

# A Bias for the Natural? Children's Beliefs About Traits Acquired Through Effort, Bribes, or Medicine

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Three studies compared beliefs about natural and late blooming positive traits with those acquired through personal effort, extrinsic rewards or medicine. Young children (5–6 years), older children (8–13 years), and adults all showed a strong bias for natural and late blooming traits over acquired traits. All age groups, except 8- to 10-year-olds, treated natural and late-blooming traits as fixed essences that would persist over time and under challenging conditions. Older children and adults viewed traits acquired by intrinsic effort as more similar to natural and late-blooming traits than those acquired through bribes or medicine, suggesting that intrinsic effort itself comes to be seen as a more natural mechanism of change. A bias for the natural may therefore be an early emerging way of evaluating others that is reinforced by the ambient culture and becomes stronger with increasing age.

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Traits, or consistent characteristics that distinguish one person from another, help shape our perceptions of the self and others. Even young children make trait inferences and use this information to guide their social interactions (Heyman & Gelman, 1999). At an early age, children are also sensitive to differences in trait expression, that is, that some people are more intelligent and kinder than others (Butler, 1998). Preschoolers, for example, are able to infer that a person who finds a task easy is smarter than someone who finds a task hard (Heyman, Gee, & Giles, 2003).

People who seem to easily express positive traits that emerge during the developing period are often referred to as “naturals.” A “natural” can describe someone who appears to easily exhibit not only specific talents (a natural athlete) but also desirable personality characteristics (someone who is naturally outgoing or intelligent) or physical attributes (a natural beauty). People are generally attracted to entities described as “natural” (Rozin, 2005), and in the United States, people may value natural positive traits more than positive characteristics acquired through hard work or bio-

logical interventions. For example, in college admissions, a greater emphasis placed on SAT scores over grade point averages may reflect a preference for natural over achieved academic skills (Gladwell, 2008).

How might a preference for natural positive traits influence our views of the self and others? In some situations, this preference can bias adults' evaluations of performance. Although exposed to identical pieces of music, participants rate the performance of the “natural” musician more highly than that of “the striver,” someone who is described as acquiring musical skill through hard work (Tsay & Banaji, 2011).

A preference for natural traits might also bias our judgments in other ways. Believing naturals have an advantage in competitive situations, we might reduce the amount of effort we are willing to put forth to produce positive changes in ourselves. Having an entity, or fixed view of traits, discourages people from trying to improve under conditions of failure (Dweck, 2007). For example, if you believe only the naturally smart can achieve at a certain level and you are not a “natural,” you might think attempts to improve yourself are wasted effort.

In valuing the natural, we might also discount the accomplishments of people who work hard or take medication in order to acquire skills or physical traits; we may see their achievements as inauthentic or unlikely to last (Chang, Arkin, Leong, Chan, & Leung, 2004; Miller & Aloise, 1990). By focusing on natural positive traits, we may overestimate the extent to which individual differences are due to inherent factors as opposed to effort, opportunity, or just plain luck. Indeed, some argue that natural talent is a misguided explanation of highly talented youth even though the notion may be deeply embedded in folk psychology (Ericsson, Krampe, & Tesch-Römer, 1993; Howe, Davidson, & Sloboda, 1998).

Our studies focus not on whether natural talent is “real” but, rather, on our beliefs about natural positive traits. We ask whether children, as well as adults, prefer people who exhibit positive traits

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naturally over those who develop positive traits through other means. Moreover, if a bias for natural traits does exist, does it emerge early as a foundational framing principle, or does it only develop gradually with exposure to cultural values, similar to how an awareness of many broadly held stereotypes, such as those for racial out-groups, arises during middle childhood (Pauker, Ambady, & Apfelbaum, 2010)? Finally, we ask whether positive changes brought about through internal processes, such as intrinsic effort and a natural late blooming, are seen as preferable, stronger and more persistent than those arising through more external means, such as medicine or bribes.

