenced feedback (i.e., against previous achievement; Little, Oettingen, Stetsenko, et al., 1995) provide a complex of cues for children to relate their relative ability, effort, and difficulty.

1.1.2. Worldviews

An individual's history of successes and failures forms a basis for further goal-setting, perceptions of the self, and perceptions of how the world works (e.g., means–ends beliefs; Little, 1998). Means–ends beliefs have been found to be quite similar across school systems, and correlated with achievement to a lesser extent than competence beliefs (Skinner, Chapman, & Baltes, 1988). This frame of personal interpretation is closely linked with naïve theories about ability and effort. Believing that a certain cause (i.e., ability or effort) is effective or important for an outcome (i.e., a means–ends beliefs in ability or effort), and believing that one is capable of utilizing these means, promotes motivation. On the other hand, believing that one does not have access to a particular means (e.g., ability), when one believes that the means (e.g., ability) is important for succeeding, undermines motivation[1] (Patrick, Skinner, & Connell, 1993; Skinner et al., 1998). The extent to which such complex relations among these agent–means and means–ends distinctions would emerge in our analysis would support our choice to examine profiles derived from the ability–effort–difficulty nexus.

A second type of worldview is the individual's beliefs about the nature of ability, referred to as *entity beliefs* (i.e., the belief that intelligence is fixed) and *incremental beliefs* (i.e., the belief that ability is malleable; see Dweck, Chiu, & Hong, 1995; Grant & Dweck, 2003; Henderson & Dweck, 1990; Stipek & Gralinski, 1996). Dweck (1986; Henderson & Dweck, 1990) found that students who thought that their ability was fixed (held entity beliefs) set performance goals (wanting to gain favorable and avoid unfavorable judgments about their achievements). If their confidence in their ability was high, they showed mastery-oriented achievement behavior, sought challenges, and were persistent. Students who had low confidence in their ability displayed helpless behavior, avoided challenges, and were low in persistence. Students who thought that their ability was malleable set mastery-learning goals to improve their competence. Those who had both high and low confidence in their ability and set mastery-oriented goals, sought challenges and were highly persistent. If our ability–effort–difficulty profiles reveal such characteristic constellations of entity and incremental beliefs, it would provide criterion validation for the cluster profiles.

1.2. Motivation and adjustment

Beliefs about one's self as competent when confronted with difficulties, in conjunction with a worldview that complements one's competence beliefs, promote motivation (i.e., an adaptive belief profile). Beliefs about one's self as

[1] The definitions of capacity beliefs (Skinner, 1995) and agency beliefs (Little, 1998) overlap, both indicating individual access to a certain means for reaching an outcome ('I am smart', 'I put in enough effort'). Skinner (1995) defines strategy beliefs as the extent to which an individual thinks his or her own means are effective in producing the desired outcome, while Little (1998) defines means–ends beliefs as the extent to which an individual believes that a means is effective in general ('When other kids want to do well at school, is it because they work hard enough'). Although the distinction may seem small, it discriminates importantly between the perception of the effectiveness of one's own strategies (Skinner) vs. those of others (Little), the latter of which delineate shared cultural values and norms (Little & Lopez, 1997).

ineffectual when confronted with difficulties, in conjunction with a worldview that forms an unfavorable basis for competence judgments, undermines motivation (i.e., a maladaptive belief profile; Reeve et al., 2004; Skinner, 1995; Skinner et al., 1998). In the literature, we find two relevant approaches using motivational constructs. The first approach views motivation using the end-poles of intrinsic and extrinsic motivations, and fine-tunes the continuum in between: integrated, identified, introjected, and extrinsic motivation (Ryan & Deci, 2000). Lack of motivation is referred to as ''amotivation''. The second approach focuses on the use of achievement goals as proxies of underlying motivational orientations (Elliot, 1999). Although the two perspectives on motivation use different concepts, some overlap appears. Mastery-approach goals overlap with the intrinsic–integrated–identified pole of motivation (Ryan & Deci, 2000), both indicating the inherent value in the object—learning itself. Performance-approach goals indicate that one wishes to outperform others, while performance-avoidance goals indicate the wish to not disclose weaknesses. These goals overlap with introjected and extrinsic motivations. More specifically, introjected and extrinsic motivations point at the person you do not want to disappoint by being outperformed by others, or having your weaknesses exposed to. While mastery-approach and performance-avoidance goals seem to predict a coherent set of outcomes, the evidence is relatively mixed regarding performance-approach goals (Midgely, Kaplan, & Middleton, 2001).

The extrinsic–intrinsic continuum form a quasi-simplex structure, meaning that motivational sources located closer to each other (e.g., extrinsic and introjected) are more strongly correlated than motivational sources located further apart from each other (e.g., extrinsic and integrated; see Walls & Little, 2005, for empirical support of the simplex structure). Studies on children's and adolescents' motivational orientation have shown that agency beliefs in effort, but not ability, mediate the relations between identified regulation and school adjustment (Walls & Little, 2005). Similarly, Patrick et al. (1993) found that the effect of their compound effort construct (high strategy beliefs and high capacity beliefs for effort) was mediated through positive emotion to both intrinsic and identified regulations, while their compound ability construct (low strategy belief and high capacity belief for ability) was unrelated to perceived autonomy. Because of the way the compound measure was composed, however, non-linear effects might have been obscured. In the current study, such effects should emerge as distinct characteristics of the effort–ability–difficulty profiles.

Previous studies using an achievement–motivation approach have used either cluster analysis or multiple regression with interaction terms to identify motivational profiles. These studies have focused on different goals for determining profiles. For example, learning goals (mastery), performance goals (wanting to outperform others), as well as avoidance and reinforcement goals (not wanting to disclose weaknesses) have been used as cluster variables (Meece & Holt, 1993; Niemivirta, 1998; Valle et al., 2003).

