Published in final edited form as:

J Appl Dev Psychol. 2008 September ; 29(5): 361–370. doi:10.1016/j.appdev.2008.06.003.

Talking about Success: Implications for Achievement Motivation

Gail D. Heyman

Department of Psychology University of California, San Diego

Abstract

Three studies investigated the influence of verbal descriptions concerning the performance of others on children's ability conceptions among 177 elementary school children ranging in age from 8 to 12 years. Study 1 showed that when high-performing characters were described with labels such as "math whiz," children tended to view the character's ability as more innate, and less susceptible to being altered by a change in effort. Study 2 showed that a reference to a successful character's previous struggles led participants to conceive of ability as more malleable, and to express more optimism about their own prospects for academic success. Study 3 provided further evidence that hearing descriptions of change in performance over time can influence children's reasoning. These results suggest that when individuals frequently make use of ability-related labels or describe people as maintaining stable patterns of performance over periods of time, they may implicitly convey maladaptive conceptions of ability to children.

Keywords

Social cognition; Labeling; Inference; Achievement motivation; Academic achievement; Ability; Effort

1. Introduction

In an address to the Association for Psychological Science, Gladwell (2006) argued that a strong belief in the importance of precociousness is pervasive in American society. He stated, "We take it as an article of faith in our society that great ability in any given field is invariably manifested early on, that to be precocious at something is important because it's a predictor of future success." Gladwell pointed out that one way in which such messages about precociousness are conveyed is through discussion of highly successful individuals such as Mozart, who are characterized as revealing a special "gift" in very early childhood. The present work investigated the possibility that even simple descriptions of the performance of unfamiliar individuals can promote this view of ability among children.

There is a substantial amount of research indicating that the way individuals conceptualize ability has important implications for how they cope with the academic challenges that they face, by serving as a framework for how they interpret achievement-related experiences (Dweck, 1999; Molden & Dweck, 2006). When individuals hold entity beliefs about ability,

© 2008 Elsevier Inc. All rights reserved.

Address correspondence to Gail D. Heyman, Department of Psychology, University of California, San Diego, 9500 Gilman Dr., La Jolla CA 92093-0109. E-mail: gheyman@ucsd.edu.

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

in which they view ability in terms of fixed potential, they often respond to challenges with negative affect, negative attributions about ability, and a failure to generate effective problem-solving strategies. Entity beliefs imply that negative academic outcomes occur because one lacks the potential to succeed. In contrast, when individuals hold incremental beliefs about ability, in which they view ability as a malleable quality, they tend to respond to academic difficulty by focusing on what processes are needed to overcome the obstacles and to build new skills (Elliott & Dweck, 1988; Grant & Dweck, 2003). Entity and incremental beliefs hold important real-world implications for children's academic achievement. For example, Blackwell, Trzesniewski, and Dweck (2007) found that children who held incremental views of ability were better able to cope with the challenges posed by the transition to middle school. Because these children focused on developing their abilities, they were more likely than other children to respond to setbacks with increased effort, and were more likely to show improvement in their math performance.

Recently, a number of researchers have come to view children's conceptions of ability in terms of broader clusters of interrelated beliefs relating to psychological essentialism (Bastian & Haslam, 2006; Gelman, Heyman, & Legare, 2007). When concepts are viewed in essentialist ways they are often seen as rooted in nature, relatively difficult to change, having a nonobvious basis, and high in inductive potential (Gelman, 2003). One of the ways children are likely to learn about essentialist beliefs is through verbal discourse (Gelman, 2003). Of interest in the present research is whether there might be types of language that adults use in talking about achievement that lead to shifts in the extent to which middle and late elementary school students conceptualize ability in essentialist ways.

1.1. The development of essentialist reasoning about ability

Before describing the potential effects that discourse about achievement may have on essentialist beliefs, it is important to note the broader picture of potential factors that might influence the formation of essentialist beliefs among elementary school children. Prior research points to a wide range of factors, including competition and performance evaluation, that often cause children to become more concerned about the adequacy of their own ability (Ames & Archer, 1988). Such concerns are often associated with low levels of intrinsic motivation (Butler, 1989). Some researchers have suggested that specific classroom practices, including requirements that students work on the same task at the same time and open discussions of students' grades, can shape children's ability conceptions by creating the perception that individuals' abilities can easily be compared and ranked (Rosenholtz & Simpson, 1984).

Nicholls (1978) suggests that children become more prone to essentialist thinking over the elementary school years. Young elementary school children tend to equate effort and ability, whereas older children are more likely to view ability as a factor that can limit the effectiveness of one's efforts. Nicholls (1978) viewed these changes primarily in terms of cognitive development, but others have pointed to the possibility that changes in the social environment that increase the salience of critical evaluations, task difficulty, and the relative performance of different students may be more important (Butler, 2005). However, it is important not to overemphasize age-related differences in essentialist reasoning because direct comparisons of children across ages can be problematic given that there may be other age-related changes in how children interpret questions (Bempechat, London, & Dweck, 1991; Kurtz-Costes, McCall, Kinlaw, Wiesen, & Joyner, 2005; Yussen & Kane, 1985). In addition, the evidence concerning age-related change is inconsistent, with many studies showing no evidence of age-related changes in essentialist beliefs (e.g., the extent to which ability is malleable; Cain & Dweck, 1995; Kurtz-Costes et al., 2005). Finally, there is evidence that by early elementary school, children are capable of reasoning about ability in essentialist ways (Heyman & Compton, 2006; Heyman, Gee, & Giles, 2003), and that they sometimes show maladaptive motivational

responses associated with these beliefs (Butler, 2005; Cain & Dweck, 1995; Dweck, 1999; Heyman, Dweck, & Cain, 1992; Smiley & Dweck, 1994).

