

Control, Means–Ends, and Agency Beliefs: A New Conceptualization and Its Measurement During Childhood

Ellen A. Skinner, Michael Chapman, and Paul B. Baltes
Max Planck Institute for Human Development and Education
Berlin, West Germany

We presented a new conceptualization of perceived control in which three conceptually independent sets of beliefs are distinguished: *control beliefs*, expectations about the extent to which agents (e.g., the self) can obtain desired outcomes; *means–ends beliefs*, expectations about the extent to which certain potential causes produce outcomes; and *agency beliefs*, expectations about the extent to which agents possess potential means. In a study of 155 children from Grades 2, 4, and 6, we demonstrated that children's questionnaire responses reflected the distinction between these beliefs. Factor analyses of the items for each known cause separately revealed the predicted three factors, marked by control, means–ends, and agency items, respectively. Likewise, factor analysis of the scale scores resulted in control and agency beliefs factors as well as three factors for means–ends beliefs. Initial evidence on the usefulness of the new scheme indicates that control, means–ends, and agency beliefs show differential developmental trajectories as well as differential relations with cognitive performance.

Researchers from many areas have attempted to understand belief systems about control and action. Under the rubric of *perceived control*, researchers investigate the causes people view as responsible for important outcomes in their lives, the role people perceive themselves to play in influencing events, and the resources people believe they can access in reaching their goals. (See Baltes & Baltes, 1986, or Lefcourt, 1976, for reviews.) Perceived control has been examined not only because it is interesting in itself, but also because it predicts important aspects of motivational, cognitive, and emotional functioning (Abramson, Seligman, & Teasdale, 1978; Bandura, 1977, 1982; Findley & Cooper, 1983; Heckhausen, 1977; Lefcourt, Martin, & Saleh, 1984; Peterson & Seligman, 1984; Seligman, 1975; Strickland, 1977; Weiner, 1979, 1985). These topics have been addressed in a broad range of theories, featuring constructs like locus of control, learned helplessness, causal attributions, and self-efficacy (see ahead).

The primary purpose of the present article is to explicate a conceptualization of perceived control that involves an integration of certain aspects of these constructs by using an action-theoretical orientation as a heuristic framework. The second part of the article describes a questionnaire designed to assess

these beliefs in children from 7 to 12 years of age. Although the measurement properties of the scale are of interest, analyses are emphasized that examine the extent to which children's responses to the scale reflect the distinctions made in the new conceptualization. In the Discussion section, initial evidence is summarized indicating that this conceptualization may be useful in studying developmental change and correlates of perceived control.

Conceptualization of Perceived Control

An action–theoretical perspective was the basis for a conceptualization of perceived control informed by the most important existing relevant constructs. Action theory views actions rather than responses as the central units of psychological analysis (e.g., Boesch, 1976; Brandtstädter, 1984; Eckensberger & Silbereisen, 1980; Frese & Sabini, 1985). Actions are defined as goal-directed intentional behaviors and are conceptualized as consisting of a number of sequential components. For our purposes, the action–theoretical distinction among agents, means, and ends is of special interest. (See also Bandura, 1986, or Kuhl, 1986, for research on control in action–theoretical frameworks.)

The present conceptualization of perceived control is based on the observation that naive, everyday accounts of action involve an understanding of the *relations* among agents, means (or causes), and ends (or goal-related outcomes; Chapman & Skinner, 1985; Skinner & Chapman, 1984). On the basis of this observation we suggest that agents should have beliefs not only about the agent's role in producing outcomes, but also about the relation between means and outcomes as well as the relation between agent and means.

Accordingly, three conceptually independent sets of beliefs have been distinguished to capture this everyday view of action (see Figure 1). In the terminology proposed here, *control beliefs*

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Correspondence concerning this article should be addressed to Ellen A. Skinner, Max Planck Institute for Human Development and Education, Lentzeallee 94, D-1000, Berlin 33, West Germany.

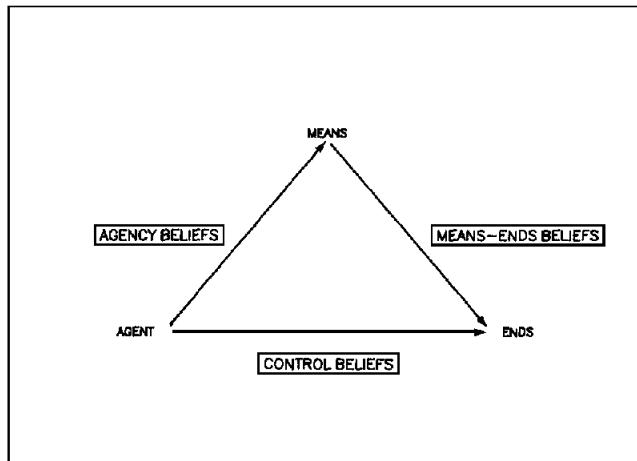


Figure 1. A schematic representation of three sets of beliefs about the relations among agents, means, and ends.

refer to beliefs about the relation between the agent and a desired outcome or class of outcomes; they are defined as that individual's (agent's) expectancies about the extent to which he or she can obtain desired outcomes, with no explicit reference to the means used. Second, *means-ends beliefs*¹ refer to beliefs about the relation between means and ends; they are defined as an individual's expectancies about the extent to which certain classes of potential causes are effective in producing desired outcomes. Third, *agency beliefs* refer to beliefs about the relation between the agent and certain potential means; they are defined as an individual's expectancies about the extent to which he or she possesses these means.

We further assume that all three types of beliefs can be arranged along other possible dimensions. For example, a dimension of specificity-generality (globality), ranging from extremely situation-specific to highly generalized beliefs, may be useful to characterize the belief sets. In the present article, we will be concerned only with generalized perceived control.

Distinction Between Control, Means-Ends, and Agency Beliefs

Theorists representing many different approaches have suggested distinctions among control-related beliefs that are similar to, but not identical with, the present conception (Abramson et al., 1978; Bandura, 1977; Gurin & Brim, 1984; Gurin, Gurin, & Morrison, 1978; Weisz, 1983; Weisz & Stipek, 1982).² To facilitate comparison with the proposed conceptualization, we summarized in Table 1 the labels and definitions of the types of beliefs distinguished by these theorists.

An examination of Table 1 reveals that our conceptualization differs from related frameworks in several respects. However, the most critical difference is that the three belief sets are conceptualized and measured independently from each other. This section describes the consequences of such a conceptualization for each of the belief sets.

Control Beliefs

From some perspectives, one might argue that control beliefs (as defined earlier) are superfluous because they are completely

predictable from (or reducible to) some combination of means-ends and agency beliefs. This conclusion is supported by an examination of ordinary language, which suggests that a statement about control of the form "I can obtain outcome Y" is semantically equivalent to a statement about means-ends of the form "There exists means X which produces Y", taken together with a statement about agency of the form "I have or can obtain means X."

The foregoing argument assumes, however, that the functional relations among the proposed belief systems mirror the semantic relations among them. Such an assumption may or may not be tenable. Aside from the possibility that the organization of beliefs may change during childhood, we argue that even in adults, beliefs may not be organized according to their semantic relations. Precisely because the focus of the conceptualization is subjective beliefs, there is no a priori guarantee that they are rational or veridical, even in adults (e.g., Weisz, 1983).

For example, people might report their beliefs about control (i.e., about their generalized expectancies regarding the extent to which they can produce desired outcomes) without necessarily reflecting on the specific means required to reach these outcomes. That is, an agent may assume that some means exist that lead to the desired outcomes without necessarily identifying those means reflectively. Furthermore, individuals' beliefs may not be organized semantically if the beliefs serve different functions. For example, control beliefs may act as an ego protection (Abramson & Alloy, 1980), whereas means-ends beliefs may serve to provide potentially effective strategies (Connell, 1985). Or, as Kuhl (1984) argued, the beliefs may serve different functions in an action sequence. Individuals may assess control in a global manner prior to making a commitment to act, and then information similar to means-ends and agency beliefs may be used to form a specific action plan.