Meece and Holt (1993) identified subgroups of children described as mastery-oriented (high achievers and effortful), high mastery-high ego-oriented (lower achievers and less effortful), and low mastery-low ego-oriented (lower achievers). Niemivirta (1998) identified groups of learning-, performance-, and avoidance-oriented students, and then related their goal orientation profile against agency beliefs, means–ends beliefs and learning strategies. Learning-oriented students (relatively high on mastery goals) had relatively high levels of agency beliefs in effort and ability, and downplayed the role of ability in relation to effort. Performance-oriented students (relatively high on performance-approach goals) thought that they were less effortful and able than the learning-oriented students, but they thought ability mattered more for achieving well at school. Avoidance-oriented students (relatively high on performance-avoidance goals) had the lowest levels of agency beliefs and thought ability mattered a lot (while they themselves did not think they were very smart), but also external and unknown causes mattered for achieving well. Valle et al. (2003) identified subgroups of children described as goal-oriented (able, effortful, and high achievers), performance-oriented (unable, un-effortful, and low achievers), and learning-oriented (moderately able, moderately effortful, and high achievers).

Using researcher-defined cut-offs on mastery and performance goals, Pintrich (2000) identified a low mastery-low performance-oriented group as the most vulnerable (low self-efficacy, low positive affect, and high levels of self-handicapping). As outlined in our discussions above, we have chosen to cluster individuals on the basis of the competence variables rather than the motivational variables. If our profiles distinguish between promoting or undermining patterns of motivation, it would be indicative of further support for our choice in clustering on the ability–effort–difficulty nexus.

1.3. Research questions

In this study, we address two over-arching questions. First, can coherent constellations of personal belief profiles based on agency beliefs in ability and effort and perceived difficulty be distinguished? Second, how are these personal

belief profiles related to worldviews, motivation, and school adjustment? Given the literature reviewed above, we expected to find both highly adaptive as well as quite maladaptive profiles. Because no study such as this has previously been undertaken, however, we cannot offer more specific hypotheses.

2. Method

2.1. Sample

We included 313 children (152 boys and 161 girls) from grades 5 and 6 attending primary school ('Grundschule') in a western suburb of Berlin (mean age 11.7 years; SD = 0.70). The primary school sample was 83.1% ethnic German, and 16.9% ethnic minority (e.g., Turkish, Polish, Russian). Parents' socioeconomic background was lower to middle class. Research assistants administered questionnaires during school hours to those students with signed parental permission (approximately 80% per grade).

2.2. Measures

2.2.1. Competence dimensions

Agency beliefs in ability and effort were measured with the Multi-dimensional Control, Agency, and Means–ends inventory (Multi-CAM; Little & Wanner, 1997; see also Little, Oettingen, & Baltes, 1995). Students responded to six positively worded items for agency in ability and in effort: ''when it comes to learning something new at school, are you smart enough to do it?'' ($\alpha = 0.94$) and ''when it comes to figuring out a new lesson, can you put enough effort into it?'' ($\alpha = 0.90$). Three items were used to measure *perceived difficulty*: ''do you think that learning something new at school is hard to do?'' ($\alpha = 0.77$).

2.2.2. Worldviews

The *means–ends beliefs* were measured with the Control, Agency, and Means–ends Inventory (CAMI; Little, Oettingen, & Baltes, 1995). Three positive and three negatively worded items per construct were included, for example, ''When others don't learn very much in class, is it because they don't work very hard?'' (means–ends effort, $\alpha = 0.78$) and ''When others manage to learn hard things at school, is it because they are smart?'' (means–ends ability, $\alpha = 0.79$). *Normative difficulty* was measured with three items ''Do others your age think that figuring out a new lesson is hard to do?'' ($\alpha = 0.68$).

Two scales were adapted from Stipek and Gralinski (1996) to assess incremental vs. fixed beliefs about ability, consisting of six items each. The *entity beliefs* scale assesses the belief that ability is fixed (higher scores) or malleable (lower scores): ''Being dumb or smart is not something you can change, no matter what you do'' ($\alpha = 0.81$). The *incremental beliefs* scale assesses the belief that effort expenditure increase one's ability ''You can get smarter by working hard in school'' ($\alpha = 0.88$).

2.2.3. Motivation

We measured self-determined motivation utilizing a series of items developed as part of the Multi-CAM (Little & Wanner, 1997; see also Walls & Little, 2005). Intrinsic regulation was assessed with 6 items (e.g., ''Why do you learn something new in school? Is it because you enjoy doing it?'' $\alpha = 0.90$); identified regulation was assessed with 12 items (e.g., ''Why do you figure out a new lesson? Is it because it is important to do?''; $\alpha = 0.84$); introjected regulation was assessed with 9 items (e.g., ''Why do you figure out a new lesson? Is it because you want to show that you can do better than others?''; $\alpha = 0.87$); and extrinsic regulation was assessed with 9 items (e.g., ''Why do you understand new things in school? Is it because you don't want your parents to be angry with you?''; $\alpha = 0.87$). Not only were the subscales quite reliable, but also their inter-correlations conformed to the expected simplex structure (see Table 1; and see Walls & Little, 2005). The quasi-simplex structure indicates that the measurement of the continuum from intrinsic to extrinsic is functional even without a particular scale for integrated motivation. In fact, Ryan and Deci (2000) also note that intrinsic and integrated motivations often collapse because fully integrated motivation becomes intrinsically motivated behavior and therefore is not empirically distinguishable.

Table 1
Correlations and descriptive statistics

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
1. Agency ability														
2. Agency effort	***0.71***[c]													
3. Personal difficulty	***−0.20***[c]	***−0.08***												
4. Means–ends ability	0.16[b]	0.14[c]	0.23[a]											
5. Means–ends effort	0.33[c]	0.40[a]	0.07	0.48[a]										
6. Normative difficulty	0.16[b]	0.27[a]	0.39[a]	0.31[a]	0.18[b]									
7. Entity belief	−0.19[c]	−0.17[b]	0.16[b]	0.27[a]	0.05	0.11								
8. Incremental belief	0.21[c]	0.26[a]	−0.16[b]	−0.04	0.17[b]	−0.08	−0.19[c]							
9. Intrinsic motivation	0.51[c]	0.49[a]	−0.13[c]	0.11	0.23[c]	0.20[c]	−0.11	0.21[c]						
10. Identified motivation	0.52[c]	0.60[a]	0.07	0.33[a]	0.55[c]	0.30[c]	−0.09	0.22[c]	**0.52**[c]					
11. Introjected motivation	0.25[c]	0.21[a]	0.22[a]	0.33[a]	0.35[c]	0.18[b]	0.07	0.10	**0.18**[b]	**0.47**[c]				
12. Extrinsic motivation	0.22[c]	0.19[a]	0.31[a]	0.37[a]	0.38[c]	0.29[c]	0.10	0.04	**0.14**[a]	**0.44**[c]	**0.74**[c]			
13. Achievement	0.36[c]	0.38[a]	−0.26[a]	−0.02	0.19[c]	0.14[a]	−0.22[c]	0.07	0.21[c]	0.26[c]	−0.11	−0.16[b]		
14. Well-being	0.28[c]	0.36[a]	−0.12[c]	−0.05	0.14[a]	0.07	−0.20[c]	0.30[c]	0.39[c]	0.26[c]	0.06	0.06	0.36[b]	
M	2.68	2.93	2.14	2.22	2.53	2.47	1.99	3.52	2.66	2.99	2.13	2.30	4.03	3.07
SD	0.77	0.66	0.74	0.55	0.57	0.65	0.72	0.57	0.81	0.51	0.64	0.67	0.94	0.62