1.2. Linguistic effects on essentialist beliefs

Gelman (2003) pointed out a number of reasons why researchers should consider the role of language in the development of essentialist beliefs. First, there is substantial variation both within and between cultures in the extent to which properties tend to be essentialized, evidenced by the fact that social class is sometimes viewed in an essentialist way and it is sometimes viewed as fluid. For example, Mahalingam (2003) found that members of high castes in India tend to hold more essentialist beliefs about caste than members of low castes. Because it is implausible that such cultural variations are innately determined, other explanations are needed. The use of language is a prime candidate because it is central to transmitting cultural beliefs. In addition, language has expressive properties that are central to essentialist reasoning. Waxman (1999) suggested that naming things might point children towards the deeper commonalities that characterize human concepts.

There is evidence that nouns can promote essentialist reasoning in children (Clark, Gelman, & Lane 1985; Gelman & Heyman, 1999; Hall & Moore, 1997), and more broadly, that language can influence essentialist reasoning (Heyman & Diesendruck, 2002). Clark, Gelman, and Lane (1985) found that 2- to 6-year old children, like adults, were more likely to describe pairs of objects using compound nouns when the links between the objects were relatively enduring (e.g., describing to a tree with branches that end in pencils as a "a pencil tree"). This suggests that even young children appreciate the use of nouns as a way to express stable properties.

Gelman and Heyman (1999) found that nouns can play a role in promoting essentialist beliefs about people. Children ages 5 and 7 years old were randomly assigned to either a noun label or a verbal predicate condition. Participants in both conditions heard a series of two-sentence descriptions of characters (e.g., "Rose is eight years old. Rose eats a lot of carrots"). Following the descriptions, participants in the noun label condition heard the character described in terms of a noun label (e.g., "Rose is a carrot-eater"), and those in the verbal predicate condition heard the information from the second sentence repeated in a slightly different form (e.g., Rose "eats carrots whenever she can"). All participants then answered a set of questions about the characteristic, such as whether it will be stable over time. As predicted, children tended to view responses in more essentialist ways in the noun-label condition.

Given the evidence of linguistic effects on children's essentialist reasoning, and the link between essentialist reasoning about ability and motivational patterns that impede long-term achievement, a key question is whether there are language effects on children's essentialist beliefs about ability. If so, it would be important for individuals who work with children to be aware of them, so that they can avoid making statements that have unintended consequences, and make use of opportunities to promote more adaptive patterns of motivation. It would also provide insight into how cultural ideology can become incorporated into children's reasoning processes.

Previous research suggests that discussions about performance outcomes can have important psychological consequences for children's achievement motivation during the middle childhood years (Altermatt, Pomerantz, Ruble, Frey, & Greulich, 2002; Mueller and Dweck, 1998). Mueller and Dweck (1998) assigned a problem-solving task to children in late elementary school and praised them for achieving successful outcomes. These outcomes were attributed to ability or effort depending on the condition to which they were assigned. Praise for ability produced negative effects on achievement motivation, including reduced task persistence and enjoyment, more negative ability attributions, and poorer task performance (see also Kamins & Dweck, 1999, concerning similar effects among younger children). This

finding raises the question of whether hearing discussions about the performance of unfamiliar others might also influence children's reasoning about ability.

1.3. The present research

Three studies investigated the influence of verbal descriptions concerning the performance of others on children's ability conceptions. The research began by examining whether the use of a classificatory label such as "math whiz" to describe another person would promote essentialist reasoning about the individual's ability among a group of 8- to 12-year-olds using a methodology adapted from Gelman and Heyman (1999). This starting point was selected in light of theory and evidence suggesting that noun labels are likely to promote essentialist thinking, and because it is generally consistent with evidence that the use of labels such as "learning disabled" can influence children's peer perceptions (Milich, McAnich, & Harris, 1992). The discussion of positive outcomes, such as giving public recognition to students who have performed better than others, is commonly used by teachers as a motivational technique (Covington, 2000). Consequently it has the potential to serve as a source of information for children who are trying to understand what is required for themselves and for others to succeed.

Participants 8 to 12 years old were chosen because children become highly attentive to the performance of others as a means of self-evaluation at about age 8 (Butler, 2005; Frey & Ruble, 1985). As a result they are likely to be highly sensitive to cues that may help them to make sense of their own positive and negative outcomes. In addition, this is an age range during which children have begun to develop a coherent understanding of how to apply essentialist beliefs to psychological characteristics (Gelman et al., 2007).

Participants in all three studies were tested by experimenters who were trained in experimental methodology and were blind to the study hypotheses. Participants were told that they were going to be asked some different questions to help the researchers learn more about children's thinking about people, and were told that they did not have to take part in the study or answer any question they did not want to answer. Of the children who had received parental permission to participate and were present when the experimenters visited, all agreed to participate and were interviewed.

2. Study 1

In Study 1, it was predicted that the use of classificatory labels would lead to an increase in the tendency to support essentialist beliefs. A between-participants design was used to investigate the influence of verbal discourse about others on children's reasoning about ability. The reasoning of children in a *Label* condition, in which successful students were described by a teacher using ability-related labels ("spelling master" and "math whiz"), was compared to the reasoning of children in a *No label* condition in which no such labels were applied. The domains of spelling and math were chosen in order to get some sense of whether or not any evident patterns might generalize across domains, and because these domains tend to involve performing tasks in which outcomes are unambiguously correct or incorrect.

When investigating labeling effects, it is important to separate the effect of the label itself from the effect of beliefs about individuals who are seen as likely to be labeled. Otherwise it would not be possible to determine if the verbal labels have a causal effect on reasoning. Accordingly, two steps were taken to reduce the possibility that children in the label condition would infer that the teacher had used the label because the character's level of performance on the test was truly outstanding, or because the character had a history of successful performance in the subject. First, the performance descriptions were held constant across conditions. Second, the way the descriptions were worded made it clear that the teacher's use of the label was based solely on which student performed best on a particular test.

2.1. Study 1 method

2.1.1. Participants—Participants were 80 elementary school students (M age = 9 years, 10 months, range = 8y 0m to 12y 4m; 29 girls) from a southwestern coastal city in the U.S. Participants were drawn from three schools that serve communities with diverse SES backgrounds. The sample was approximately 60% Anglo American, 22% Hispanic American, 12% Asian American, and 6% African American. Participants were told that they would be asked some different questions to help the researchers learn more about children's thinking about people, and that they did not have to take part in the study or answer any question that they did not want to answer.