We expect that children's general positivity bias might propel even 5-year-olds to favor natural positive traits. Children make more positive attributions about others and pay more attention to successes than failures (Boseovski, 2010; Boseovski, Shallwani, & Lee, 2009). Thus, children might be particularly aware of those who exhibit positive traits easily and early. Our motivation to maintain a consistent sense of self also may contribute to a preference for natural positive traits (Swann, Rentfrow, & Guinn, 2002). Both children and adults perceive early-occurring positive traits as highly stable over time (Heyman & Giles, 2004; Lockhart, Chang, & Story, 2002). Positive traits provide a sense of self-continuity across development and aging, as well as an optimistic view of the future. Indeed, all ages believe that positive traits are unlikely to change toward the negative, even when desired, such as the boy who wishes he were not so smart so he would not have to worry about world problems (Heyman & Giles, 2004).

A view of early developing positive traits as highly stable may be linked to psychological essentialism, namely, the bias to assume that certain categories are organized around fixed, causally central features that provide a powerful platform for induction (Keil, 1989; Medin & Ortony, 1989). Young children attribute stable surface properties to fixed, underlying essences both in their reasoning about kinds, such as race and gender, and individual traits, such as aggression and shyness (Gelman, 2003; Gelman, Heyman, & Legare, 2007). Although young children's essentialist beliefs are less coherent than those of adults, by third grade, they have started to develop an integrated model of how the different facets of essentialism, such as stability, innateness, and different biological factors, are interrelated (Gelman et al., 2007). Early emerging traits may be more likely to be essentialized, since "being born with" a characteristic is a consistent early predictor of endorsing essentialist factors (Gelman et al., 2007). Moreover, adults essentialize desirable traits more than negative ones, particularly those that are central to a person's identity (Haslam & Whelan, 2008). In short, early emerging positive traits might be particularly likely to be viewed as biologically fixed and inherent. Indeed, here we define a natural bias as the tendency to prefer positive traits that seem easily expressed and appear to emerge from pre-existing internal, stable, and congenital causes.

A preference for positive natural traits might reflect not only a biological but also a moral imperative, particularly in Western cultures. The idea of God-given natural talents is embedded in Christian theology. The "Parable of the Talents" (Matthew 25:14–30) suggests that God-given abilities should be not be hidden but used to their fullest extent. Natural positive traits are seen as a person's reason for being and as an essential part of the person, shaped not by genes but by a supreme being. In a world where humans constantly seek to uncover "intention" (Kelemen & Di-

Yanni, 2005; Newman, Keil, Kulhmeier, & Wynn, 2010), natural traits might be seen as part of a grand design.

A greater emphasis on natural positive traits relative to acquired traits might be especially strong in cultures where behavior is seen as primarily determined by unique internal attributes (Markus & Kitayama, 1991). For example, in the United States, parents are more likely to attribute excellence to inborn or natural abilities rather than to effort (Holloway, 1988). Indeed, a bias for the natural might become stronger with age in response to such cultural factors.

Our beliefs about the changeability of undesirable traits might also shape our preferences for natural positive traits. Young children are optimistic about negative traits changing in a positive direction over development and aging (Diesendruck & Lindenbaum, 2009; Lockhart, Nakashima, Inagaki, & Keil, 2008). Adults are more likely than children to believe that negative traits will remain relatively stable, particularly those with a biological substrate. Although adults do maintain some degree of optimism about positive change, they think a person's "true" nature will sometimes reappear, implying that an acquired positive trait may be less persistent than a natural one (Lockhart et al., 2008). Moreover, children and adults believe any positive changes that do occur over development will not match the level of trait expression found in natural positive traits. Thus, they think an individual who was unintelligent early on can become smarter as she matures but will not be as smart as someone who always exhibited a high degree of intelligence, suggesting a bias for natural positive traits (Lockhart et al., 2008).