In sum, we find it useful to proceed from the assumption that each set of beliefs may represent a separate cognitive construction and, therefore, to distinguish conceptually among control, means-ends, and agency beliefs. Empirical evidence can then be used to evaluate the tenability of this assumption. In short, the question regarding the independence of these three belief sets can be resolved only by attempting to measure the three sets of beliefs separately and by studying the empirical relations between them, with special emphasis on whether control beliefs can in fact be "reduced" to a combination of agency and means-ends beliefs (see the Results and Discussion sections).

Means-Ends Beliefs

In contrast to most frameworks, beliefs about the relations between causes and outcomes in our conceptualization refer to agents in general, and not to the particular agent in question. This decision is based on the fact that beliefs about the relations

¹ Earlier publications referred to them as *causality beliefs*.

² Two additional groups of theories have also informed our conceptualization, although they do not distinguish between the three sets of beliefs; they are attribution theories (Crandall, Katkovsky, & Crandall, 1965; Weiner, 1979, 1985) and locus of control theories (Bialer, 1961; Lefcourt, 1976; Nowicki & Strickland, 1973; and especially, Connell, 1985).

Table 1
Comparison of Theoretical Distinctions Similar to Control, Means-Ends, and Agency Beliefs

Theoretical framework	Agent-ends relation	Means-ends relation	Agent-means relation
Action theory (Chapman, Skinner, & Baltes, 1983)	Control beliefs: Generalized expectations about the extent to which an agent can produce desired outcomes	Means-ends beliefs: Generalized expectations about the extent to which certain potential means produce desired outcomes	Agency beliefs: Generalized expectations about the extent to which the self possesses certain potential means
Features	May be related to means-ends and agency beliefs in various ways	Two agent-related means (effort, attributes), two non-agent-related means (powerful others, luck) and unknown causes	Accessibility of a range of potential means to agent (effort, attributes, powerful others, luck)
Social Learning Theory (Bandura, 1977)		Response-outcome expectancy: "A person's estimate that a given behavior will lead to certain outcomes" (p. 193)	Efficacy expectation: "The conviction that one can successfully execute the behavior required to produce the outcome" (p. 193)
Comparison	No analogous distinction	Behaviors only as causes No non-agent-related causes; no unknown causes	Accessibility of only behavior-related causes No accessibility of non-agent-related causes
Sociology (Gurin & Brim, 1984)		System responsiveness: "Judgment of the environment's likely response to an individual's action" (p. 285)	Personal efficacy: "Judgment of the self as able to produce acts that should lead to desirable outcomes" (p. 285)
Comparison	No analogous distinction	Actions only as causes No non-agent-related causes No unknown causes	Accessibility only of actions as causes No accessibility of non-agent-related causes
Developmental (Weisz, 1983; Weisz & Stipek, 1982)	Accurate control judgment	Contingency judgment: "The degree to which outcomes in the situation are contingent on people's behavior" (Weisz, 1983, p. 234)	Competence judgment: "One's own competence to produce the necessary behavior" (Weisz, 1983, p. 234)
Comparison	Describes relation of contingency judgments and competence judgments in a specific situation	Behaviors only as causes No non-agent-related causes No unknown causes	Accessibility only of behavior-related causes No accessibility of non-agent-related causes
Learned helplessness (Abramson, Seligman, & Teasdale, 1978)		Universal helplessness: "Cases in which the individual as well as other individuals do not possess controlling responses" (p. 51)	Personal helplessness: "Cases in which an individual lacks requisite controlling responses that are available to other people" (p. 51)
Comparison	No analogous distinction	Responses only as causes No non-agent-related causes No unknown causes	Accessibility only of responses as causes No accessibility of non-agent-related causes

between means and ends for particular agents (i.e., the self) can mix means-ends and agency beliefs (Abramson et al., 1978; Krantz & Rude, 1984; Weiner, Russell, & Lerman, 1979). For example, a belief about the self of the form "When I do well in school, it's because I'm smart" implies the agency belief "I'm smart." Likewise, a rejection of this statement, that is, a belief about the self of the form "When I do well in school, it's *not* because I'm smart" could imply either a means-ends belief (i.e., doing well in school is *not* due to being smart), an agency belief (i.e., "I'm not smart"), or both.

In contrast, our conceptualization of means-ends beliefs as involving agents in general attempts to keep separate means-ends and agency beliefs. For example, a means-ends belief of the form "When kids do well in school, it's because they're smart," does not specify agency beliefs (i.e., whether or not the particular agent believes he or she is smart). Hence, our concern that agency and means-ends beliefs be conceptualized and measured independently results in the use of means-ends beliefs for agents in general. (See Connell, 1981, or Skinner, Schindler, & Tschechne, 1987, for a study of the difference be-

tween means–ends beliefs about the self and about agents in general.)

Agency Beliefs

The third aspect of our framework that follows from our desire to consider the belief sets separately relates to agency beliefs. Within most frameworks (e.g., Bandura, 1977; Weisz, 1983) beliefs about whether the self has access to causes refer to expectancies that one has access to the means that are effective in producing the outcome. Obviously, beliefs about possessing *effective* causes imply something about means–ends beliefs, namely, that at least one effective cause exists. In contrast, in our conceptualization, agency beliefs are defined for a broad range of potential causes or means. Hence, within our framework, high agency beliefs do not necessarily specify the nature of means–ends beliefs (or vice versa). In fact, it is possible to endorse high agency for many potential means (e.g., high effort, ability, help from others, luck) and at the same time endorse low means–ends (none of these means are effective).

In sum, we argue that a conceptualization of perceived control based on an action–theoretical orientation suggests that it may be useful to distinguish between three sets of beliefs: control, means–ends, and agency. Special consideration was given to the conceptual independence of the three belief sets. This scheme provided the basis for a new instrument designed to measure control-related beliefs in children. Whether children's responses to the scale would reflect the distinction among control, means–ends, and agency beliefs was of special interest.

Method

In a series of four studies in which 450 German and American children from Grades 1 to 6 participated, a questionnaire was developed to measure the proposed beliefs. In this article, primary emphasis is placed on the results of a fifth study in which assessment benefited from earlier efforts to maximize measurement reliability and content validity. Findings from the four previous samples are mentioned when appropriate (see end of Results section). In the Discussion section, additional findings are summarized to illustrate the empirical usefulness of the conceptualization for examining developmental trajectories and correlates of beliefs.

Subjects

Participants in the present sample were 155 children (M age = 10.4 years, SD = 1.60): 40 from Grade 2 (M = 8.2 years, SD = .54); 48 from Grade 4 (M = 10.1 years, SD = .43); and 67 from Grade 6 (M = 12.0 years, SD = .49), approximately equally divided by sex, from three elementary schools in a large German city. Social class background was heterogeneous. (The other samples are described briefly in the Results section, with the relevant findings.)

Control, Agency, and Means–ends Interview

One measure developed to study the proposed conceptualization is the Control, Agency, and Means–ends Interview (CAMI), a 64-item questionnaire for children from ages 7 to 12 years. (A copy of the most recent version of the questionnaire can be obtained from the authors on request.) The current version consists of 10 scales that refer to the domain of school performance:³ control beliefs (8 items); means–ends beliefs for effort (8 items), for attributes (8 items), for powerful others (8

items), for luck (8 items), and for unknown causes (8 items); and agency beliefs for effort (4 items), for attributes (4 items), for powerful others (4 items), and for luck (4 items). Control and means–ends beliefs scales contained twice as many items as agency scales because the former two scales included an equal number of items about positive and negative events. Because agency beliefs do not specify outcomes, items assessing them did not include outcome valences.

Selection of means. Categories of means were chosen on the basis of open-ended interviews with children about the potential causes for school success and failure (see the technical report by Skinner, Chapman, & Baltes, 1986) and on research that indicates that certain categories of causes show differential relations to aspects of functioning or differential developmental trajectories. Specifically, five categories of causes were included in the questionnaire: (a) effort, (b) personal attributes (Dweck & Reppucci, 1973; Fincham, 1983; Nicholls, 1978, 1984; Weiner, 1979), (c) powerful others, (d) luck (Connell, 1985; Levenson, 1973; Mirrel, 1970; Nicholls & Miller, 1985; Ryckman & Malikioti, 1975; Weiner, 1979), and (e) unknown (Connell, 1985).