2.1.2. Procedure—Participants were randomly assigned to the *Label* or *No label* condition. Experimenters trained in the methodology but blind to the study hypotheses tested participants in a one-on-one interview sessions. Interviewers presented children in each condition with two scenarios, one that described a character who performs successfully in math, and another that described a character who performs successfully in spelling. These scenarios were presented in random order. The sex and name of each character was chosen randomly for each participant.

In the label condition, a teacher informed the class that whoever gets the highest score in the class will earn the title of "math whiz" or "spelling master," and applied the label to the child who performed most successfully. The math scenario for the label condition was: *There is a class just like yours. In this class the teacher said that whoever does the best in the class on the math test will be called a "math whiz." Joseph did the best in the class, so he was called a "math whiz."*

In the no label condition, the performance information was simply repeated: *There is a class just like yours. In the class the teacher said, "Let's see who does the best in the class on the math test." Joseph did the best in the class. He did better than anyone else in the class on the math test.*

After each scenario, participants responded to a set of four questions that were adapted from Gelman and Heyman (1999). The questions were always presented in the order shown, and were identical for each scenario except for the academic subject (math or spelling) and the name of the character that was described as successful.

1. Was Joseph good at math even before he started school?
2. Do you think Joseph had to spend a lot of time practicing his math before he got to be good at it?
3. Was Joseph born with special math ability?
4. Will Joseph still do really well at math when he is grown up, even if he doesn't have much time to practice at it?

Responses that were consistent with the most essentialist conception of ability were coded as 1 ("Yes" to Questions 1, 3, and 4, and "No" to Question 2), and responses that were consistent with the least essentialist conception of ability were coded as 0 ("no" to Questions 1, 3, and 4, and "yes" to Question 2). Responses of "maybe" were coded as .5. Scores were averaged across the math and spelling scenarios to create a set of four single-question essentialism scores. The single-question essentialism scores, which can be conceptualized as measuring different aspects of ability beliefs, were then averaged to create a single composite essentialism score, as a general index of essentializing tendencies (Gelman & Heyman, 1999). Combining these measures resulted in an alpha level of .49, which is relatively low (but see Gelman et al., 2007, concerning relations among different measures of psychological essentialism and the extent to which children see them as overlapping).

2.2. Study 1 results and discussion

A series of preliminary analyses (ANOVAs) were conducted to explore possible effects of participant sex, the sex of the character in the priming manipulation, and the academic subject in relation to composite essentialism scores. No significant main or interaction effects were observed and these factors were not included in subsequent analyses. Additional preliminary analyses also showed no relation between age and composite essentialism scores.

An ANOVA on composite essentialism scores with Condition (label, no label) as a between-participants factor revealed a main effect of Condition, $F(1, 78) = 10.15, p < .01, \eta^2 = .12$. Children in the label condition provided more essentialist responses ($M = .44, SD = .21$) than children in the no label condition ($M = .30, SD = .20$). Analyses of essentialism scores summed across the four measures from each domain revealed a significant effect of label for both spelling and math, $F_s(1, 78) = 12.33$ and 5.41 , respectively, $p_s < .01, \eta^2_s = .14$ and 5.41 , respectively. Analyses of single-question essentialism scores showed that this effect was statistically significant for two of the questions: whether the character was born with special ability, $F(1, 78) = 6.50, p < .05, \eta^2 = .08$; and whether the character would still do well without subsequent practice, $F(1, 78) = 6.54, p < .05, \eta^2 = .08$. These results suggest that the use of ability-related labels to describe performance can convey to children the notion that ability is a function of innate potential.

One question that remains is why priming effects were evident only for some questions. One possibility is that these types of priming effects are most likely to occur on measures in which multiple participants are not sure what they believe, or on questions in which children have multiple conceptual frameworks to draw upon (see Heyman & Gelman, 2000). Beliefs about innateness fit this criteria, as well as beliefs about future behavior and performance, but not past behavior and performance. Heyman & Gelman (2000) found linguistic priming effects on questions relating to future behavior, but not to past behavior.

3. Study 2

Study 1 showed that labels used to describe an individual's successful performance can influence the way children reason about the individual's ability. Study 2 examined the implications of another aspect of discussions about achievement: whether the successful performance is described as a continuation of earlier successes. Such a possibility is consistent with evidence that children age 8 and older who are taught about one essentialist property of a novel characteristic (e.g., it cannot change) tend to infer that other essentialist properties apply to the characteristic as well (e.g., it is inborn, detectable in the blood and brain, and not due to environmental factors; Gelman et al., 2007).

3.1. Study 2 method

3.1.1. Participants—Participants were a total of 64 elementary school students (M age = 9 years, 6 months; range = 8y 0m to 12 y 4m; 40 boys) from a southwestern coastal city in the U.S. The sample was approximately 63% Anglo American, 20% Hispanic American, 14% Asian American, and 3% African American. Participants were drawn from two schools that serve communities from diverse SES backgrounds.

3.1.2. Procedure—In a between-participants design, participants were randomly assigned to a *Continuity* or a *Discontinuity* condition. Participants in each condition were primed with a single scenario that described a character's successful performance. In the continuity condition the scenario included information indicating that the character had also been successful previously, and in the discontinuity condition the scenario included information indicating that the character had not been successful previously. The sex of the character and

the character's name were selected randomly for each participant. The description for the continuity condition was: *I know a girl named Carly. Carly does really well on her schoolwork. You know what? When Carly was younger she also did well on her schoolwork. Why does Carly do really well on her schoolwork?*

The description for the discontinuity condition was: *I know a girl named Carly. Carly does really well on her schoolwork. You know what? When Carly was younger she didn't do well on her schoolwork. Why does Carly do really well on her schoolwork?*

Following the description, participants in each condition were asked the same two questions. First, in an evaluation question adapted from Heyman & Dweck (1998), children were asked whether some people might lack the ability to achieve academic success: *Someone I talked to told me that he could just never learn to be good at math. Do you think he is right about this, wrong about this, or are you not sure?*

Second, a future success measure asked participants to identify the school subject that is most difficult for them, and to predict their level of future success in it: *School subjects are topics you study in school, like math, spelling, science, and art. What subject is the hardest for you at school? Do you think you'll ever be really good at [named subject]?*

Responses of yes were coded as 1, responses of no were coded as 0, and responses of maybe were coded as .5, following the practice of previous studies, in which essentialist beliefs are measured along a scale with clearly essentialist responses at one end, clearly anti-essentialist responses at the other end, and responses that express uncertainty located at the middle (Gelman et al., 2007).