This difference in judgments about natural and acquired positive trait expression may also reflect our beliefs about mechanisms of change. Positive changes that occur through intrinsic effort are generally approved by our culture (Levine, 1999), perhaps because effortfulness itself can be seen as a natural part of the person, that is, as an intrinsic trait. Through books such as *The Little Engine That Could* (Piper, 1961), children are taught that effort and determination are the means through which significant transformations can occur. Although hard work does not always produce positive changes (Schuman, Walsh, Olson, & Etheridge, 1985), most people believe that a person who exerts effort to improve deficits should be rewarded (Nicholls, 1978). Initially, children believe that the best at a task also work the hardest, but by 8 to 10 years of age, children realize that these two are not always related and that a person with less ability must exert more effort to attain the same level of achievement (Folmer et al., 2008; Nicholls, 1978). Even then, elementary school children highly value hard workers, which is reinforced by teachers and parents (Juvonen & Murdock, 1995). By junior high, effort begins to be devalued as inborn abilities are seen as constraining the changes effort can bring (Harari & Covington, 1981), and changes brought about by effort may be viewed as less long lasting. Folk notions of ego depletion—that we are limited in our ability to exert effortful control over our behavior (Baumeister & Tierney, 2011)—may contribute to such views. A boy with attention deficit disorder may work hard to focus but when stressed or overtired, we may believe his inherent inattentiveness will resurface due to cognitive depletion. Thus, culturally we may value the "hard-worker," but with increasing age, we may view the products of such efforts as more constrained and fragile, resulting in a stronger natural bias.

We may also prefer people who exhibit natural positive traits to those who acquire them through biological interventions. The biological augmentation of traits makes us uneasy as evidenced by controversies over steroid use by athletes and by concerns that antidepressant medication might result in personality cosmetology (Kramer, 1993; Svenaeus, 2009). Adults view the use of performance-enhancing drugs as wrong (Caplan & Elliott, 2004; Sabini & Monterosso, 2005). Traits modified through biological means may be objectionable not only because they undermine the importance of human effort and are seen as offering unfair advantages but also because they represent a kind of “unnatural” human act to remake ourselves—to change our “natural” essence (Sandel, 2004). For example, people are particularly reluctant to change traits through biological means that are more central to identity than those that are peripheral (Riis, Simmons, & Goodwin, 2008). Indeed, we seem to only reward and approve of transformations that fit within our concept of “natural,” even when they involve effort. People whose efforts are shaped by extrinsic reinforcement are more likely to be devalued than people whose efforts are intrinsically motivated (Godfrey & Lowe, 1975), perhaps because the effort is not seen as natural. This devaluation of characteristics acquired through forced effort relative to natural means may occur early in development, since children as young as five use the discounting principle when external causal factors are salient (Kassin & Gibbons, 1981; Miller & Aloise, 1990). If we think a person is striving to change in order to gain an external reward, we may view any positive changes as less authentic and less enduring.

### The Present Studies

Here we ask if natural traits, as opposed to those acquired through medicine, bribes, or effort, are perceived as being expressed more strongly and more persistently over time and if natural traits influence interpersonal preferences. Although we expect this bias to become stronger with age through socialization and a more sophisticated understanding of trait origins, we predict even young children will show a preference for natural positive traits. Because both ability and effort are valued by United States culture, we expect positive traits arising from internal sources (i.e., congenital factors or intrinsic effort) to be preferred over those acquired through external influences (i.e., medicine or bribes). Also, although we predict effort will be viewed as a more natural mechanism of change, we hypothesize that with increasing age, positive traits acquired through effort will also be perceived as more fragile than natural traits and less likely to persist under challenging conditions. Finally, we hypothesize that “late-blooming” natural traits that emerge later in development will be viewed similarly to early emerging natural traits.

#### Study 1: Natural Versus Acquired Positive Traits

Study 1 compared children’s and adults’ beliefs about natural and acquired positive traits with respect to the strength and persistence of trait expression. In order to investigate a preference for natural traits, we also asked participants if they would be more likely to befriend and reward naturals. Although we expected the bias to become stronger with age, we hypothesized that even young children would favor natural traits over acquired positive traits. Since essentialist thinking can be found even in preschoolers

(Gelman, 2003), we predicted that all age groups would expect natural traits to be expressed more strongly and persistently. If a bias for the natural also plays a role in interpersonal preferences, we expected it to be apparent in friendship choices. Finally, since even preschool children have some notions of fairness (Killen, Pisacane, Lee-Kim, & Ardila-Rey, 2001), we hypothesized that participants would discount the merit of traits that appear through biological interventions and bribes and would be less likely to reward or favor them than traits acquired through more authentic means, such as intrinsic effort.