It is important to note that we make no claims about any other dimensions on which these causes may vary (e.g., internality, globality, specificity, predictability, controllability). It may be possible to describe the first two categories as *internal* or *agent-related* causes because according to their definition they reside within persons in general, and to define the second two as *external* or *non-agent-related* because they reside outside persons in general. However, it should be emphasized that this classification gives no information about the extent to which particular agents perceive these causes as available to them (e.g., high ability vs. low ability, or high luck vs. low luck). These latter expectancies are contained in agency beliefs.

Item construction. Each item consisted of a question to which children responded on a four-choice answer scale of *almost never, not very often, often, or almost always*. Because expectancies rather than attributions were of interest, all of the items were phrased in the present tense. Strict rules were adhered to in the generation of items. First, a specified set of descriptive phrases was developed to represent the five potential means. (a) effort: try hard, work hard, put in a lot of effort, pay attention, listen carefully, work carefully, and be prepared; (b) personal attributes: smart, just good at it, just a good student, very good at school, talent, do well on hard tasks with no effort, and very fast on hard tasks; (c) powerful others: teacher like/help/explain; (d) luck; and (e) unknown factors: not know (the reason) why, and hard to know/say/figure out why.

Second, another specified set of descriptive phrases was developed to represent the outcome domain *school* (negative valence in parentheses): do good (bad) in school/school work, get good (bad) grades, answer teachers' questions right (wrong), get problems like on a math or spelling test right (wrong), (not) learn/understand/know a lot about something, do good (bad) on homework, and don't (do) make mistakes. Note that the outcomes were designed to describe events (e.g., *do* good on school work, *answer* wrong) as opposed to attributes (e.g., *be* good in school work, *not be able* to answer). The use of events allows for a wider range of potential means; attributes tend to result in global and stable causal explanations (Abramson et al., 1978; Peterson, Luborsky, & Seligman, 1983). These standard phrases describing means and ends were then systematically combined according to specified rules (described ahead) to form items appropriate to the three sets of beliefs. (See Tables 2–6 for the actual items.)

Control beliefs items referred to a causal connection between the agent (the self) and the outcome without explicit reference to any intervening means. For positively valenced events, these items were of the

³ Earlier versions of the questionnaire combined beliefs about both school and friendship. Additional efforts are underway to complete the development of a scale for the friendship domain.

general form "Given motivation, can you produce a positive outcome?" For negatively valenced events, items took the general form of "Given motivation, can you prevent a negative outcome?"⁴ Altogether eight control beliefs items were used (2 outcome valences by 4 replicates).

Means-ends beliefs items referred to the causal connection between the five potential means and outcomes. Positive items were of the general form "When a good outcome occurs, is this cause likely present?" and negative items were of the form "When a bad outcome occurs, is this cause likely missing?" Altogether, 40 means-ends beliefs items were used (5 means by 2 outcome valences by 4 replicates).

Agency beliefs items referred to the extent to which the agent possesses the four known potential means. (Because agency beliefs specify causes according to our definition, no agency is possible for unknown means.) Agency questions were of the general form "Do you have access to the potential means?" Altogether 16 agency beliefs items were used (4 means by 4 replicates).

Bilingual version. The CAMI exists in both English and German. In contrast to many comparable instruments, the two versions were developed interactively. The original English item pool was first translated into German, and as a result of finding words or concepts that could not be easily translated, the item pool was modified. For example, "being good in school" can be translated into German as meaning either "showing a high performance" or "being well-behaved." Because the first meaning was intended, the English item was changed to the unambiguous "doing good at school work." In our view, this interactive process of scale construction resulted in parallel items that are conceptually relatively clean.

Administration

For the present study, the 64 items were divided by replicates into two questionnaires. The items were ordered randomly with the restriction that no replicates appeared consecutively and that the items phrased in second person (i.e., control and agency beliefs) preceded the items in third person (i.e., means-ends beliefs). This procedure was followed in order to maximize the children's use of the appropriate reference group.

The standard instructions (translated from the German) are as follows:

Hello _____,

I'd like to ask you a few questions about things that happen to kids your age. This isn't a test. There are no right and wrong answers. I just want to know what *you* think. To help me remember what you say, I'll write down what you think here. I'd like to tape this too. Is that okay?

For children in Grades 4 and 6, group administration was used. A trained interviewer read the questions aloud to groups of 5 to 10 children in a room separate from the classroom. Each child had a questionnaire containing the items with the four answer choices underneath. The children crossed out the answer of their choice—the German equivalent of circling answers.

The second graders were assessed individually by trained interviewers. Following the two-step answer procedure suggested by Harter (e.g., Harter & Pike, 1984), children responded to each item (e.g., "Do you try as hard as you can in school?") by a "yes" or "no." Then they were asked to choose between the two responses at that pole (e.g., for a yes answer, the interviewer would continue "Do you *often* or *almost always* try as hard as you can in school?"). On the basis of our observations, children had no trouble adapting to this sequence.

Results

Data analysis focused on (a) whether the postulated belief sets could be measured separately, (b) how internally consistent and

reliable they were over time, and (c) how they were related to other existing measures of control. For these purposes, the information derived from the responses of the sample of 155 7- to 12-year-olds included the properties of the questionnaire at the item level, such as item means and factor patterns, and the properties of the questionnaire at the scale level, such as scale means, internal consistencies, and intercorrelations. Data from four previous samples were available to assess (a) the test-retest correlations of the scales, and (b) the relation between the CAMI and children's responses to measures of locus of control.

Item Characteristics

The primary purpose of these analyses was to examine the questionnaire at the item level. Of interest was whether the structure of children's responses would correspond to the three hypothesized sets of beliefs, namely, control, means-ends, and agency. To determine this, exploratory factor analyses were conducted on the item scores (ranging from 1 to 4), using principal axis factor analysis with oblique (promax) rotation (Jöreskog, 1975). As criteria for how many factors to extract, the Tucker-Lewis coefficient of reliability was used (Tucker & Lewis, 1973). This index, which indicates the quality of representation of interrelations among attributes in a battery by a maximum likelihood factor analysis, and which leads to similar results as the Cattell scree test (Cattell, 1966), should approach but not exceed 1.

Four separate factor analyses were conducted, one for each category of known causes. In each factor analysis, means-ends and agency beliefs items for the respective cause (e.g., means-ends and agency items for the cause effort) and control beliefs items (which in our conceptualization do not specify particular causes) were included. In a fifth factor analysis, beliefs about unknown causes were examined. Because no agency is possible for unknown causes, however, this factor analysis included only control and means-ends beliefs items. We predicted that, if the conceptualization was meaningful at the item level, then each cause-specific analysis would result in three factors, marked by control, means-ends, and agency items, respectively.

The results of the factor analyses are presented for each of the five causes in Tables 2 to 6. As can be seen in Tables 2 to 5, for each known cause the predicted three-factor solution was indicated in which the three factors were marked by the control, means-ends, and agency beliefs items, respectively. For unknown causes (which had no corresponding agency items), the predicted two-factor solution was indicated in which the two factors were marked by control and means-ends beliefs items,

⁴ It is recognized that this use of *control negative* items does not correspond to existing *negative* control scales (Crandall, Katkovsky, & Crandall, 1965; Mischel, Zeiss, & Zeiss, 1974; Seligman et al., 1984). Typical negatively valenced items are of the form "When a bad event occurs, did you produce it?" Although earlier versions of the Control, Agency, and Means-ends Interview (CAMI) included such items (e.g., Skinner, Chapman, & Baltes, in press), it was concluded, on the basis of factor loadings and correlations, that these beliefs could be better labeled *perceived responsibility* or *internality*. Hence, they were not included in this article. (See Brewin & Shapiro, 1984, for a discussion of this issue in adult locus of control scales.)