3.2. Study 2 results and discussion

Preliminary analyses were conducted to examine the effect of participant sex and the sex of the character who was described in the priming manipulation. There was no significant interaction between these variables, and no significant effects of these variables on the key dependent measures, so they were excluded from subsequent analyses.

Two ANOVAs were conducted with Condition (continuity, discontinuity) as a between-participants factor. In the first ANOVA, the dependent measure was the response to the evaluation question, which indicated whether some people might lack the ability to achieve academic success. Results revealed a significant effect of Condition, with children in the continuity condition showing greater agreement with the notion that the character will never be good at math (1 child agreed that some people lack the ability to succeed, 17 responded they were not sure; and 14 disagreed; $M = .30$, $SD = .28$) than did children in the discontinuity condition (0 responses of right, 8 responses of not sure, 24 responses of wrong about lack of ability to achieve success; $M = .13$, $SD = .22$), $F(1, 62) = 6.46$, $p < .01$, $\eta^2 = .11$.

In the second ANOVA, the dependent measure was the response to the question about whether the participant would ever be really good at school subject that he or she identified as being the most difficult. Again, there was a significant effect of Condition, with children in the continuity condition less likely to predict eventual success (18 responses of yes, 9 of maybe, 5 of no; $M = .70$, $SD = .38$) than were children in the discontinuity condition (30 responses of yes, 1 of maybe, 1 of no), $M = .95$, $SD = .20$; $F(1, 62) = 11.05$, $p < .01$, $\eta^2 = .15$. Because the response options "yes," "maybe," and "no" are categorical data, Pearson chi-square analyses were conducted in which each response option was treated as a separate category. Outcomes were consistent with the ANOVA results such that the evaluation measure $\chi^2(2, N = 64) = 6.87$, $p < .05$, and the future success measure $\chi^2(2, N = 64) = 12.07$, $p < .01$, each varied with the continuity/discontinuity condition.

Although these differences were statistically significant, the descriptions led to only a small shift in children's reasoning about ability. Rather than shifting from one clear belief to a different belief, it appears that the default belief for most participants was that their own difficulties and the difficulties of others can be overcome, and this pattern of response was weaker among children in the continuity condition.

Children also were asked to identify the school subject that they found to be the most difficult. Math and natural science classes were identified by 61% of the participants as their most difficult subject; the next most common response was a social studies class (28% of participants). The identification of a math or natural science classes versus another type of class was not related to children's predictions of future success.

There was a sex difference in school subjects identified as most difficult: 79% of the girls identified a math or natural science class as their most difficult subject, but only 45% of boys did so, $\chi^2(1, N = 64) = 7.18, p < .01$. One possible reason for this difference is that children may accept the common sociocultural stereotype that boys are better than girls at math and science.

Age was not correlated with responses to the evaluation question (whether some people might lack the ability to achieve academic success) but it was significantly correlated with responses about level of future success in subjects that are perceived as difficult ($r = -.54, p < .01$). Specifically, older participants were less likely to report optimism about their own chances of being really good at the subject they identified as the most difficult. Notably, all six children who reported that they could never become really good at the subject were at least six months older than the mean age of the sample. Although this finding is based on only one measure and should be interpreted with caution, it is consistent with previous findings suggesting that when age-related changes are seen over the elementary school years, they tend to be in the direction of more essentialists reasoning among older children (see Kurtz-Costes et al., 2005).

4. Study 3

In Study 2, participants who were told about the continuity of another's performance showed higher scores for essentialist reasoning, as compared with participants who were told about the discontinuity of another's performance. However, it is possible that it was the reference to negative performance, rather than differences in the continuity of performance, that promoted essentialist beliefs. To rule out this possibility, and to explore how characterizations of successful performance might compare to characterizations of poor performance, Study 3 examined children's inferences after they heard about both high and low performers in continuity and discontinuity conditions. To maximize statistical power, within-participants comparisons were made. Dependent measures were adapted from those that showed sensitivity to labeling effects in Study 1. It was predicted that current level of performance would be viewed in more essentialist ways if it were described as a reflecting a continuation of earlier levels of performance, rather than a change in the level of performance (see Gelman et al., 2007, for related findings).

4.1. Study 3 method

4.1.1. Participants—Thirty-three elementary school students (mean age = 9 years, 6 months; range = 9y 0m to 10y 6m; 15 girls) from a southwestern coastal city in the U.S. participated. The sample was approximately 79% Anglo American, 9% Hispanic American, 9% Asian American, and 3% African American. Participants came from three schools that served primarily middle class communities.

4.1.2. Procedure—Participants were presented with four scenarios; information about both a character's past and present performance was presented in each scenario. Two of the scenarios

depicted positive current performance, while two depicted negative current performance. In two of the scenarios, present performance and past performance were the same, while in the other two scenarios past performance differed from current performance. This resulted in a 2 (Current Performance: positive, negative) by 2 (Continuity: yes, no) within-participants design. The four scenarios were presented in a random order to each participant. The characters in each of the scenarios heard by the child were either all boys or all girls, determined randomly. Within condition, names were randomly assigned to scenarios. The wording of the scenarios is as follows.