### Method

**Participants.** Fifty-four 5- to 6-year-old children (29 females;  $M_{\text{age}} = 6:2$ ; age range: 5:2–6:11), fifty-four 8- to 10-year-old children (26 females;  $M_{\text{age}} = 9:1$ ; age range: 8:0–10:11), sixty 11- to 13-year-old children (31 females;  $M_{\text{age}} = 12:1$ ; age range: 11–13:5), and 90 adults (45 females;  $M_{\text{age}} = 22:6$ ; age range: 18–55) participated in the study. The children were recruited from rural elementary and middle schools in Connecticut with a median family income of \$61,000. The child sample included 90% European American children, 5% African American children, 1% Latino American children, and 4% Asian American children. The adults were university students and staff whose ethnicity was 74% European American, 14% Asian American, 7% African American, 4% Latino American, and 1% “other.”

#### Stimuli.

**Types of traits.** Six traits judged by a panel of adults to be desirable and capable of being modified by medicine were used in the study: cheerfulness, nonaggressiveness, intelligence, bravery, attractiveness, and height. These traits had been used in previous studies examining trait change (Lockhart et al., 2008).

**Stories.** Six short stories were constructed such that each contained two characters. In each story, one character naturally displayed the desirable trait at ages 5 and 10 (in order to clarify that the behavior was characteristic of the person and not a temporary state), and a second character displayed the opposite, undesirable trait at the same ages. The second character was then described as acquiring the desirable trait from 10 to 18 years of age, either through (a) *Effort* (intrinsic effort): the character worked hard to enhance the undesirable trait; (b) *Bribe* (extrinsic effort): the parents wanted the character to change and rewarded the character with money for working hard to change the trait in the desired direction, or (c) *Medicine* (biological intervention): the character took medicine to enhance the trait.

At age 18, both characters were described as possessing the desirable trait to the *exact same extent*. Participants were then asked which character (showing either the natural or acquired trait) (a) would express the desirable trait “just a bit” more strongly at age 18, even though they were essentially the same in trait expression (*Strength*); (b) should be more highly rewarded at age 18 (*Reward*); (c) would they want most as a friend (*Friend*); and (d) would express the desirable trait most strongly at age 40 (*Persistence*).

To assess whether participants believed a change actually had occurred, they were asked to judge on a 5-point scale (1 = *the same* to 5 = *very different*) how much the character in each acquired trait story was different, as judged by friends who knew them at ages 5 and 10. The gender of the characters in the stories

always matched the gender of the participant (see Appendix A in the online supplemental materials for a story example).

**Procedure.** Each participant was told the six different stories in a random order. Each participant heard two stories of each type of intervention counterbalanced over three groups; that is, two stories in which the trait was changed through intrinsic effort, two stories in which medicine was used to effect the change, and two stories in which bribes were used to motivate the person to use effort to change. A set of drawings accompanied the stories (see Appendix B in the online supplemental materials for an example).

Each child was interviewed individually in a quiet place for 20 to 40 min. Junior high participants and adults received the stories in a questionnaire format in a group setting. Participants were asked to justify their answers to questions about the strength, rewarding and persistence of traits.

**Scoring.** Responses favoring the natural trait were scored 1, and those favoring the acquired trait were scored 0. In all analyses, higher scores indicated a greater preference for natural positive traits over acquired traits. Total score for an individual ranged from 0 to 24, reflecting four judgments for each of six stories. For each Question  $\times$  Intervention type, mean scores ranged from 0 to 2, reflecting that every participant received two stories for each intervention.

All justifications for natural responses were judged by two independent scorers as falling into one of five categories: *Natural* (e.g., Born or naturally that way; Things natural are always best); *No intervention needed* (e.g., Natural was expressed without any intervention); *Continuity* (e.g., Natural always has been the best); *Fleeting, toxic or inauthentic change through intervention* (e.g., Person with the acquired trait is a “fake” or a “cheater”; Person with acquired trait will regress; or Intervention over time will

produce harm); and *Miscellaneous* (e.g., It’s all in their genes; Natural has had more experience over time).