Table 2
Items, Item Means and Standard Deviations, and Factor Patterns for the Means Effort

Item	<i>M</i>	<i>SD</i>	Factor pattern		
			Control	Means-ends	Agency
Control beliefs ^a					
Positive events					
7. If you decide to sit yourself down and learn something really hard, can you learn it?	3.07	0.80	.56		
10. Getting good grades is probably something you like. Can you get good grades?	3.03	0.73	.51		
42. Let's say that you want to get all the problems (like in spelling) right. Can you do that?	3.14	0.70	.71		
35. If you want to do well in school, can you?	3.24	0.66	.46		
Negative events					
3. Let's say you get unhappy when the teacher calls on you and you don't know the answer. Can you do anything to keep that from happening? ^b	1.99	0.79	.32		
5. I'll bet you don't like to get bad grades. Can you do anything to keep from getting any?	2.78	1.06	.57		
34. Let's say: You decide that you're not going to get any problems wrong (like on a math or spelling paper). Can you do it?	2.79	0.93	.66		
41. Let's say that making mistakes in school really drives you crazy. Can you keep from doing bad in school?	3.07	0.93	.71		
Means-ends beliefs for effort					
Positive events					
23. When kids give the right answers to teachers' questions, is it because they try really hard? ^c	3.20	0.73		.30	
20. When a kid knows a lot about something, is it because the kid works hard at learning it?	3.23	0.70		.34	
61. When a kid does good on schoolwork, is it because the kid works very carefully?	3.20	0.78		.47	
64. What's the reason kids understand what teachers say? Is it because they pay attention and really listen?	3.35	0.69		.44	
Negative events					
19. When a kid doesn't understand something at school, is it because the kid doesn't pay enough attention?	2.98	0.82		.45	
16. When kids give the wrong answers on a test is it because they don't work carefully?	2.71	0.92		.59	
56. When kids don't learn very much in class, is it because they don't work very hard?	3.07	0.80		.76	
47. A teacher asks a kid a question and the kid gives the wrong answer. Is that because the kid isn't trying enough?	2.65	0.88		.46	
Agency beliefs for effort					
1. What do you think: Do you try as hard as you can in school?	3.34	0.71			.57
4. Do you really pay attention in class?	3.11	0.79			.80
37. When it comes down to it: Do you really work hard on your homework?	3.31	0.71			.49
33. Do you listen very carefully to what your teacher says?	3.10	0.75			.66

Note. *N* = 155 children from Grades 2, 4, and 6. Numbers refer to the order of the items on the questionnaire. Items potentially ranged from 1 (*almost never*) to 4 (*almost always*). Factor loadings were calculated using principal axis factor analysis with a promax/oblique rotation; loadings less than .30 are omitted for clarity.

^a Control beliefs refer to the connection between agents (e.g., the self) and desired ends without any reference to particular means. Hence, the same control beliefs were included in factor analysis for each potential means.

^b New item: If you decide not to get any bad grades, can you really do it?

^c New item: Is the reason kids do well in school because they really try hard?

respectively (see Table 6). The Tucker-Lewis reliability coefficients were as follows for the causes effort, attributes, powerful others, luck, and unknown factors: .966, .959, .978, 1.00, and .929, respectively.

The factor intercorrelations indicated generally low relations among the three factors. In general, agency was positively related to both means-ends and control, whereas the relation between control and Means-Ends differed across the five causes.

Table 3
Items, Item Means and Standard Deviations, and Factor Patterns for the Means Attributes

Item	<i>M</i>	<i>SD</i>	Factor pattern		
			Control	Means-ends	Agency
Control beliefs ^a					
Positive events					
7. If you decide to sit yourself down and learn something really hard, can you learn it?	3.07	0.80	.43		(.33)
10. Getting good grades is probably something you like. Can you get good grades?	3.03	0.73	.34		(.47)
42. Let's say that you want to get all the problems (like in spelling) right. Can you do that?	3.14	0.70	.68		
35. If you want to do well in school, can you?	3.24	0.66	.46		
Negative events					
3. Let's say you get unhappy when the teacher calls on you and you don't know the answer. Can you do anything to keep that from happening?	1.99	0.79	.17		
5. I'll bet you don't like to get bad grades. Can you do anything to keep from getting any?	2.78	1.06	.53		
34. Let's say: You decide that you're not going to get any problems wrong (like on a math or spelling paper). Can you do it?	2.79	0.93	.60		
41. Let's say that making mistakes in school really drives you crazy. Can you keep from doing bad in school?	3.07	0.93	.75		
Means-ends beliefs for attributes					
Positive events					
18. What would you say: When a kid does good at school, is it because the kid's just smart?	2.87	0.92		.36	
13. When kids give the right answer to questions in class, is it because they're just good students?	2.88	0.82		.49	
50. When a kid manages to learn hard things, is it because the kid's smart?	2.96	0.88		.62	
53. If kids understand things fast, is it because they're very good at school?	3.01	0.86		.49	
Negative events					
17. When kids get bad grades, is it just because they're no good at school?	2.62	0.91		.80	(-.37)
22. When a kid does bad in school is the main reason because the kid's just not smart?	2.28	0.83		.70	
49. When kids don't understand something, is it because they're just no good at school?	2.40	0.87		.55	
52. Imagine that a kid gives the wrong answer to a teacher's question. Is it because the kid's just not smart enough?	2.23	0.89		.62	
Agency beliefs for attributes					
2. How does it work for you? Can you learn things you need to for school pretty fast, without really working at it?	2.81	0.86			.60
9. Are you smart in school—even without studying a lot?	2.42	0.90			.63
39. Do you get the problems right (like in math), even if you don't try hard?	2.70	0.81			.48
44. Are you pretty smart? Can you understand the teachers' lessons quickly?	3.01	0.84			.62

Note. *N* = 155 children from Grades 2, 4, and 6. Numbers refer to the order of the items on the questionnaire. Items potentially ranged from 1 (*almost never*) to 4 (*almost always*). Factor loadings were calculated using principal axis factor analysis with a promax/oblique rotation; loadings less than .30 are omitted for clarity. Factor loadings in parentheses indicate items that cross-loaded on other dimensions.

^a Control beliefs refer to the connection between agents (e.g., the self) and desired ends without any reference to particular means. Hence, the same control beliefs were included in factor analyses for each potential means.

The factor intercorrelations for effort, attributes, powerful others, luck, and unknown causes, respectively, were as follows: between control and means-ends, .24, -.14, -.18, -.20, and .02;

between control and agency (excluding "unknown causes"), .26, .35, .27, and .37; and between means-ends and agency (excluding "unknown causes"), .36, .25, .08, and .29.

Table 4
Items, Item Means and Standard Deviations, and Factor Patterns for the Means Powerful Others

Item	<i>M</i>	<i>SD</i>	Factor pattern		
			Control	Means-ends	Agency
Control beliefs ^a					
Positive events					
7. If you decide to sit yourself down and learn something really hard, can you learn it?	3.07	0.80	.60		
10. Getting good grades is probably something you like. Can you get good grades?	3.03	0.73	.56		
42. Let's say that you want to get all the problems (like in spelling) right. Can you do that?	3.14	0.70	.76		
35. If you want to do well in school, can you?	3.24	0.66	.55		
Negative events					
3. Let's say you get unhappy when the teacher calls on you and you don't know the answer. Can you do anything to keep that from happening?	1.99	0.79	.26		
5. I'll bet you don't like to get bad grades. Can you do anything to keep from getting any?	2.78	1.06	.50		
34. Let's say: You decide that you're not going to get any problems wrong (like on a math or spelling paper). Can you do it?	2.79	0.93	.58		
41. Let's say that making mistakes in school really drives you crazy. Can you keep from doing bad in school?	3.07	0.93	.70		
Means-ends beliefs for powerful others					
Positive events					
24. Let's say a kid gets good grades. Is that because the kid gets along good with the teacher?	2.08	0.96		.57	
14. Do kids do good at school because their teachers help them?	2.02	0.90		.56	
60. When kids understand something quickly, is it because the teacher explains it well? ^b	3.13	0.79		.09	
45. When kids do really good in school, is it because of the teacher?	2.23	0.94		.42	
Negative events					
15. When kids don't understand something, is it because their teacher doesn't explain it good enough? ^c	2.33	0.86		.27	
21. When a kid does bad in school, is it because the teacher doesn't really like that kid very much?	1.75	0.80		.55	
63. When kids do bad in a subject, is it usually because the teachers just don't help them very much?	1.94	0.91		.55	
51. When kids have problems in school, is it usually because of the teacher?	2.00	0.86		.43	
Agency beliefs for powerful others					
12. When you want them to, will your teachers help to see that you do good in school?	2.53	0.90			.61
11. If you want them to, will your teachers help you with your classwork? ^d	1.76	0.88			.23
40. Do you have teachers who will help you when you want them to?	2.77	0.87			.74
43. Do your teachers try hard to see that you really understand what they're explaining? ^e	3.03	0.78			.41