Current positive, continuity: *Nicholas does very well in school. He did very well even when he was little.*

Current positive, discontinuity: *Joshua does very well in school. When he was little he didn't do well in school at all.*

Current negative, continuity: *Tyler has a lot of trouble in school. He had a lot of trouble in school even when he was little.*

Current negative, discontinuity: *Michael has a lot of trouble in school. When he was little he did really well in school.*

After hearing each story, participants were asked a question about the *innateness* of the character's ability and a question about the *impact of effort* on the character's future success.

These questions were used because priming effects were found in Study 1 using similar essentialist questions. These questions were always asked in the same order. The two questions that were asked about the current positive, continuity condition scenario were:

Does Nicholas do well in school now because of the kind of brain he was born with?

Will Nicholas do well in school when he is older even if he doesn't try very hard?

When the character's current performance was described as poor, the participants were asked whether the character has "a lot of trouble in school now because of the kind of brain he [she] was born with," and whether he or she will "have a lot of trouble in school when he [she] is older even if he [she] tries very hard." For each question, the responses options were no, maybe, and yes (coded as 0, 0.5, and 1, respectively).

4.2. Study 3 results and discussion

ANOVAs for each of the two essentialist measures (innateness and impact of effort) were conducted separately. Preliminary analyses revealed no significant effects of participant sex, the sex of the character described in the scenarios, or interactions between these factors, thus they were excluded from subsequent analyses. In each of the two final ANOVAs, Current performance (positive, negative) and Continuity (yes, no) were included as within-participants factors. Means and standard deviations of the innateness and impact of effort measures for each Current Performance by Continuity group are presented in Table 1.

Analysis of responses about the innateness of the character's ability indicated that both main effects were significant, and that there was no significant interaction. As predicted, participants were more likely to consider abilities to be innate when there was continuity of performance, as opposed to discontinuity, $F(1, 32) = 19.18, p < .001, \eta^2 = .37$. In addition, participants were more likely to view the character's ability as innate when current performance was positive rather than poor, $F(1, 32) = 10.92, p < .01, \eta^2 = .25$. This effect is consistent with other evidence

that elementary school age children often reason in more essentialist ways about positive outcomes than negative outcomes (see Heyman & Giles, 2004).

Analysis of the impact of effort indicated that participants were less likely to believe that effort would increase one's level of ability when there was continuity of performance, $F(1, 32) = 4.53, p < .05, \eta^2 = .12$. These results suggest that when individuals make reference to the continuity of positive or negative performance over time it can encourage children to reason in more essentialist ways about the individual being described.

5. General discussion

The present research investigated the hypothesis that exposure to discourse about the performance of others can influence the way children in late elementary school reason about ability. Findings of Study 1 suggest that the use of ability-related labels to describe individuals who perform successfully encourages children to reason about abilities in an essentialist way. Specifically, when a story character that performed better than his/her classmates was labeled as a "math whiz" or a "spelling master," school age children were more likely to assume that the character was born with special ability and would continue to be successful without further practice or effort. These results are consistent with evidence from other domains that have found that category labels promote essentialist reasoning about ability (Gelman 2003; Gelman & Heyman, 1999; Markman, 1989). Perhaps such labels reify social categories (Rothbart & Taylor, 1992) and can imply that the category membership is stable and unchanging (Gelman, Coley, & Gottfried, 1994; Gelman & Wellman, 1991).

The results of Study 2 indicated that exposure to descriptions of previous difficulties encountered by high achievers, as compared to descriptions of previous successes, led participants to become relatively more optimistic about the prospect of overcoming their own academic difficulties and more likely to strongly reject the notion that someone might lack the ability to succeed in math. One possible explanation for these findings is that these descriptions primed naive theories about ability that are not typically primed (see Heyman & Compton, 2006; Heyman et al., 2003). Results of Study 3 indicated that reference to continuing negative performance as well as positive performance can promote essentialist reasoning. These findings help to rule out the possibility that differences in Study 2 resulted from the mere mention of negative performance and can be directly linked to references to continuity.

Children are likely to encounter messages in their classrooms that are similar to the manipulations that were used in the present research. For example, teachers may describe successful students with labels such as "bright" or "gifted," or point to students who have achieved success after a long struggle. Children who are exposed to these types of messages are likely to draw upon them as a source of information as they attempt to understand their own successes and failures, and form expectations about the future. For example, a child who hears that a peer's success in math is a consequence of being "gifted" may reason that her own lack of success is due to a lack of innate ability. Consequently, she may infer that trying harder or using new strategies would offer little benefit. In contrast, a child who learns that a peer's success in math follows a long period of struggle may reason that it sometimes takes time to overcome difficulties, and may consequently be more willing to engage in processes directed toward that end. However, these messages should not be viewed as simply pushing children toward one set of beliefs or another. Instead, it is more likely that children of this age are actively seeking out information that helps them make sense of the academic domain (Butler, 2005), and talk about other children is one of many potential sources they can draw upon. It is also important to note that there may be important individual differences in the extent to which children are likely to accept, question, or reinterpret achievement-relevant information (Hacking, 1995; Mehan, Hertweck, & Meihls, 1986; Molden & Dweck, 2006).

5.1. Relation to previous research

The present findings add to a growing body of evidence indicating that the extent to which children conceive of ability as a static versus a malleable quality is subject to social influence (Aronson, Fried, & Good, 2002; Blackwell et al., 2007; Good, Aronson, & Inzlicht, 2003; Heyman & Compton, 2006; Kamins & Dweck, 1999; Mueller & Dweck, 1998). For example, Good et al. (2003) found that seventh graders' math and reading scores improved after they were taught about the expandability of intelligence.