Note: our clustering variables are indicated in ***bold italics***, and the quasi-simplex structure of motivational beliefs in **bold**.
[a] $p < 0.05$.
[b] $p < 0.01$.
[c] $p < 0.001$.

2.2.4. School adjustment

Children's school *well-being* was measured with three negatively worded (e.g., "I don't like being at school; reverse coded") and six positively worded items (e.g., "I feel comfortable at school"; $\alpha = 0.90$).

To represent *achievement*, grades from both language and mathematics were drawn from school records and were coded such that higher values indicate higher grades (1–6; $r_{xy} = 0.69$). In order to remove teacher-specific differences, we standardized achievement within each classroom prior to analyses.

2.3. Analyses

We used the 'Sleipner' cluster-analysis program (Bergman & El-Khouri, 1998; Bergman et al., 2003). After eliminating outliers (1 child in the total sample, and 1 boy and 1 girl in the gender-specific analysis), 151 boys and 160 girls remained in the gender-specific analysis. An initial hierarchical clustering was performed using Ward's method on standardized variables (Ward, 1963). The advantages of Ward's method are that it recovers known typological structures well (Kuiper & Fisher, 1975), even in the face of various conditions of within-group correlation (Donaghue, 1995). It outperforms other methods in reducing overlap between clusters (see McDermott & Weiss, 1995), and has desirable properties for replication studies (e.g., Overall & Magee, 1992). We interpreted the relocated cluster solutions because they allow optimal group membership for each individual.

A debated issue in the literature on cluster analysis is how to determine the optimal number of clusters. We based the selection of clusters on the explained variance, which should be above two thirds (Bergman et al., 2003, p. 89), the maximum homogeneity coefficient of the cluster solution, which should be below 1 (Bergman et al., 2003, p. 99), the qualitative differences and theoretical relevance of the clusters, and the replicability of the cluster solution.

3. Results

Prior to conducting cluster analysis of the variables, we assessed the structural validity of the constructs in the present model in a Confirmatory Factor Analysis (CFA; Brown, 2006). All items were grouped into three parcels per construct, except two indicators for school achievement. The use of parcels reduces item non-normalities and the number of parameters to estimate, increasing model parsimony (e.g., Bandalos, 2002; Little, Cunningham, Shahar, & Widaman, 2002). The preliminary CFA of the constructs fitted the data well ($\chi^2_{(717,\ n=313)} = 893.01$; $p < 0.001$; RMSEA $= 0.028_{(0.022|0.034)}$;

NNFI = 0.95; CFI = 0.96), in line with previous studies using the same or overlapping variables (Little & Wanner, 1997; Malmberg & Little, 2002; Walls & Little, 2005).

Prior to the cluster analysis we inspected the relationship between our profile variables. As shown in Table 1 personal difficulty was weakly related to agency beliefs in ability ($r = -0.20$) and unrelated to agency beliefs in effort ($r = 0.08$), while agency beliefs in ability and effort were strongly correlated ($r = 0.71$). For the main analyses of interest, then, we first conducted the cluster analyses for the whole sample. The 5-cluster solution fitted best for the overall sample. As shown in Table 2, the explained variance of the 5-cluster solution was above 0.67 and the maximum homogeneity coefficient was below one.

We tested whether any of the cluster solutions (from two to seven) were more prominent among boys or girls, using a series of χ^2 tests. The number of boys and girls in each cluster did not differ across each solution. Next, as a form of cross-validation, we inspected whether the 5-cluster solution would replicate in the boy and girl groups separately. We compared the cluster memberships of the 5-cluster solution conducted among all children against the 5-cluster solutions from the boy and girl groups. Membership overlap was substantial (i.e., 281 out of 311, or 90.4%). In an additional series of replications, we used the same methodology for a different age group: among 1410 secondary school students (grades 7–10; 661 boys and 749 girls), replicating the profiles of the 5-cluster solution (see Fig. 1). We also conducted Latent Class Analysis (LCA), using M*plus 3.13* (Muthén & Muthén, 2003) and Latent Gold 3 (Madigson & Vermunt, 2002), replicating the same 5-cluster solution among the primary school students. In M*plus*, the 5-cluster solution showed a slightly lower level of perceived difficulty for the Striver group, and overlapped 60.4% with Ward's solution. In Latent Gold, a 5-cluster solution in which the error variances were defined as class independent and gender was included as an active covariate overlapped by 83.1% with Ward's method (more details are available upon request).

In addition to the various replications of the 5-cluster solution, the profiles explained 73.05% of the variance among the boys and 69.95% among the girls, respectively, the within-cluster homogeneity coefficients were all below 1 (Bergman et al., 2003), and the clusters were readily interpretable. The five profiles, which had generally the same pattern for boys and girls, were: (1) *Agentic*, (2) *Strivers*, (3) *Normative*, (4) *Disengaged*, and (5) *Challenged*. The solutions are described in standardized metric (z-scores) and the value for each variable within a cluster is compared in relation to that same variable in the other clusters.

The *Agentic* ($n = 67$; 21.5%; 24 boys and 41 girls) cluster was characterized by relatively high values on agency beliefs in ability (0.93–1.31) and effort (0.99–1.34) and relatively low values for perceived difficulty (−0.70 to −1.03). *Agentic* boys expressed a higher level of agency belief in ability ($t_{65} = 2.67$; $p < 0.01$), effort ($t_{65} = 3.27$; $p < 0.01$), and lower level of perceived difficulty ($t_{65} = -2.29$; $p < 0.05$) than *Agentic* girls.