Note. *N* = 155 children from Grades 2, 4, and 6. Numbers refer to the order of the items on the questionnaire. Items potentially ranged from 1 (*almost never*) to 4 (*almost always*). Factor loadings were calculated using principal axis factor analysis with a promax/oblique rotation; loadings less than .30 are omitted for clarity.

^a Control beliefs refer to the connection between agents (e.g., the self) and desired ends without any reference to particular means. Hence, the same Control beliefs were included in factor analyses for each potential means.

^b New item: When a kid does good in school, is that because the kid gets along fine with the teachers?

^c New item: If a kid gets bad grades, is it because the teacher doesn't like that kid?

^d New item: Do your teachers, on the whole, like you?

^e New item: When you think about it, would you say that your teachers are pretty satisfied with you?

Table 5
Items, Item Means and Standard Deviations, and Factor Patterns for the Means Luck

Item	<i>M</i>	<i>SD</i>	Factor pattern		
			Control	Means-ends	Agency
Control beliefs ^a					
Positive events					
7. If you decide to sit yourself down and learn something really hard, can you learn it?	3.07	0.80	.60		
10. Getting good grades is probably something you like. Can you get good grades?	3.03	0.73	.62		
42. Let's say that you want to get all the problems (like in spelling) right. Can you do that?	3.14	0.70	.78		
35. If you want to do well in school, can you?	3.24	0.66	.56		
Negative events					
3. Let's say you get unhappy when the teacher calls on you and you don't know the answer. Can you do anything to keep that from happening?	1.99	0.79	.25		
5. I'll bet you don't like to get bad grades. Can you do anything to keep from getting any?	2.78	1.06	.38	(-.32)	
34. Let's say: You decide that you're not going to get any problems wrong (like on a math or spelling paper). Can you do it?	2.79	0.93	.59		
41. Let's say that making mistakes in school really drives you crazy. Can you keep from doing bad in school?	3.07	0.93	.73		
Means-ends beliefs for luck					
Positive events					
28. Is doing well in school a matter of luck?	2.06	0.90		.64	
25. Some kids learn things easier than other kids. What do you think? Are they just luckier?	2.46	0.95		.65	
57. Does getting good grades come from luck?	2.17	0.99		.66	
48. When a teacher calls on a kid and the kid knows the answer, would you say it's because the kid's lucky?	2.19	0.92		.64	
Negative events					
29. When kids get bad grades, is it because they have bad luck?	2.15	0.97		.68	
32. Imagine this: The teacher calls on a kid and the kid doesn't know the answer. Is it because the kid's unlucky?	1.96	0.89		.80	
58. When a kid does bad on homework, is that because the kid's out of luck?	2.20	0.94		.80	
62. When a kid has a hard time learning something, is it because the kid's unlucky?	2.03	0.89		.86	
Agency for luck					
6. What do you think—are you a person who has luck with your homework?	2.66	0.58			.82
8. When the teacher calls on you, are you usually lucky in knowing the answer ^b	3.06	0.72			.09
38. When it comes to learning something hard, do you usually have luck on your side?	2.59	0.50			.61
36. What would you say? When it comes to schoolwork, are you a lucky duck?	2.91	0.55			.70

Note. *N* = 155 children from Grades 2, 4, and 6. Numbers refer to the order of the items on the questionnaire. Items potentially ranged from 1 (*almost never*) to 4 (*almost always*). Factor loadings were calculated using principal axis factor analysis with a promax/oblique rotation; loadings less than .30 are omitted for clarity. Factor loadings in parentheses indicate items that cross-loaded on other dimensions.

^a Control beliefs refer to the connection between agents (e.g., the self) and desired ends without any reference to particular means. Hence, the same Control beliefs were included in factor analyses for each potential means.

^b New item: Let's say: Your teacher asks you a couple of really tough questions. Does luck give you a hand in answering them?

At the level of individual items, examination of the factor loadings indicated that of the 64 items, only 5 failed to load on their designated factor at the level of .30. For two of the items (control negative 1 and agency luck 2), the complexity of the

items was apparent and, as indicated in the footnotes to Tables 2–5, new items were suggested for use in subsequent versions.

However, for the scale to which the remaining three items belonged, namely, the powerful others scales (means-ends posi-

Table 6
Items, Item Means and Standard Deviations, and Factor Patterns for Unknown Means

Item	<i>M</i>	<i>SD</i>	Factor patterns	
			Control	Means-ends
Control beliefs ^a				
Positive events				
7. If you decide to sit yourself down and learn something really hard, can you learn it?	3.07	0.80	.61	
10. Getting good grades is probably something you like. Can you get good grades?	3.03	0.73	.61	
42. Let's say that you want to get all the problems (like in spelling) right. Can you do that?	3.14	0.70	.78	
35. If you want to do well in school, can you?	3.24	0.66	.59	
Negative events				
3. Let's say you get unhappy when the teacher calls on you and you don't know the answer. Can you do anything to keep that from happening?	1.99	0.79	.22	
5. I'll bet you don't like to get bad grades. Can you do anything to keep from getting any?	2.78	1.06	.44	
34. Let's say: You decide that you're not going to get any problems wrong (like on a math or spelling paper). Can you do it?	2.79	0.93	.59	
41. Let's say that making mistakes in school really drives you crazy. Can you keep from doing bad in school?	3.07	0.93	.77	
Means-ends beliefs for unknown factors				
Positive events				
30. When kids do better than usual in a subject, is it hard to tell why?	2.27	0.90		.42
26. The teacher asks a kid a hard question and the kid answers right. Is it hard to figure out why the kid gave the right answer?	2.03	0.74		.43
46. When kids get good grades in school, is it hard to know the reason why?	2.13	0.84		.63
55. Just imagine that a kid does really great on a test. Is it hard to know why?	2.13	0.91		.65
Negative events				
31. When kids mess up in school, is it hard to figure out why that happens?	2.25	0.89		.42
27. When a kid gets lots of problems wrong (like in spelling), is it hard to know the reason why?	2.23	0.87		.59
54. When kids give the wrong answer to teachers' questions, is it hard to know why that happens?	2.32	0.88		.69
59. When a kid does worse in a subject than usual, is it hard to know why that is?	2.29	0.88		.73

Note. *N* = 155 children from Grades 2, 4, and 6. Numbers refer to the order of the items on the questionnaire. Items potentially ranged from 1 (*almost never*) to 4 (*almost always*). Factor loadings were calculated using principal axis factor analysis with a promax/oblique rotation; loadings less than .30 are omitted for clarity. In our scheme it is not possible to have access to causes that are not known. Hence, no Agency beliefs for Unknown causes are included.

^a Control beliefs refer to the connection between agents (e.g., the self) and desired ends without any reference to particular means. Hence, the same Control beliefs were included in factor analyses for each potential means.

tive 3 and negative 1 and agency 2), a conceptual problem was detected. As indicated earlier, for means-ends for powerful others items, children were questioned about three kinds of perceived causal connections: the extent to which school performance was due to teachers (a) liking children, (b) helping children, or (c) explaining things well. As is clear from Table 5, children's responses to items involving teachers' explanations did not load on the factor defined by the other items. It may be that perceiving good grades as the result of the teacher's help or affection may have different implications than did viewing teachers' explanations as a cause of students' performance. As a

result, instead of rewording replacement items for the powerful others scales, new items were created that used teacher helping or liking (and not explanations) as the potential cause of school performance (see footnotes to Table 5).