Findings from Study 1 also add to the literature on the role of labeling in children's social reasoning. There is substantial evidence that children often make negative inferences about individuals who have been described with labels that hold negative connotations, such as those relating to disability (Harris, Milich, Corbitt, Hoover, & Brady, 1992; Milich et al., 1992; Thelen, Burns, & Christiansen, 2003). The present research suggests that ostensibly positive labels can have negative implications as well. For example, children may assume that a classmate who has been described as a "math whiz" holds a special gift, which raises the question of who else might or might not have such a gift, and shifts attention away from the processes that are involved in developing skills. Mueller and Dweck (1998) made a similar critique of labeling children as "talented" or "gifted," arguing that such labeling may lead some children to "become overly concerned with justifying that label and less concerned with meeting challenges that enhance their skills" and to "react more poorly to setbacks because they worry that mistakes, confusions, or failures mean that they do not deserve to be labeled as gifted." (p. 50).

The present research demonstrated short-term effects of simple messages about the ability of others. Even short-term effects might have important implications for children's future achievement because they could affect motivation and decision making at important times, such as when children are taking placement tests or deciding whether to continue lessons or activities. A remaining question is whether real-world discourse might have longer-term effects on children's conceptions of ability. It would not be surprising if the same types of cues that elicit short-term effects on children's reasoning prove to underlie more long-term effects. Given that significant effects were detected in the presence of relatively subtle cues in the present research, it may be that even larger effects would be seen following extended exposure to overt and situationally-embedded statements about the nature of ability.

There were few age effects in the present research, despite the broad age range of participants in the first two studies. One notable exception was in Study 2, in which older children were less likely than younger children to accept the idea that they could eventually become "really good at" the school subject they had identified as the most challenging. These findings are generally consistent with findings that age-related differences in reasoning about ability are not always evident over the elementary school years (e.g., Cain & Dweck, 1995), but when they do appear they tend to be consistent with age-related increases in essentialist reasoning (e.g., Droege & Stipek, 1993; see Kurtz-Costes et al., 2005 for a review). Droege and Stipek (1993) asked children to identify the peers they considered to be "very smart" and "not too smart." Children were later asked about whether one of the children they labeled as "not too smart" could become as smart as one of the children they had labeled as "very smart." Results indicated that older children were less likely to endorse this possibility. Future work will be needed to determine why age-related changes have been seen in some studies and not in others. One possibility is that age-related changes are more easily detected when children are asked to reason about themselves or familiar others, versus being asked to reason about unfamiliar others, or answering more abstract questions about the nature of ability.

Among the participants in Study 2, girls were more likely than boys to indicate that a math or a natural science class was their most difficult subject. However, there were no effects of

achievement domain or participant sex on any of the primary dependant measures. In interpreting the lack of such effects it is important to note that there is prior work suggesting that sex, gender and achievement domain can be important for many aspects of children's reasoning about ability and competence. For example, there are sex differences in a number of achievement-related beliefs that sometimes interact with domain (see Hyde & Durik, 2005). If these factors had been made more salient to children, by personally involving them in achievement tasks within different domains for example, effects of or achievement domain on the primary dependent measures might have been seen (see Licht & Dweck, 1984).

5.2. Practical implications

One of the most fundamental questions in cognitive development is how children generalize what they learn. The present research builds on previous work suggesting that children sometimes draw inferences about the nature of ability in response to statements made by adults, even when the adult speaker has no intention to communicate these types of messages. For example, a teacher might say, in front of the entire class, "You have always been such an artist," to a student who has completed a successful project. The work of Mueller and Dweck (1998) suggests that this statement would be likely to have a negative effect on the student's reasoning about ability and his motivational response in the face of difficulty. The present work suggests that the comment is also likely to affect the other students in the class by encouraging them to believe that the student's achievement is a result of his innate ability in art, and perhaps even causing a subtle shift in how they reason about their own abilities. For example, such a message might cause them to question whether they are capable of succeeding when they run into difficulty, and divert their attention from what needs to be done to overcome obstacles (Dweck, 1999). Consequently, the present work suggests that when talking to children about others, the use of ability labels and discussion of the continuity of ability over time should be handled carefully.

The present work also suggests that children ages 8 to 12 are likely to benefit from exposure to examples of others who have shown academic improvement over time. Such benefits have been seen for college students: Wilson and Linville (1982) found that showing college freshmen videos that depicted upperclassmen describing their grades as improving since their freshmen year led to significant improvements in grade point averages the following year. It is perhaps not surprising that among children ages 8 to 12, who are actively struggling to make sense of their place in the academic world (see Butler, 2005), and who are having to make sense of substantial information related to achievement would be sensitive to cues about interpreting salient outcomes. People working with children might also employ other techniques to normalize periods of difficulty and confusion in learning, so that obstacles are seen as a normal part of the learning process, rather than as indicators of a lack of potential. For example, adults might point to specific examples of struggles they have had to go through before achieving success or highlight the fact it cannot be assumed that people are objective reporters of their own performance (Heyman, Fu, & Lee, 2007). One reason for this is because children have self-presentational motives to impress others, which often result in false claims. Such critiques can even be applied to well-known examples of child prodigies, such as Mozart, whose father (according to Gladwell, 2006) misrepresented the extent of his son's precociousness. Such discussions may be particularly helpful to children who hold unrealistically low assessments of their ability (see Phillips, 1987), and who may believe that they are the only ones having difficulty, that everyone else learns new things easily, or that people who are successful have never experienced significant failure.

5.3. Limitations and future research

It is important to acknowledge the limitations of the present work and to caution against overinterpreting the findings. Although it is possible that the repeated communication of certain

messages influences the development of relatively long-lasting beliefs about ability, there is no direct evidence that it does. Also, to create a controlled experimental design that allowed causal inferences to be drawn, children were presented with a small amount of information about the characters they were asked to reason about. Future research will be needed to determine how these results might apply to contexts in which the ability-related information is embedded in a broader social context, and how these results might relate to a broad array of well documented influences on children's developing understanding of ability and competence, including parental influences (see Pomerantz, Grolnick, & Price, 2005), peer influences (see Wentzel, 2005), and temperament factors (see Rothbart & Hwang, 2005). For example, it is well documented that parents' beliefs about their children's level of competence is related to children's beliefs about their own level of competence (see Pomerantz et al., 2005), but little is known about the impact of children's observations of parental discussions of the successes and failures of others. To explore such possibilities it will be important to use a range of research strategies, including the examination of the relation between children's reasoning about ability and how their parents discuss the ability and achievement-related outcomes of others.