Table 2
Cluster solutions and replications

N clusters	All		Boys		Girls	
	Max H	EESS	Max H	EESS	Max H	EESS
4	1.05	63.28	0.96	66.48	0.84	61.58
5	0.85	69.66	0.89	73.05	0.77	69.95
6	0.77	73.02	0.77	76.08	0.75	72.95
Replications						
	Ward's method (secondary school)		Latent Class Analysis in primary school sample			
	Sleipner		M*plus*		Latent Gold	
N clusters	Max H	EESS	BIC	Entropy	BIC	AIC3
4	1.09	53.84	2476.39	0.86	1912.32	1854.65
5	1.15	62.61	2451.75	0.87	1907.05	1835.64
6	1.15	65.94	2457.24	0.84	1927.00	1841.87

Note: Max H = maximum within-cluster homogeneity and EESS = Estimated Error Sum of Squares, from Sleipner (Bergman & El-Khouri, 1998). The cut-off for EESS is approximately at or above 2/3, and for the maximum H approximately at or below 1 (Bergman et al., 2003). The Bayesian Information Criterion (BIC) and Entropy index are from M*plus* (Muthén & Muthén, 2003), and the BIC and the Akaike Information Criterion - 3 (AIC3) are from Latent Gold (Vermunt & Madigson, 2002). For the BIC and AIC3 relatively lower values are better. For the Entropy Index relatively higher values are better.

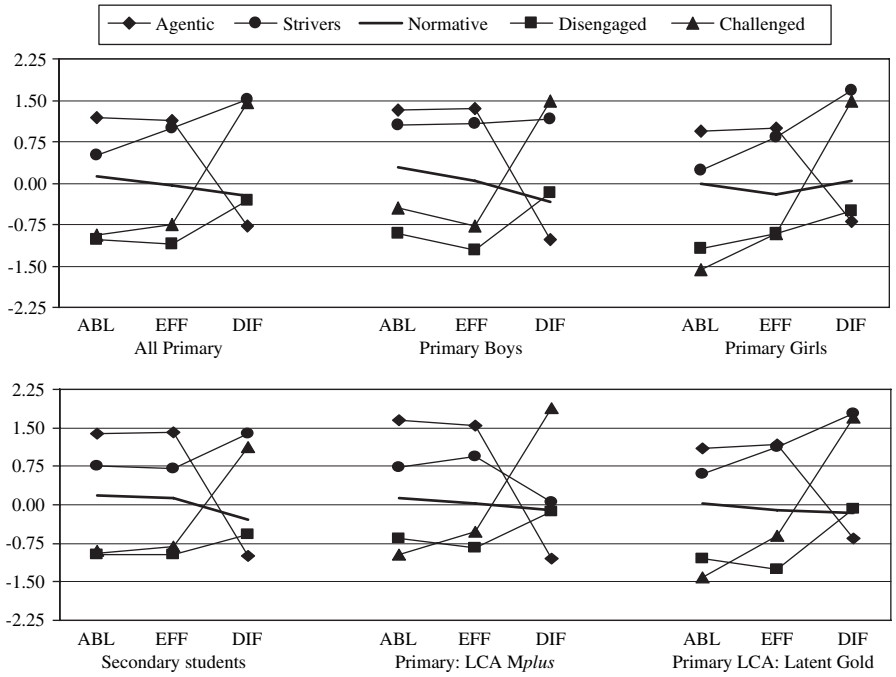

Fig. 1. Five-cluster solution in whole primary school sample, and among boys and girls separately (above), and replications of 5-cluster solution among secondary school students and using Latent Class Analysis among primary school students (below). Note: ABL = Agency: ability, EFF = Agency: effort, DIF = Personal difficulty.

The *Strivers* ($n = 37$; 11.9%; 16 boys and 21 girls) cluster was characterized by an above mid-point level of agency belief in ability in the whole group (0.28−1.05), a relatively high level of agency belief in effort (0.89−1.06), and relatively high values for perceived difficulty (1.16−1.69). *Striver* boys expressed a higher level of agency belief in ability ($t_{35} = 3.72$; $p < 0.001$) and a lower level of difficulty ($t_{35} = -2.35$; $p < 0.05$), than *Striver* girls.

The *Normative* group ($n = 104$; 33.4%; 54 boys and 50 girls) was close to the mean-value for all variables (see also Niemivirta, 2002). *Normative* boys expressed higher levels of agency belief in ability ($t_{102} = 3.74$; $p < 0.001$), effort ($t_{102} = 3.04$; $p < 0.01$), and lower difficulty ($t_{102} = -3.52$; $p < 0.001$), than *Normative* girls.

The *Disengaged* ($n = 74$; 23.8%; 42 boys and 32 girls) expressed relatively low levels of agency beliefs in ability and effort (−0.92 to −1.22) and relatively mid-range perceived level of difficulty (−0.18 to −0.50). *Disengaged* boys expressed higher levels of agency belief in ability ($t_{72} = 2.06$; $p < 0.05$), lower effort ($t_{72} = -2.36$; $p < 0.01$), and higher difficulty ($t_{72} = 2.43$; $p < 0.001$), than *Disengaged* girls.

The *Challenged* ($n = 29$; 9.3%; 13 boys and 16 girls) were characterized by relatively low agency belief in ability (−0.44 to −1.56) and agency beliefs in effort (−0.74 to −0.92), and relatively high levels of difficulty (1.47−1.50). *Challenged* boys expressed higher levels of agency belief in ability ($t_{27} = 5.33$; $p < 0.001$) than *Challenged* girls.

Although the mean-values of the three clustering variables had generally similar profiles (see Fig. 1) for boys and girls, they differed most notably for agency belief in ability as compared to the cluster solution for the whole group. This gender-specific finding has also been consistently found in previous studies of agency beliefs (Stetsenko, Little, Gordeeva, Grasshof, & Oettingen, 2000). Because of these differences, we estimated cluster, gender, and a cluster × gender interaction effect in a series of MANOVAs using four combinations of dependent variables in each: (a) means−ends beliefs in ability, effort, and normative difficulty, (b) entity and incremental beliefs, (c) intrinsic, identified, introjected and extrinsic motivations, and (d) well-being and school achievement (see Fig. 2).