In conclusion, as predicted, for every category of known means included in our conceptualization, a three-factor solution was indicated. This provides empirical evidence at the item level that the factorial structure of children's responses corresponds to the distinction between control, means-ends, and agency beliefs.

Item means and standard deviations. As can be seen from

Table 7
Means, Standard Deviations, and Internal Consistencies for the Control, Agency, and Means-Ends Interview

Beliefs scales	No. of items	<i>M</i>	<i>SD</i>	Internal consistency ^a
Control beliefs	8	2.89	0.58	.81
Means-ends beliefs				
Effort	8	3.05	0.46	.77
Attributes	8	2.66	0.56	.81
Powerful others	8	2.19	0.48	.70
Luck	8	2.15	0.72	.90
Unknown	8	2.21	0.55	.82
Agency beliefs				
Effort	4	3.21	0.54	.67
Attributes	4	2.74	0.62	.76
Powerful others	4	2.52	0.56	.61
Luck	4	2.80	0.55	.69

Note. *N* = 155 children from Grades 2, 4, and 6.

^a Calculated using Spearman-Brown equal-length split-half reliabilities.

Tables 2 to 6, the item means ranged over the entire four-choice answer scale, varying from about 1.75 to 3.30. Item means within scales tended to be homogeneous, whereas between-scale variation was apparent. Item means seemed to be highest for control of positive events and for items involving effort as a means, most of which were above 3.00, indicating that children both see themselves as able to produce desired events and report that the means effort is effective and available to them. Even for these items, however, standard deviations indicated considerable variability, ranging overall from .70 to 1.00.

Scale Properties

Internal consistencies. Because, in the factor analyses, it was found that for both control and means-ends beliefs, items of the two different outcome valences (positive and negative) loaded on the same factor,⁵ we decided to collapse across valence in forming control and means-ends scales.

Scale characteristics for the resulting 10 scales are listed in Table 7: control beliefs; means-ends beliefs for effort, for attributes, for powerful others, for luck, and for unknown factors; and agency beliefs for effort, for attributes, for powerful others, and for luck. As indicated by the split-half reliabilities, internal consistencies for all of the scales were moderate to high ($M = .76$). Although adequate, the consistencies were somewhat lower for means-ends for powerful others (which, as indicated earlier, contained two items that did not load with the other six items) and for the four-item agency scales. These findings suggested satisfactory reliability of responses, especially considering that the respondents were children (Halpin & Ottinger, 1983).

Scale means and standard deviations. As can also be seen in Table 7, the scale means showed considerable variation. The differences in mean level of beliefs were examined by conducting a repeated measure analysis of variance for each of the belief sets using a multivariate procedure (O'Brien & Kaiser, 1985).

The analysis of variance for means-ends beliefs was significant, $F(4, 205) = 130.55, p < .001$. Follow-up tests indicated that effort was perceived to be the most effective cause, signifi-

cantly higher than all of the other causes; and attributes was perceived as second most effective, significantly higher than powerful others, luck, and unknown, which in turn did not differ from each other. The analysis of variance for agency beliefs was also significant, $F(3, 291) = 131.15, p < .001$. Follow-up tests indicated that effort was perceived as the most accessible cause, followed by attributes and luck, which did not differ from each other. Powerful others were perceived as least accessible.

Relations between the scales. The correlations among the 10 basic scales are presented in Table 8. To determine whether children's scores at the scale level corresponded to the distinction among control, means-ends, and agency beliefs, a factor analysis of the scale scores was conducted using principal axis factoring with oblique rotation, as described earlier. To provide two indices of control and means-ends beliefs, the scale scores were included for positive and negative events separately, resulting in 16 scale scores.

The results of the factor analysis are presented in Table 9. As can be seen, a five-factor solution was indicated (Tucker-Lewis reliability coefficient = .932). The control beliefs scales loaded on the first factor, means-ends beliefs scales loaded on the next three factors, and the agency beliefs scales loaded on the last factor. The only cross loading was agency for attributes, which also loaded on the control factor. The factor intercorrelations (see Table 9) are low to moderate, indicating a general positive relation between agency and the other factors.

An examination of the three means-ends factors showed that the first was marked by the effort and attributes causes. The second means-ends factor was marked by two other causes, namely, powerful others and luck, and by attributes for negative events as well. The third means-ends factor consisted of beliefs about unknown causes. Obtaining three factors may lead to speculation about the conceptual dimensions these causes have in common. For example, because attributes for negative events loaded on the second means-ends factor, it could be inferred that this factor does not represent beliefs about external causes. One possibility is that these causes are viewed as less controllable than effort. Attributes, although usually viewed as internal causes, may be perceived as having a share of uncontrollability (Russell, 1982; Weiner, 1979). However, without further information about children's perceptions of controllability, this interpretation is tentative.

In sum, just like the pattern of results at the item level, the findings at the scale level also indicated that the factorial structure of children's responses corresponds to the theoretical distinction among beliefs about control, means-ends, and agency.

Predictors of control beliefs. Although the factor analyses of

⁵ Beliefs about the relations between means and ends for the self would not be expected to be positively correlated across valence, precisely because, as indicated earlier, they contain agency information. For example, as described earlier, a belief about the causes of positive events such as "When I do well in school, it's because I'm smart" implies the agency belief "I'm pretty smart", whereas the parallel negative item "When I do bad in school, it's because I'm not smart enough" could imply the agency belief "I'm pretty dumb." Hence, such items about the self would probably tend to be *negatively* correlated across valence.

Table 8
Intercorrelations Among the Scales of the Control, Agency, and Means-Ends Interview

Beliefs scales	Control beliefs	Means-ends beliefs					Agency beliefs				
		1	2	3	4	5	1	2	3	4	
Control beliefs	—										
Means-ends beliefs											
1. Effort	.20	—									
2. Attributes	-.07	.40*	—								
3. Powerful others	-.13	.19	.46*	—							
4. Luck	-.19	.22	.58*	.68*	—						
5. Unknown	.01	-.05	.24	.34*	.44*	—					
Agency beliefs											
1. Effort	.19	.22	.25	.07	.19	.10	—				
2. Attributes	.48*	.06	.13	.08	.09	.08	.30*	—			
3. Powerful others	.20	.27*	.25	.02	.17	.16	.36*	.24	—		
4. Luck	.37*	.06	.16	.03	.19	.22	.47*	.55*	.30*	—	

Note. $N = 155$ children from Grades 2, 4, and 6. Correlations greater than .14 and .18 are significant at the $p < .05$ and $p < .01$ level, respectively.
 * $p < .001$.

both the item and the scale scores indicated that control beliefs formed a factor separate from beliefs about means-ends and agency, and an examination of the correlations between factors revealed relations between belief sets to be low at both the item level (ranging from $-.18$ to $.37$) and the scale level (ranging from $-.23$ to $.43$), it was nevertheless of interest to investigate the extent to which control beliefs could be accounted for by some combination of means-ends and agency beliefs. To examine this issue, a multiple regression analysis was performed with control beliefs as the criterion and the other nine scale scores entered simultaneously as predictors.

The weighted linear combination of the nine predictor variables accounted for a significant amount of variance in control beliefs ($R^2 = .378$, $p < .001$), and beta weights were statistically significant for four scales: two means-ends beliefs scales, namely, Effort ($\beta = .270$, $p < .001$) and Luck ($\beta = -.309$, $p < .004$), as well as two agency beliefs scales, namely, attributes ($\beta = .384$, $p < .001$) and luck ($\beta = .188$, $p < .034$). Nevertheless, despite the a posteriori maximization of predictive power, a substantial portion of the variance in control beliefs could not be accounted for by the combination of the means-ends and agency beliefs scales, as our conceptualization would suggest.