Although the present research suggests that hearing ability-related descriptions of others can shape the way children reason about ability, efforts to promote more adaptive reasoning might not succeed unless they are part of broader efforts to create an educational system in which there is a greater focus on learning, understanding, and appreciating what is being learned, as opposed to emphasizing comparison and competition among students (see Covington, 2000). One problem is that if adults who work with children hold essentialist beliefs and stop expressing them in one way, they may continue to express them in other ways.

5.4. Conclusion

The present research provides evidence that when individuals use ability-related labels to describe the performance of others, they also may be teaching children about the nature of ability, without intending to do so. The findings suggest that people who work with children can help to promote adaptive achievement motivation by refraining from using labels to describe performance and by emphasizing examples of individuals who have overcome obstacles on their way to achieving success.

References

- Altermatt ER, Pomerantz EM, Ruble DN, Frey KS, Greulich FK. Predicting changes in children's self-perceptions of academic competence: A naturalistic examination of evaluative discourse among classmates. *Developmental Psychology* 2002;38:903–917. [PubMed: 12428703]
- Ames C, Archer J. Achievement goals in the classroom: Students' learning strategies and motivation processes. *Journal of Educational Psychology* 1988;80:260–267.
- Aronson J, Fried CB, Good C. Reducing the effects of stereotype threat on African American college students by shaping theories of intelligence. *Journal of Experimental Social Psychology* 2002;38:113–125.
- Bastian B, Haslam N. Psychological essentialism and stereotype endorsement. *Journal of Experimental Social Psychology* 2006;42:228–235.
- Bempechat J, London P, Dweck CS. Children's conceptions of ability in major domains: An interview and experimental study. *Child Study Journal* 1991;21:11–36.
- Blackwell L, Trzesniewski K, Dweck CS. Implicit theories of intelligence predict achievement across an adolescent transition: A longitudinal study and an intervention. *Child Development* 2007;78:246–263. [PubMed: 17328703]
- Butler R. Interest in the task and interest in peers' work in competitive and noncompetitive conditions: A developmental study. *Child Development* 1989;60:562–570.

- Butler, R. Competence assessment, competence, and motivation between early and middle childhood. In: Elliot, A.J.; Dweck, C., editors. *Handbook of competence and motivation*. New York: Guilford; 2005. p. 202-221.
- Cain K, Dweck CS. The development of children's achievement motivation patterns and conceptions of intelligence. *Merrill-Palmer Quarterly* 1995;41:25-52.
- Clark EV, Gelman SA, Lane NM. Compound nouns and category structure in young children. *Child Development* 1985;56:84-94.
- Covington MV. Goal theory, motivation, and school achievement: An integrative review. *Annual Review of Psychology* 2000;51:171-200.
- Droege KL, Stipek DJ. Children's use of dispositions to predict classmates' behavior. *Developmental Psychology* 1993;29:646-654.
- Dweck, CS. *Self-theories: Their role in motivation, personality, and development*. Philadelphia, PA: Psychology Press/Taylor & Francis; 1999.
- Elliott ES, Dweck CS. Goals: An approach to motivation and achievement. *Journal of Personality and Social Psychology* 1988;54:5-12. [PubMed: 3346808]
- Frey KS, Ruble DN. What children say when the teacher is not around: Conflicting goals in social comparison and performance assessment in the classroom. *Journal of Personality and Social Psychology* 1985;48:550-562. [PubMed: 3989661]
- Gelman, SA. *The essential child: Origins of essentialism in everyday thought*. New York: Oxford; 2003.
- Gelman, SA.; Coley, .; Gottfried, GM. Essentialist beliefs in children: The acquisition of concepts and theories. In: Hirschfeld, L.; Gelman, S., editors. *Mapping the mind: Domain specificity in cognition and culture*. New York: Cambridge University Press; 1994. p. 341-365.
- Gelman SA, Heyman GD. Carrot-eaters and creature-believers: The effects of lexicalization on children's inferences about social categories. *Psychological Science* 1999;10:489-493.
- Gelman SA, Heyman GD, Legare CH. Developmental changes in the coherence of essentialist beliefs about psychological characteristics. *Child Development* 2007;78:757-774. [PubMed: 17517003]
- Gelman SA, Wellman HM. Insides and essences: Early understandings of the nonobvious. *Cognition* 1991;38:213-244. [PubMed: 2060270]
- Gladwell, M. *Behavior in the blink of an eye*. Paper presented at the annual meeting of the Association for Psychological Science; New York. 2006 May.
- Good C, Aronson J, Inzlicht M. Improving adolescents' standardized test performance: An intervention to reduce the effects of stereotype threat. *Journal of Applied Developmental Psychology* 2003;24:645-662.
- Grant H, Dweck CS. Clarifying achievement goals and their impact. *Journal of Personality & Social Psychology* 2003;85:541-553. [PubMed: 14498789]
- Hacking, I. The looping effects of human kinds. In: Sperber, D.; Premack, D.; Premack, A.J., editors. *Causal cognition: A multidisciplinary debate*. New York: Clarendon Press/Oxford University Press; 1995. p. 351-394.
- Hall DG, Moore CE. Red bluebirds and black greenflies: Preschoolers' understanding of the semantics of adjectives and count nouns. *Journal of Experimental Child Psychology* 1997;67:236-267. [PubMed: 9388808]
- Harris MJ, Milich R, Corbitt EM, Hoover DW, Brady M. Self-fulfilling effects of stigmatizing information on children's social interactions. *Journal of Personality and Social Psychology* 1992;63:41-50. [PubMed: 1494984]
- Heyman GD, Compton BJ. Context sensitivity in children's reasoning about ability across the elementary school years. *Developmental Science* 2006;9:616-627. [PubMed: 17059459]
- Heyman GD, Diesendruck G. The Spanish ser/estar distinction in bilingual children's reasoning about human psychological characteristics. *Developmental Psychology* 2002;38:407-417. [PubMed: 12005383]
- Heyman GD, Dweck CS. Children's thinking about traits: Implications for judgments of the self and others. *Child Development* 1998;69:391-403. [PubMed: 9586214]
- Heyman GD, Dweck CS, Cain KM. Young children's vulnerability to self-blame and helplessness: Relationship to beliefs about goodness. *Child Development* 1992;63:401-415. [PubMed: 1611943]