3.1. Worldviews

The MANOVA for the first worldview block had a significant main effect of cluster (Pillai's Trace = 0.314; $F_{12,903} = 8.80$; $p < 0.001$), gender (Pillai's Trace = 0.026; $F_{3,299} = 2.63$; $p = 0.05$), and their interaction (Pillai's

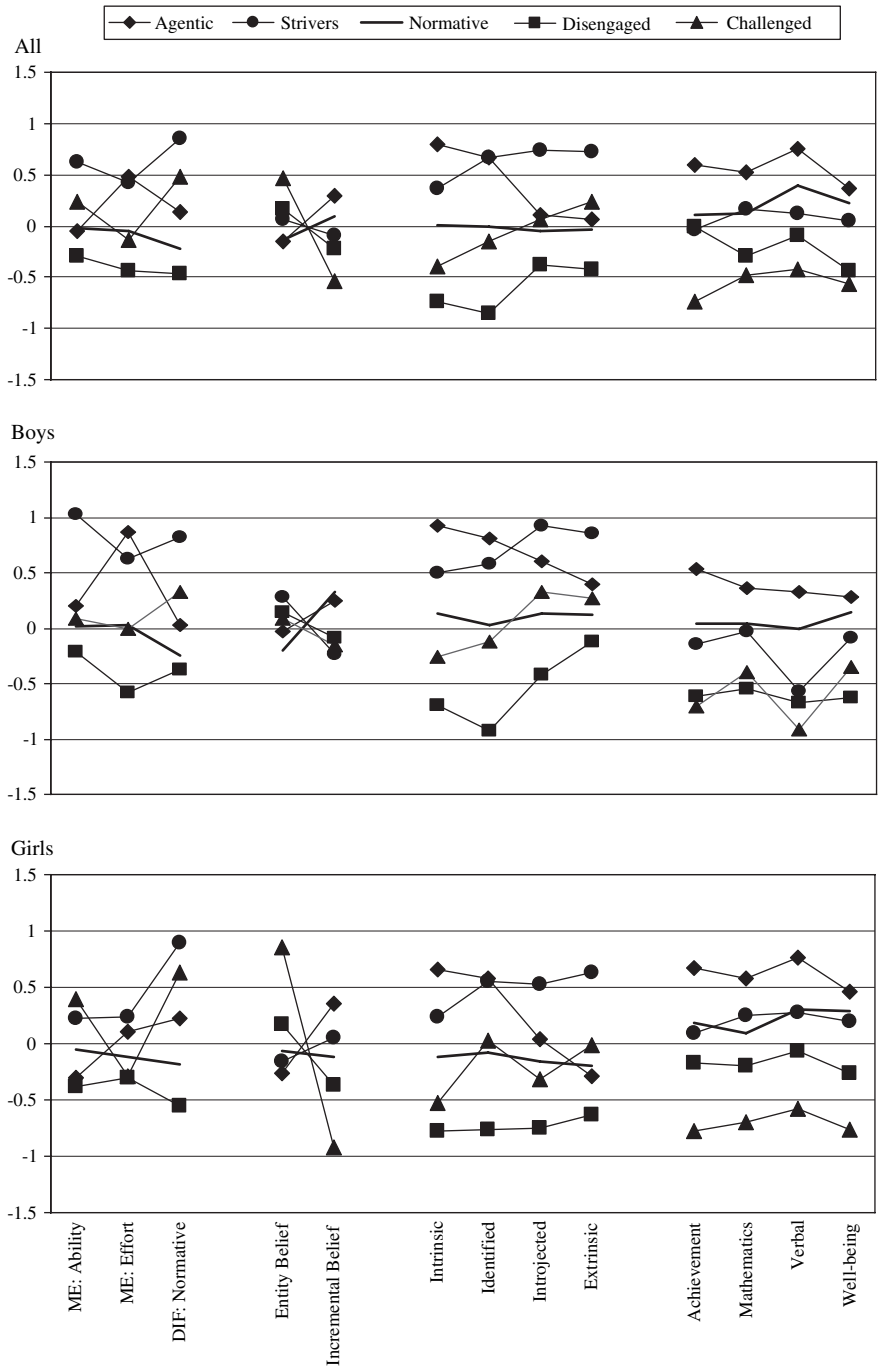

Fig. 2. Worldviews, motivation and school adjustment, by profile, among all primary school students, boys and girls, respectively. Note: ME = Means–ends beliefs, DIF = Perceived difficulty.

Trace = 0.070; $F_{12,903} = 1.80$; $p < 0.05$). On the univariate tests, boys expressed higher levels of means–ends beliefs in ability ($F_{1,301} = 4.14$; $p < 0.05$) and effort ($F_{1,301} = 4.84$; $p < 0.05$) than did girls. The interaction effect ($F_{4,301} = 2.75$; $p < 0.05$) indicated that *Agentic* boys expressed a higher level of agency belief in effort than did *Agentic* girls ($t_{65} = 2.95$; $p < 0.01$). Main cluster effects were found for agency beliefs in ability ($F_{4,301} = 6.25$; $p < 0.001$; $\eta^2 = 0.08$), agency beliefs in effort ($F_{4,301} = 10.62$; $p < 0.001$ $\eta^2 = 0.12$), and personal difficulty ($F_{4,301} = 16.66$; $p < 0.001$; $\eta^2 = 0.18$).

We conducted post hoc tests for the main cluster effect by Duncan's test given that it corrects for Type I comparison-wise error rates. The post hoc test showed that the *Strivers* group thought that ability was the most salient cause of school achievement, while the *Disengaged* group thought that ability mattered the least ($ps < 0.05$). Children in the *Agentic* and *Strivers* groups thought that effort mattered the most for school achievement, while children in the *Disengaged* thought that it mattered the least ($ps < 0.05$). When the normative difficulty was inspected, children in the *Striver* group thought that school tasks were the most difficult, more difficult than children in the *Challenged* and *Agentic* groups, while children in the *Normative* and *Disengaged* groups thought that school tasks were the easiest ($ps < 0.05$).