Test-Retest Correlations

Data from previous samples (collected in preparation for the present study) were available that indicated the level of the test-retest correlations of the CAMI scales. Three previous studies looked at the correlations between repeated administrations of the CAMI over time. Sample 1 involved 80 German children from Grades 3 ($M = 9.1$ years, $SD = .49$) and 6 ($M = 12.1$ years, $SD = .91$), equally divided by grade and sex, with a test-retest interval of 1 week. Sample 2 involved 54 American children, 16 from Grade 1 ($M = 6.8$, $SD = .44$), 18 from Grade 3 ($M = 8.7$, $SD = .51$), and 20 from Grade 6 ($M = 11.9$, $SD = .50$), equally divided by sex, with a test-retest interval of 9 weeks. Sample 3 involved 136 American children, 46 from Grade 2 ($M = 7.68$, $SD = .56$), 20 from Grade 3 ($M = 8.32$, $SD = .84$),

15 from Grade 4 ($M = 9.60$, $SD = .68$), 26 from Grade 5 ($M = 10.78$, $SD = .64$), and 28 from Grade 6 ($M = 11.71$, $SD = .51$), approximately equally divided by sex, with a test-retest interval of 8 weeks.

The substantial test-retest correlations (all $ps < .001$; see Table 10) were taken as an indication that children answered the items of the CAMI in a consistent fashion and that their control-related beliefs were fairly stable over a period of up to 9 weeks. This interpretation was supported by a comparison of the test-retest correlations of the CAMI scales with those of other frequently used control scales. For example, for a sample of 526 3rd to 6th graders, Halpin and Ottinger (1983) reported test-retest correlations over a period of 4 weeks for the Bialer (1961) of .38, and for the Nowicki-Strickland (1973) of .43. Both of these correlations are lower than those obtained with the CAMI scales ($M = .54$), although the other scales contain between 4 and 10 times as many items as do the CAMI scales.

Correlations With Other Scales

An examination of the correlations between the CAMI and other instruments available to study control-related beliefs is important for two reasons. First, meaningful relations should be found with those facets of other scales that are similar in definition. Second, because the present conceptualization should contain information about perceived control not captured by other scales, reliable variance in the CAMI scores should be found that does not overlap with variation in other scales.

Data were available from Sample 3 and from Sample 4, consisting of 180 German children from Grades 2 ($M = 8.26$ years, $SD = .37$), 4 ($M = 10.24$ years, $SD = .44$), and 6 ($M = 12.21$ years, $SD = .44$), equally divided by grade and sex. The two most frequently used locus of control instruments were used in this study for comparison purposes: the Bialer Locus of Control Scale (Bialer, 1961) and the Nowicki-Strickland Locus of Control Scale (Nowicki & Strickland, 1973).

Two aspects of these scales should be noted before the pattern

Table 9
Factor Pattern^a for the Scales of the Control, Agency,
and Means-Ends Interview

Beliefs scales	Control	Means-ends			Agency
		1	2	3	
Control beliefs					
Positive events	.75				
Negative events	.65				
Means-ends beliefs					
Effort					
Positive events		.51			
Negative events		.78			
Attributes					
Positive events		.37			
Negative events		.57	(.31)		
Powerful others					
Positive events			.61		
Negative events			.71		
Luck					
Positive events			.90		
Negative events			.73		
Unknown					
Positive events				.73	
Negative events				.84	
Agency beliefs					
Effort					.60
Attributes	(.43)				.48
Powerful others					.37
Luck					.81
Factor intercorrelations					
Control	—				
Means-ends 1	-.02	—			
Means-ends 2	-.23	.38	—		
Means-ends 3	-.05	.10	.45	—	
Agency	.28	.43	.17	.21	—

Note. $N = 155$ children from Grades 2, 4, and 6.

^a Calculated using principal axis factor analysis with a promax/oblique rotation. Factor loadings less than .30 are omitted for clarity. Factor loadings in parentheses indicate scales that cross-loaded on other factors.

of correlations with CAMI scales can be evaluated. First, both the Bialer and the Nowicki-Strickland scales are heterogeneous with respect to several aspects, for example, domain and valence of outcome, reference person (self vs. agents in general), and type of internal and external causes. Hence, correlations with the relatively homogeneous CAMI scales were not expected to be extremely high. Second, because the Bialer and Nowicki-Strickland scales are based on a conception of locus of control that is unidimensional and bipolar (internal vs. external), these scales are to be scored by combining internal and external items (e.g., by summing the internal items answered "yes" with the external items answered "no"). To facilitate comparison with the CAMI scales, which assess causes separately, the internal and the external items of the Bialer and the Nowicki-Strickland were summed separately.

The intermeasure correlations are presented in Table 11. In general, the correlations with the CAMI were slightly higher for the Nowicki-Strickland than for the Bialer. As would be expected from the conceptual analysis presented in the introduc-

tion, primary relations were between the CAMI means-ends beliefs scales and the corresponding subscales of the locus of control instruments. For example, the external items of both the Bialer and the Nowicki-Strickland were correlated positively with CAMI Attributes, Powerful Others, Luck, and Unknown. Surprising perhaps was the positive correlation found between means-ends beliefs for attributes and the locus of control external items. As mentioned previously, it may be that attribute causes are perceived as somewhat uncontrollable.

In contrast, the CAMI control beliefs scale and the agency beliefs scales were not consistently related to the locus of control scales; the low correlations that did appear were primarily positive relations to the internal items. Consistent with theoretical expectations, the variance contained in the measurement of control and agency beliefs seems unique to the present questionnaire.

The added variance associated with our measurement of belief systems (i.e., control and agency) seems to be systematic and meaningful. First, explanations for the lack of relations with locus of control measures on the basis of measurement properties can be ruled out because both control and agency beliefs showed satisfactory reliability of measurement. Second, on the basis of the factor analysis of the scale scores, it can be seen that the control and agency scales form factors separate from means-ends scales. We conclude that the CAMI overlaps in interpretable ways with existing measures of control-related beliefs (especially as expected with the means-ends beliefs scales), but also contains unique elements (e.g., control and agency beliefs scales).

Discussion

A new conceptualization of control-related beliefs was presented that we argue should be useful for research on individual

Table 10
Test-Retest Reliabilities for the Control, Agency,
and Means-Ends Interview

Beliefs scales	Test-retest correlations		
	1 week ^a	9 weeks ^b	8 weeks ^c
Control beliefs			
Positive events		.53	.56
Negative events		.39	.42
Means-ends beliefs			
Effort			
Effort	.45	.58	.39
Attributes	.50	.64	.58
Powerful others	.54	.65	.53
Luck	.76	.57	.51
Unknown	.62	.46	.55
Agency beliefs			
Effort		.59	.61
Attributes			.56
Powerful others			.64
Luck			.60

Note. All correlations are significant at the $p < .001$ level.

^a $N = 80$ children from Grades 3 and 6; only means-ends beliefs were measured.

^b $N = 54$ children from Grades 1, 3, and 6; all agency causes were combined.

^c $N = 136$ children from Grades 2, 3, 4, 5, and 6.

Table 11
Correlations Between the Control, Agency, and Means-Ends Interview and Two Locus of Control Scales

Belief scales	Bailer scale ^a				Nowicki-Strickland scale ^b			
	Sample 3		Sample 4		Sample 3		Sample 4	
	Internal ^c	External ^d	Internal	External	Internal	External	Internal	External
Control beliefs								
Positive events	.18	-.08	.13	.09	.12	-.22*	.18	-.01
Negative events	.03	.10	-.04	.07	-.11	.18	.13	.04
Means-ends beliefs								
Effort	.18	-.06	.05	.13	.17	.02	.15	.13
Attributes	.04	.35**	.04	.23	.23*	.35**	.03	.26**
Powerful others	.01	.45**	.15	.18	.20*	.43**	.10	.25**
Luck	-.08	.32**	.03	.33**	.01	.48**	-.06	.35**
Unknown	-.22*	.24*	-.21*	.17	-.13	.27**	-.11	.16
Agency beliefs								
Effort	-.06	.03	-.15	-.03	-.02	.05	-.10	-.02
Attributes	.23*	.01	.09	-.03	.19	.16	.12	-.04
Powerful others	.09	.22*	.19	-.02	.08	.17	.26**	-.05
Luck	.10	.05	.02	-.01	.11	.10	-.05	-.05

Note. Sample 3, $N = 136$ children from Grades 2, 3, 4, 5, and 6; Sample 4, $N = 180$ children from Grades 2, 4, and 6.