- Heyman GD, Fu G, Lee K. Evaluating claims people make about themselves: The development of skepticism. *Child Development* 2007;78:367–375. [PubMed: 17381778]
- Heyman GD, Gee CL, Giles JW. Preschool children's reasoning about ability. *Child Development* 2003;74:516–534. [PubMed: 12705570]
- Heyman GD, Gelman SA. Beliefs about the origins of human psychological traits. *Developmental Psychology* 2000;36:663–678. [PubMed: 10976605]
- Heyman GD, Giles JW. Valence effects in reasoning about evaluative traits. *Merrill-Palmer Quarterly* 2004;50:86–109.
- Hyde, JS.; Durik, AM. Gender, competence, and motivation. In: Elliot, AJ.; Dweck, CS., editors. *Handbook of competence and motivation*. New York: Guilford; 2005. p. 375-391.
- Kamins ML, Dweck CS. Person versus process praise and criticism: Implications for contingent self-worth and coping. *Developmental Psychology* 1999;35:835–847. [PubMed: 10380873]
- Kurtz-Costes B, McCall RJ, Kinlaw CR, Wiesen CA, Joyner MH. What does it mean to be smart? The development of children's beliefs about intelligence in Germany and the United States. *Journal of Applied Developmental Psychology* 2005;26:217–233.
- Licht BG, Dweck CS. Determinants of academic achievement: The interaction of children's achievement orientations with skill area. *Developmental Psychology* 1984;20:628–636.
- Mahalingam R. Essentialism, culture, and power: Representations of social class. *Journal of Social Issues* 2003;59:733–749.
- Markman, EM. Categorization and naming in children: Problems of induction. Cambridge, MA: MIT Press; 1989.
- Mehan, H.; Hertweck, A.; Meihls, JL. Handicapping the handicapped: Decision making in students' educational careers. Stanford, CA: Stanford University Press; 1986.
- Milich R, McAnich CB, Harris MJ. Effects of stigmatizing information on children's peer relations: Believing is seeing. *School Psychology Review* 1992;21:400–409.
- Molden DC, Dweck CS. Finding "meaning" in psychology: A lay theories approach to self-regulation, social perception, and social development. *American Psychologist* 2006;61:192–203. [PubMed: 16594836]
- Mueller C, Dweck CS. Praise for intelligence can undermine children's motivation and performance. *Journal of Personality and Social Psychology* 1998;75:33–52. [PubMed: 9686450]
- Nicholls JG. The development of the concepts of effort and ability, perception of academic attainment, and the understanding that difficult tasks require more ability. *Child Development* 1978;49:800–814.
- Phillips DA. Socialization of perceived academic competence among highly competent children. *Child Development* 1987;58:1308–1320. [PubMed: 3665647]
- Pomerantz, EM.; Grolnick, WS.; Price, CA. The role of parents in how children approach achievement: A dynamic process perspective. In: Elliot, AJ.; Dweck, CS., editors. *Handbook of competence and motivation*. New York: Guilford; 2005. p. 259-278.
- Rosenholtz SJ, Simpson C. The formation of ability conceptions: Developmental trend or social construction? *Review of Educational Research* 1984;54:31–63.
- Rothbart, MK.; Hwang, J. Temperament and the development of competence and motivation. In: Elliot, AJ.; Dweck, CS., editors. *Handbook of competence and motivation*. New York: Guilford Press; 2005. p. 167-184.
- Rothbart, M.; Taylor, M. Category labels and social reality: Do we view social categories as natural kinds?. In: Semin, S.; Fiedler, K., editors. *Language, interaction and social cognition*. London: Sage; 1992. p. 11-36.
- Smiley PA, Dweck CS. Individual differences in achievement goals among young children. *Child Development* 1994;65:1723–1743. [PubMed: 7859551]
- Thelen RL, Burns MK, Christiansen ND. Effects of high-incidence disability labels on the expectations of teachers, peers, and college students. *Ethical Human Sciences and Services* 2003;5:183–193.
- Waxman, SR. The dubbing ceremony revisited: Object naming and categorization in infancy and early childhood. In: Medin, DL.; Atran, S., editors. *Folkbiology*. Cambridge, MA: MIT Press; 1999. p. 233-284.

- Wentzel, KR. Peer relationships, motivation, and academic performance at school. In: Elliot, AJ.; Dweck, CS., editors. *Handbook of competence and motivation*. New York: Guilford; 2005. p. 279-296.
- Wilson TD, Linville PW. Improving the academic performance of college freshmen: Attribution therapy revisited. *Journal of Personality and Social Psychology* 1982;42:367–376.
- Yussen, SR.; Kane, PT. Children's conception of intelligence. In: Yussen, SR., editor. *The growth of reflection in children*. Orlando, FL: Academic Press; 1985. p. 207-241.

Acknowledgment

This research was supported by R01 HD048962 from NICHD. The author is grateful to Brian Compton, Alicia Coggins, Richmond Pagaduan, and Monica Sweet for comments on the manuscript.

Table 1Mean (*SD*) innateness scores and impact of effort scores from Study 3.

Current performance	Continuity	
	Yes	No
	Innateness	
Positive	.73 (.38)	.41 (.42)
Negative	.53 (.41)	.26 (.31)
	Impact of Effort	
Positive	.36 (.34)	.21 (.31)
Negative	.42 (.40)	.35 (.34)

Note. For each measure, greater values correspond to stronger endorsement of essentialist reasoning. Innateness scores ranged from 0 = least innate to 1 = most innate, and impact of effort scores ranged from 0 = most affected by effort to 1 = least affected by effort.