In the second worldview block (i.e., entity and incremental beliefs), the MANOVA showed a cluster main effect (Pillai's Trace = 0.090; $F_{8,602} = 3.56$; $p < 0.001$), but no gender or interaction effects. Univariate effects were found for entity beliefs ($F_{4,301} = 3.05$; $p < 0.001$) and incremental beliefs ($F_{4,301} = 5.18$; $p < 0.001$). Children in the *Challenged* group expressed the highest level of entity beliefs in ability (i.e., they thought ability was most fixed) and children in the *Agentic*, *Striver*, and *Normative* groups the lowest. Children in the *Challenged* group also expressed the lowest level of incremental beliefs (i.e., they thought that effort increased ability the least), while children in the *Agentic* group expressed the highest ($ps < 0.05$). Although Fig. 2 might lead us to think that *Challenged* girls had a higher level of entity belief than *Challenged* boys had, this trend was not significant ($t_{27} = -1.85$; $p = 0.075$). Neither was there a significant difference between Challenged boys' and girls' incremental belief ($t_{27} = 1.41$; $p = 0.17$).

3.2. Motivation

We inspected whether the quasi-simplex structure of the extrinsic–intrinsic continuum (Ryan & Deci, 2000) replicated in the present study. As shown in Table 1 (in bold) the diagonal elements were consistently more strongly intercorrelated (average $r = 0.58$) than in the first off-diagonal (average $r = 0.31$), and the end-point ($r = 0.14$). We then included the four motivational variables (extrinsic, introjected, identified, and intrinsic) in the next MANOVA, which showed a main effect of cluster (Pillai's Trace = 0.473; $F_{16,1204} = 10.08$; $p < 0.001$), gender (Pillai's Trace = 0.056; $F_{4,298} = 4.39$; $p < 0.01$), but no interaction. Univariate effects were found for intrinsic ($F_{4,301} = 30.32$; $p < 0.001$; $\eta^2 = 0.29$), identified ($F_{4,301} = 35.13$; $p < 0.001$; $\eta^2 = 0.32$), introjected ($F_{4,301} = 8.77$; $p < 0.001$; $\eta^2 = 0.10$), and extrinsic motivation ($F_{4,301} = 9.59$; $p < 0.001$; $\eta^2 = 0.11$). As compared to girls, boys expressed a higher level of intrinsic regulation ($F_{1,311} = 4.33$; $p < 0.05$), introjected regulation ($F_{1,311} = 12.76$; $p < 0.001$), and extrinsic regulation ($F_{1,311} = 11.22$; $p < 0.001$). Children in the *Agentic* group expressed the highest level of intrinsic regulation followed by children in the *Strivers* and *Normative* groups, while children in the *Disengaged* and *Challenged* groups expressed the lowest intrinsic motivation. Children in the *Agentic* and *Strivers* groups expressed the highest level of identified regulation followed by children in the *Normative* and *Challenged* groups, while children in the *Disengaged* group expressed the lowest level. Children in the *Strivers* group expressed the highest level of introjected regulation followed by children in the four other groups. Children in the *Strivers* group also expressed the highest level of extrinsic regulation followed by children in the *Challenged* group, while children in the *Disengaged* group were the lowest ($ps < 0.05$).

3.3. School adjustment

With regard to school adjustment, we found a significant effect of cluster (Pillai's Trace = 0.235; $F_{8,602} = 10.02$; $p < 0.001$), but no gender or interaction effects.[2] Univariate effects of cluster were found on achievement ($F_{4,301} = 12.76$; $p < 0.001$; $\eta^2 = 0.18$) and well-being ($F_{4,301} = 9.11$; $p < 0.001$; $\eta^2 = 0.12$). Children in the *Agentic* profile had the highest school achievement, children in the *Strivers* and *Normative* groups showed average levels of achievement, while children in the *Disengaged* and *Challenged* groups had the lowest school achievement. The children in the *Agentic*, *Strivers*, and *Normative* groups had a higher level of well-being than children in the *Disengaged* and *Challenged* groups. Also, when we analyzed math and verbal scores separately we found a significant effect of cluster (Pillai's Trace = 0.188; $F_{8,602} = 7.79$; $p < 0.001$) and gender (Pillai's Trace = 0.082; $F_{2,300} = 13.35$; $p < 0.001$), but no interaction effect. Girls outperformed boys in verbal achievement ($F_{1,301} = 20.20$; $p < 0.001$; $\eta^2 = 0.06$), but no gender difference was found for math.

[2] The findings from a univariate ANOVA of unstandardized school achievement ($F_{4,311} = 13.97$; $p < 0.001$; $\eta^2 = 0.16$), did not differ substantively from the results of the ANOVA of the within-classroom standardized school achievement.

4. Discussion

We investigated whether we could distinguish coherent constellations of personal belief profiles based on the nexus of agency beliefs in ability, effort, and perceived difficulty (Heider, 1958; Mueller & Dweck, 1998; Nicholls, 1984; Nicholls & Miller, 1984). Using these dimensions as clustering variables, we identified five distinct subgroups of students that were generally similar across males and females. Because difficulty is only weakly correlated with achievement and competence beliefs ~ (Malmberg et al., 2007), linear modeling approaches would not reveal the striking characteristics that typified each of the cluster profiles. That is, the five clear profiles were meaningfully distinguished in their worldviews, motivational orientations, and academic adjustment.

We have organized the discussion in terms of how the profiles converge with or diverge from the conceptualizations and findings of previous studies, and we discuss the added value of including difficulty constructs in the conceptualizations.

4.1. The role of difficulty

In our view, including perceived difficulty (Heider, 1958; Mueller & Dweck, 1998; Nicholls, 1984; Nicholls & Miller, 1984) in the constellation with beliefs about ability and effort was quite successful. Our profile analysis revealed key non-linear features in this tripartite relationship. Students who perceived school tasks as easy (*Normative* and *Disengaged*), average (*Agentic*) and difficult (*Strivers* and *Challenged*) differed quite meaningfully in their agency beliefs for effort and ability. Importantly, our five profiles expand Niemivirta's (2002) 3-cluster solution of just agency beliefs in ability and effort. Although Niemivirta's focus was more on methodology and he did not relate the clusters to any other variables, he found a high ability-low effort-group, a Normative group (as in the present study), and a low ability-high effort-group. Thus, including the perception of personal difficulty together with agency beliefs in ability and effort provides more nuances than only using ability and effort.