^a The Bailer scale is typically scored by adding the "yes" answers to the internal items (18) to the "no" answers in the external items (5). ^b The Nowicki-Strickland scale is typically scored by adding the "yes" answers to the external items (24) to the "no" answers to the external items (16).

^c Calculated as the sum of the "yes" answers to the internal items. ^d Calculated as the sum of the "yes" answers to the external items.

* $p < .01$. ** $p < .001$.

differences and developmental change. Conceptually, the new scheme follows from action-theoretical perspectives that suggest a distinction between control, means-ends, and agency relations. Before usefulness can be judged, however, it must be demonstrated that children's beliefs reflect the distinctions posited in the conceptualization.

Empirical Indicators of Control, Means-Ends, and Agency Beliefs

Most important was evidence about the extent to which children's responses to the questionnaire, designed to operationally define the new scheme, indicated a distinction between control, means-ends, and agency beliefs at the empirical level. Two kinds of factor analyses revealed the predicted pattern of children's responses. First, on the item level, for every known cause, a three-factor solution was indicated marked by control, means-ends, and agency items, respectively. Second, factor analysis of the scale covariance matrix revealed separate factors for control, means-ends, and agency beliefs. In addition to a control beliefs and an agency beliefs factor, there were three means-ends factors, the first of which was marked by the causes effort and attributes, the second of which was marked by the causes attributes (for negative events only), powerful others, and luck, and the third of which was marked by unknown factors. These results provide further evidence of the multidimensional nature of children's perceived control. (See also Connell, 1985; Levenson, 1973.)

The psychometric properties of the CAMI questionnaire were evaluated as satisfactory for the 10 scales: control beliefs, means-ends beliefs for effort, for attributes, for powerful others, for luck, and for unknown; and agency beliefs for effort, for at-

tributes, for powerful others, and for luck. Internal consistencies were moderate to high (average = .76). It could be inferred from an examination of scale means that, of the causes that were included on the questionnaire, children reported effort to be the most effective and accessible.

In addition, the evidence of 1-, 8-, and 9-week test-retest correlations as lower bound estimates of internal consistency is of special significance. Overall, the belief systems showed substantial correlations ($M = .54$) especially when compared with other measures of perceived control in children (Halpin & Ottinger, 1983). Evidence was also available about the concurrent validity of the measurement instrument in terms of its relations to other instruments attempting to measure perceived control. The correlations between control, means-ends, and agency beliefs, on the one hand, and two locus of control instruments, on the other, indicated theoretically meaningful overlap (especially with means-ends beliefs) and uniqueness as well (especially for control and agency beliefs).

In sum, we have provided evidence that children's responses to the new questionnaire reflect the postulated distinction between control, means-ends, and agency beliefs and that the new measure results in a large spectrum of psychometrically sound and theoretically meaningful variance that is not available in other instruments operationally defining related conceptions.

Initial Evidence of the Usefulness of the New Conceptualization

Two areas in which the usefulness of the new conceptualization can be tested are in the examination of developmental differences in mean level and in correlates of perceived control. Some initial findings indicate that the multidimensional conceptualization adds to the study of these two topics.

Basis of the correlations between perceived control and cognitive performance. With regard to individual differences, one of the key questions about control-related beliefs is how they are related to behavior and action. In fact, the new conceptualization was operationally defined in the substantive domain of school outcomes, precisely because the central issue was the nature of the control-related beliefs that regulate action in cognitive performances.

Previous findings in this area clearly indicate that individuals who report a more internal locus of control (relative to those with a more external locus of control) show better performance on a variety of cognitive indices, including grades, achievement tests, and intelligence tests. As may be inferred from the previous discussion, this relation could be based on any of several aspects of "internality" that are combined in standard measures. For example, cognitive performance could be positively related to "internality": (a) in the sense of beliefs that one can produce desired school outcomes oneself (in our terminology, control beliefs), (b) in the sense of beliefs that school outcomes are caused by agent-related causes (effort or attribute means-ends beliefs), or (c) in the sense of beliefs that one has many resources available to reach the goal of good school performance (agency beliefs). Moreover, because locus of control is assumed to be a unidimensional bipolar construct, the positive relation between internal locus of control and cognitive performance could be due to a negative correlation between performance and beliefs that school outcomes are due to "external" factors (e.g., powerful others, luck, or unknown means-ends beliefs).

The use of the new conceptualization allows the locus of control construct to be "unpacked" and permits each aspect of control-related beliefs in its relation to cognitive performance to be empirically examined. Initial evidence from a study of these relations in a sample of 180 German children from Grades 2, 4, and 6 (Chapman & Skinner, 1985; Chapman, Skinner, & Baltes, 1987) can be summarized as follows. Clear relations with psychometric measures of crystallized intelligence (tapping spelling and arithmetic performance) were found for agency beliefs only. In general, no significant relations were found for control beliefs nor for any categories of means-ends beliefs. In addition, the relations between cognitive performance and agency beliefs emerged in Grade 4 (age 10), and were significant for agency beliefs about the causes, effort, attributes, and luck. Moreover, none of the patterns of results could be accounted for by differential reliabilities of any of the instruments or age groups.

Although this pattern of results needs to be replicated, it provides initial evidence that the new conceptualization may be helpful in discovering the aspects of control-related beliefs that predict certain behaviors and actions. In the case of cognitive performance during middle childhood, beliefs about the accessibility to the self of potential causes (agency beliefs) seem to be the best predictor. Importantly, however, not just agency about "internal" causes are related to good performance, as might be predicted from self-efficacy (Bandura, 1977) or competence judgment (Weisz, 1983) perspectives. In addition, agency for causes that are typically considered "external", namely, luck, predict cognitive performance as well.

Development of perceived internality during middle childhood. A second domain in which the new conceptualization

may be useful is the study of how perceived control changes with development. A generally accepted finding in the literature on locus of control is that perceived internality increases during middle childhood (Lefcourt, 1976; Weisz & Stipek, 1982). Theorists have assumed that these increases are the result of linear increases in perceived internality combined with linear decreases in perceived externality. However, because, as already mentioned, typical locus of control instruments combine perceived internality and externality, this presumed pattern of developmental differences has never been examined directly.

Moreover, the assumption that internal locus of control increases during middle childhood conflicts with an accepted finding in the area of perceived internality as studied from a Piagetian perspective (Piaget, 1927/1930). From this perspective, it is argued that young children overestimate the effectiveness of their efforts and actions and with age show increasingly more conservative estimates, resulting in decreases in perceived internality across middle childhood.

The multidimensional conceptualization of means-ends beliefs (which according to the correlations previously presented is most closely related to locus of control) allows for the examination of developmental differences in several internal and external causes independently. The results of such an analysis using data from 240 children from Grades 1 to 6 (Skinner & Chapman, 1987) indicated that, as predicted by Piagetians, beliefs about the effectiveness of causes in general decreased across middle childhood. At the same time, however, in line with findings from locus of control research, the differences between the causes in terms of their effectiveness increased during middle childhood. This finding, which has been replicated in independent samples, indicates that one primary development in means-ends beliefs during middle childhood is the differentiation of causes from each other in terms of their perceived effectiveness. (See also Skinner, Chapman, & Baltes, in press.)

In conclusion, a new conceptualization of perceived control was described that is based on an action-theoretical approach. Evidence was presented that the conceptual distinctions between control, means-ends, and agency beliefs are reflected in children's responses to a questionnaire designed to tap these beliefs. In addition, findings were summarized from initial studies that document how the multidimensional conceptualization may be used to study individual differences and developmental change in beliefs about control and action.

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