Justifications for responses favoring acquired traits were judged as falling into one of the following five categories: *Worked hard* (e.g., Put forth effort to change, even by taking medicine); *Negative change in natural* (e.g., Natural can fade with time; Natural will be lazy and won’t work to maintain); *Efficacy of medicine* (e.g., Medicine cured; Person continued to take medicine or it continued to work); *Money as motivator* (e.g., Money is a powerful incentive; People can do anything if paid enough); and *Miscellaneous* (e.g., Person who worked hard can deal better with adversity; Other person’s turn to be best).

Justifications that were missing, reiterations of the story, or “do not know” responses were dropped from the analysis. Inter-rater reliability for justifications was 92% for natural responses ( $\kappa = .895$ ) and 96% for acquired responses ( $\kappa = .939$ ); disagreements in scoring were resolved by discussion.

**Results**

Table 1 shows the means scores and standard deviations for each age group by Question (strength, reward, friend, persistence) and Intervention Type (effort, bribe, or medicine).

**Natural versus acquired positive traits.** As predicted, one sample *t* tests, using participants’ total scores (0–24), revealed an overall above-chance preference for natural traits over acquired traits at all ages (5–6 years  $M = 15.15$ ,  $SD = 5.27$ ; 8–10 years  $M = 14.46$ ,  $SD = 4.96$ ; 11–13 years  $M = 17.23$ ,  $SD = 4.0$ ; adults  $M = 17.24$ ,  $SD = 3.3$ ), all  $t(53, 53, 59, 89) \geq 3.65$ ,  $p < .001$ , test value = 12. In order to further examine participants’ preferences for natural traits over acquired traits, one-sample *t* tests, using

Table 1  
Mean Natural Scores by Age, Questions, and Interventions

Question	Intervention	Age group								Total	
		5 to 6 years (n = 54)		8 to 10 years (n = 54)		11 to 13 years (n = 60)		College (n = 90)		(n = 258)	
		M	SD	M	SD	M	SD	M	SD	M	SD
Strength	Effort	1.43	0.74***	1.26	0.73*	1.35	0.68***	1.43	0.69***	1.38	0.71***
	Bribe	1.20	0.79†	1.53	0.69***	1.67	0.54***	1.66	0.54***	1.53	0.65***
	Medicine	1.44	0.74***	1.65	0.62***	1.64	0.53***	1.47	0.65***	1.54	0.64***
	Mean total	1.36	0.56***	1.47	0.45***	1.55	0.38***	1.52	0.40***	1.48	0.45***
Reward	Effort	1.19	0.77†	0.67	0.78**	1.05	0.77	0.99	0.71	0.98	0.77
	Bribe	1.09	0.81	1.41	0.79***	1.65	0.58***	1.49	0.66***	1.43	0.73***
	Medicine	1.31	0.82**	1.56	0.77***	1.70	0.56***	1.47	0.64***	1.51	0.70***
	Mean total	1.20	0.64**	1.21	0.56**	1.47	0.49***	1.31	0.44***	1.30	0.53***
Friend	Effort	1.18	0.75†	0.85	0.74	1.04	0.76	1.14	0.70†	1.07	0.74
	Bribe	1.09	0.81	1.37	0.73**	1.65	0.63***	1.73	0.51***	1.50	0.70***
	Medicine	1.22	0.79*	1.24	0.70*	1.69	0.62***	1.66	0.58***	1.49	0.70***
	Mean total	1.16	0.58*	1.15	0.45*	1.46	0.48***	1.51	0.40***	1.35	0.49***
Persistence	Effort	1.26	0.85*	0.70	0.74**	0.96	0.74	1.18	0.71*	1.05	0.78
	Bribe	1.33	0.75**	1.28	0.83*	1.61	0.66***	1.59	0.56***	1.48	0.70***
	Medicine	1.31	0.75**	0.91	0.83	1.22	0.72*	1.40	0.65***	1.24	0.75***
	Mean total	1.30	0.59***	0.96	0.62	1.26	0.51***	1.39	0.41***	1.25	0.54***
Mean total	Effort	1.26	0.53**	0.87	0.56	1.10	0.51	1.19	0.44***	1.12	0.52***
	Bribe	1.18	0.59*	1.39	0.55***	1.64	0.37***	1.61	0.37***	1.48	0.50***
	Medicine	1.32	0.57***	1.34	0.49***	1.56	0.41***	1.50	0.41***	1.44	0.47***
	Mean total	1.25	0.45***	1.20	0.41**	1.44	0.33***	1.43	0.27***		

Note. Range of scores = 0 to 2, with higher scores favoring the natural. One-sample *t* test (test value = 1).  
 †  $p < .10$ . \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

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participants' total scores (0–2) for each intervention within each question, were conducted against a test value of 1.