As Nicholls (1984) stressed, students gauge their beliefs in relation to their previous task performance and by probing their relative position in the classroom (based on comparisons with peers and feedback from teachers). Such processes contribute to their competence beliefs as well as to their perceptions of difficulty. The *Challenged* had an equally high level of personal difficulty as the *Strivers*. However, the *Strivers* thought they were more effortful and smart than the *Challenged* students. When we interpret the relationships between ability and difficulty, by using Heider's (1958) proposition (''can = ability minus difficulty''), we find that the ''the fixed force of personal ability'' is up against the level of difficulty for overcoming the goal. Although Heider's conceptualization defined ability as fixed, Dweck's conceptualization allows ability to be either fixed or malleable (Dweck, 1986; Stipek & Gralinski, 1996). By implication (and supported by the findings), the same level of difficulty can be interpreted as either an obstacle or an opportunity depending on the competence belief profile.

The kind of research question that the current study cannot answer, however, is what kind of tasks students in the different beliefs profiles would choose when they are confronted with a choice. The literature shows that mastery or success oriented students choose optimal tasks in experimental settings (Heckhausen, 1991; Mueller & Dweck, 1998), while failure or avoidance-oriented students choose either an easier subsequent task (to be sure to make it) or a very difficult one (to have an excuse for not passing it; for a review, see Heckhausen, 1991). In this sense, choosing too-difficult tasks can be a self-handicapping strategy (Martin & Marsh, 2003). *Strivers* appear to perceive school tasks as non-optimal and above their ability, but they still believe that they have what it takes to carry out most of the tasks successfully. In contrast, the *Challenged* also view school tasks as quite difficult, but they did not believe that they have what it takes to perform them. Some of these students might be in danger of selecting too-difficult tasks (if they have a choice), only to use lack of effort as a face-saving strategy afterward if they are not successful. We view this issue of what difficulty connotes to different students as quite important: is the difficulty level a possibility for learning more (i.e., optimal level), or is difficulty perceived as an obstacle to learning? This question is also posed by Dermitzaki and Efklides (2001), who highlight the metacognitive role of difficulty as a guiding principle for self-regulation.

4.2. Adaptive and maladaptive profiles

Previous research has categorized the relationship between agency beliefs and means–ends beliefs into adaptive profiles (e.g. ''effort matters, I'm effortful'') and maladaptive profiles (e.g., ''ability matters, I'm not so bright''; see

e.g., Skinner, 1995). An adaptive profile for ability is indicated by downplaying the role of ability but believing that one is able, and for effort, it is indicated by emphasizing the role of effort and believing one is effortful. When we use these definitions of adaptive and maladaptive beliefs profiles on our profiles, we find profiles that are clearly adaptive or maladaptive, as well as profiles that have both adaptive and maladaptive elements in their constellation (see below). The *Agentic* profile was clearly adaptive (high agency belief in ability as well as both agency beliefs and means–ends beliefs in effort), while the *Disengaged* and *Challenged* profiles were clearly maladaptive. Both the *Disengaged* and *Challenged* thought that they were relatively unable and un-effortful. Children in the *Challenged* profile, however, thought that both ability and effort mattered more than did children in the *Disengaged* profile. The *Striver* profile bore signs of adaptation believing that effort matters and that they are effortful, but they thought that ability mattered the most, while feeling less able themselves—a sign of maladaptation.

The two most maladaptive profiles are that of the *Challenged* and the *Disengaged*. For the *Challenged*, their low level of agency beliefs in ability and effort, the high level of difficulty, coupled with high entity, low incremental beliefs, and a lack of intrinsic motivation reflects signs of learned helplessness (i.e., that outcomes are not contingent on one's own actions; Dweck, 1986; Seligman, 1975). Because this group also showed the lowest levels of achievement and the lowest levels of school well-being, they may be considerably at-risk for future school drop out. For the *Disengaged*, they had a similar profile to the *Challenged* with a couple of notable exceptions. The *Disengaged* did not view school tasks as particularly difficult either in general or for themselves and, indeed, this group showed normative levels of achievement (except in mathematics, see Fig. 1). However, the *Disengaged* showed very low levels of school well-being. This profile reflects a lack of engagement in school that is similar to that of students involved in deviant peer group activities.

4.3. Motivation

Our profile analysis was able to identify these contrasting patterns in motivational orientations. In prior work, Patrick et al. (1993) found no mediation from perceived autonomy via positive emotion on their compound ability construct (low strategy beliefs and high capacity beliefs for ability). Nor did Walls and Little (2005) find a mediating effect from identified regulation via agency beliefs in ability on school adjustment. However, defining ability perceptions as a unidimensional (e.g., agency) or multidimensional variable (agency times means–ends; agency minus means–ends) may be misleading in that the constellation of beliefs profiles revealed in this study clearly show distinct differences in the motivational systems.

With regard to well-being, Ryan and Deci (2000; see also Ryan, 1995; Ryan, Sheldon, Kasser, & Deci, 1996) view intrinsic motivation as a protective factor and extrinsic motivation as a risk factor. In this regard, the *Agentic* profile follows a pattern of very adaptive motivation. Namely, the *Agentic* felt most autonomous (high intrinsic and identified motivations) but near normative levels of extrinsic motivation. Consistent with Ryan and Deci's conjectures, this group showed the highest levels of both achievement and school well-being. In contrast, the *Strivers'* motivational profile revealed a unique pattern; here, the levels of intrinsic motivation are quite high, but the *Strivers* had even higher levels of extrinsic motivation. *Strivers'* achievement and school well-being were generally at the normative level. It would appear from this profile that the overall levels of intrinsic motivation provide some buffer against the generally undermining effects of extrinsic motivation. For the *Disengaged*, we see a clear maladaptive pattern of amotivation (i.e., they had the lowest levels of *both* intrinsic and extrinsic motivations). Although the achievement levels of this group were generally in the middle group, the levels of school well-being were low, which is consistent with the amotivation profile. Finally, for the *Challenged* group the low levels of intrinsic motivation coupled with the high levels of extrinsic motivation are consistent with the maladaptive well-being patterns identified in work by Ryan and Deci (2000) and, in fact, this group showed the lowest levels of school well-being.

4.4. Gender influences

We found that boys and girls differed in their mean-levels for agency belief in ability in all belief profiles. Although not all studies have found systematic gender differences (Cain & Dweck, 1995), some previous work has found that girls are more prone to develop patterns of helplessness, particularly in mathematics (Mac Iver, 1988; Pajares, 1996). Further, Dweck (1986) found that high achieving girls attribute occasional failure to lack of ability while high achieving boys do not. Stetsenko et al. (2000) identified a cross-culturally pervasive gender effect in that when boys and girls

are at equal levels of achievement, girls undervalue their ability as a contributing factor to their levels of performance. In their review of gender differences in perceived ability, Ruble and Martin (1998) suggested that contextual influences, stereotypes, and attitudes form a basis for self-fulfilling prophecy about gender stereotypical beliefs about achievement.

The mean-level gender differences notwithstanding, the most notable finding of this study is the general parallels in the belief profiles. Although some mean differences across boys and girls did emerge, the pattern similarity in these profiles is clearly evident (see Fig. 1). That is, even casual inspection of the profiles indicates that the constellations of ability, effort, and difficulty revealed parallel subgroups. Moreover, the percentages of boys and girls in each profile cluster did not differ significantly. All told, we view the gender similarity as a form of cross-validation of the cluster profiles.

4.5. Practical implications

Meaningful constellations of agency beliefs, worldviews, motivation, and school adjustment were identified, as in other clustering (classification) studies (Meece & Holt, 1993; Niemivirta, 1998; Pintrich, 2000; Valle et al., 2003). Overall, the findings suggest multiple targets for interventions. As Renninger (1998) notes, one of the risks of teacher (or even parent) perception is dichotomizing students into weak vs. strong or under vs. over achiever, which in the long run may be counterproductive for both student and teacher. By paying closer attention to the complex interplay between several belief types, such dichotomization might be avoided. Also, exploring more distal moderators of beliefs such as the child's sociocultural background is important. Parents may differ in the extent to which they posit extrinsic values (or lack thereof), which in conjunction with competence and difficulty beliefs give rise to different profiles.

The implications from this study echo those of others (e.g., Martin, 2002). For example, targeted intervention and prevention efforts can be tailored to the deficits indicated in the various profiles (Martin & Marsh, 2003). For example, for the *Challenged*, guided mastery experiences (Bandura, 1997) can enhance agency beliefs in effort and reduce perceptions of difficulty. Self-determination learning interventions (e.g., Wehmeyer, Palmer, Agran, Mithaug, & Martin, 2000) would be beneficial to nearly all profiles because such interventions can target the specific areas of deficit associated with a given profile. Such intervention models provide student supports for them to develop goals, implement action plans, engage in pathways thinking, and so on—all features that are generally characteristics of the *Agentic* profile (Little, Snyder, & Wehmeyer, 2006).

4.6. Methodology issues and limitations

One limitation of the current study is that we assessed the school-related beliefs of these youth at a general level of academic performance. Given that school-related beliefs show greater predictability when they are assessed in a more domain specific manner (e.g., beliefs about mathematics vs. beliefs about achievement; see Pajares, 1996), one can question whether the belief profiles are an artifact of the domain general nature of the assessments. We doubt that these profiles are artifactual but, instead, we expect that they may be somewhat attenutated by the general nature of the assessments. If these school-related beliefs were all assessed with a subject-specific focus, it is possible that the characteristic signatures of the five profiles would be even more pronounced.

The present study was conducted in a cross-sectional sample. Initial findings from our cluster replication among secondary school youth showed that the profiles of the 5-cluster solution were very similar to the ones among primary school students. However, a longitudinal follow-up would be necessary to investigate whether the number of clusters remains the same, whether the shape of the profiles stays invariant over time, and whether each person's cluster membership is stable over time.

Two features of cluster analysis have been long debated. First, the method of extraction, and their pros and cons, do not yet seem to be wholly resolved, although Ward's method appears to be the *defacto* favorite in the literature (Donaghue, 1995; McDermott & Weiss, 1995; Overall & Magee, 1992). Second, the number of clusters to be extracted, and how to evaluate the various cluster solutions, is also not without controversy, but, again, recent work by Bergman et al. (2003) makes a strong case for the criteria used in the current study (see also Milligan, 1996). Although model-based procedures such as Latent Class Analyses (LCA; Muthén, 2004) are also not without debate (e.g., Bauer & Curran, 2004), some studies have compared traditional clustering methods with LCA and found that LCA outperforms K-means clustering (Vermunt & Madigson, 2002), but not Ward's method (LaLonde, 2001).

Clearly more work in this area is needed to determine how robust the various methods are. For the current study, the replicability across genders, age group, and methods of extraction as well as the clear interpretability of the clusters, provide strong evidence of their usefulness for characterizing the learning profiles of these elementary aged children.

5. Conclusions

Although several authors have mentioned the complex interplay between ability, effort, and difficulty (Heckhausen, 1991; Heider, 1958; Nicholls, 1984; Nicholls & Miller, 1984; Niemivirta, 2002), no study, to the best of our knowledge, has used these three variables for clustering. Given their central place in the achievement literature and their inherent complexity, it is surprising that they have not been examined from a person-centered perspective. Because these personal beliefs emanate from one's personal interpretations of one's previous successes and failures as well as one's educational and cultural experiences, examining their complex interplay from a person-centered perspective seems particularly warranted. The five profiles of *Agentic*, *Strivers*, *Normative*, *Disengaged* and *Challenged* youth expressed clearly distinguishable (and replicable) levels of ability, effort and difficulty. The underlying patterns of worldviews, motivations, and adjustment generally agree with previous conceptualizations of (a) action-control regulation (Skinner, 1995), (b) entity vs. incremental theorists (Dweck, 1986), and (c) sources of motivational regulation (Ryan & Deci, 2000). More in keeping with the goals of this study, we believe that the identified subgroups of students would have gone unnoticed in linear designs. Including perceptions of difficulty into the competence profile (as a proxy of the perceived challenges or obstacles) seems an attractive way of incorporating contextual demands into profiles of self-regulatory beliefs about school achievement.

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