**Strength.** Overall, all ages believed that natural positive traits would be a bit more strongly expressed than acquired traits, see Table 1, all  $t(53, 53, 59, 89) \geq 4.66, p < .001$ . Broken down by type of intervention, all ages believed natural traits would be more strongly expressed than positive traits acquired by effort or by medicine, all  $t(53, 53, 59, 89) \geq 2.60, p < .012$ . All participants, except 5- to 6-year-olds, also believed natural positive traits would be more strongly expressed than traits acquired through bribed effort, all  $t(53, 59, 89) \geq 5.49, p < .001$ .

**Reward.** All ages overall believed natural positive traits should be rewarded more than acquired positive traits, see Table 1, all  $t(53, 53, 59, 89) \geq 2.29, p < .026$ . By type of intervention, all ages were more likely to reward natural traits than those acquired by medicine, all  $t(53, 53, 59, 89) \geq 2.82, p < .007$ . All participants, except for the 5- to 6-year-olds, also believed natural positive traits should be rewarded more than traits acquired through bribed effort, all  $t(53, 59, 89) \geq 3.79, p < .001$ . Participants did not distinguish between rewards given to natural positive traits and those acquired through intrinsic effort, except for 8- to 10-year-olds, who believed effort-acquired traits should receive greater rewards,  $t(53) = -3.15, p = .003$ .

**Friend.** Overall, all ages desired to befriend people expressing natural positive traits more than those who acquired positive traits (see Table 1), all  $t(53, 53, 59, 89) \geq 2.09, p < .041$ . By type of intervention, all age groups were more likely to befriend naturals than characters who acquired positive traits through medicine, all  $t(53, 53, 59, 89) \geq 2.06, p < .044$ . All participants, except 5- to 6-year-olds, also desired to be friends with naturals more than those who acquired traits by being bribed, all  $t(53, 59, 89) \geq 3.71, p < .001$ . Generally, participants did not distinguish between natural positive traits and those acquired by effort with respect to friendship choices, although there was a tendency for the youngest and oldest participants to prefer the natural, all  $t(53, 89) \geq 1.73, p > .053, p < .089$ .

**Persistence.** All ages, with the exception of 8- to 10-year-olds, believed that natural traits overall would be more likely to persist over aging than acquired traits (see Table 1), all  $t(53, 59, 89) \geq 3.76, p < .001$ . By type of intervention, all ages thought natural traits would persist more over aging than traits acquired by bribes, all  $t(53, 53, 59, 89) \geq 2.49, p < .018$ . Except for 8- to 10-year-olds, participants also believed natural traits would be more likely to persist than those acquired by medicine, all  $t(53, 59, 89) \geq 2.44, p < .018$ . The youngest and oldest participants believed traits acquired by effort would be less likely to persist than natural traits, both  $t(53, 89) \geq 2.24, p < .029$ ; 8- to 10-year-olds, on the other hand, believed that traits acquired by effort would be more likely to persist,  $t(53) = -2.93, p = .005$ .

**Differences between age groups, interventions, and questions.** Given that natural traits were preferred at above chance levels, a repeated-measures analysis of variance (ANOVA) with Age as a between-subjects factor and Question and Intervention Type as within-subject factors was conducted to explore differences between age groups, interventions, and questions. Supporting our hypothesis that a bias for the natural would increase with age, 11- to 13-year-old children and adults were more likely than the two groups of younger children to favor natural traits in their responses (see Table 1),  $F(3, 254) = 7.05, p < .001$ , Bonferroni,  $p < .05$ . As predicted, participants overall were more likely to favor traits acquired by effort than traits

acquired by bribes or medicine (see Table 1),  $F(2, 508) = 65.35, p < .001$ , Bonferroni,  $p < .05$ . The youngest children did not differentiate among the methods of trait acquisition, whereas all other ages favored traits acquired by intrinsic effort over traits acquired by other means (see Table 1),  $F(6, 508) = 8.76, p < .001$ , Bonferroni,  $p < .05$ .

Overall, participants were more likely to give natural responses to the strength question than to the other three questions (see Table 1),  $F(3, 762) = 17.94, p < .001$ , Bonferroni,  $p < .05$ . A significant Question  $\times$  Grade interaction revealed 8- to 10-year-olds and 11- to 13-year-olds were more likely to give natural responses to the strength question than the persistence question (see Table 1),  $F(9, 762) = 4.62, p < .001$ , Bonferroni,  $p < .05$ . A significant Question  $\times$  Intervention interaction,  $F(6, 1524) = 9.93, p < .001$ , showed that when considering effort as an intervention, participants were most likely to give natural responses to the strength question, and when considering medicine, participants were least likely to give natural responses to the persistence question (see Table 1, Bonferroni,  $p < .05$ ).

**Differences between specific traits.** At all ages, participants gave natural responses at above chance levels to questions about all traits, with the exception of 5- to 6-year-olds' responses to intelligence ( $p = .09$ ), and 8- to 10-year-olds' responses to bravery ( $ns$ ) and height ( $p = .09$ ); binomial, two-tailed, all  $p < .05$ . Percentage of natural responses by 5- to 6-, 8- to 10-, 11- to 13-year-olds, and Adults, were, respectively: Attractive—63%, 58%, 68%, 74%; Brave—59%, 54%, 67%, 68%; Cheerful—66%, 67%, 75%, 85%; Height—61%, 56%, 74%, 69%; Intelligent—56%, 57%, 66%, 69%; Nonaggressive—72%, 67%, 82%, 67%. Five- to 6-year-olds and 11- to 13-year-olds were most likely to give natural responses to questions about nonaggressiveness, all  $\chi^2(5) \geq 14.7, p < .012$ . Eight- to 10-year-olds gave natural responses most frequently for the traits of cheerfulness and non-aggressiveness,  $\chi^2(5) = 14.9, p = .011$ , and adults were most likely to give natural responses for the trait of cheerfulness,  $\chi^2(5) = 43.5, p < .001$ .

**Perceived overall change in character.** At all ages, participants believed that intervention by effort, bribes or medicine would significantly change the person, all  $t(53, 53, 59, 72) \geq 5.18, p < .001$ , test value = 3. Adults predicted less change than the three other age groups,  $F(3, 240) = 5.85, p < .001$ , Adult  $M(3.34, SD = 0.56) < 11-13 M(3.64, SD = 0.74) = 8-10 M(3.77, SD = 0.79) = 5-6 M(3.89, SD = 1.04)$ ; Bonferroni,  $p < .05$ .

**Justifications for responses.** Table 2 shows the percentage of justification types given to both natural and acquired responses. For natural responses, the youngest children were significantly more likely to give continuity justifications ("Always the best") than the other age groups,  $\chi^2(3) = 495.6, p < .001$ , who more strongly emphasized the fleeting, inauthentic, or toxic nature of the acquired trait,  $\chi^2(3) = 196.39, p < .001$ . As one adult noted, "By being nonaggressive, Amy is in some way always having to fight against her nature." Or, as a 10-year-old said about a bribed change, "Jeff was never truly happy, just pretended to be; he's a fake." Older children and adults also believed that, over time, medicine could have a toxic effect causing the character to become even less attractive, less happy, or less smart. Eleven- to 13-year-olds and adults also gave more justifications focusing on the inherent appeal of natural traits,  $\chi^2(3) = 31.55, p < .001$ : "Natural beauty is always better than beauty from a bottle."

Table 2  
*Percentage of Responses by Type of Justification in Study 1*

Age group	n	Type of justification				
		Natural	No intervention needed	Continuity of best	Acquired is toxic, fleeting or fake	Miscellaneous
Justifications for natural responses						
5 to 6 years	531	.28	.11	.54	.03	.04
8 to 10 years	554	.26	.19	.25	.23	.07
11 to 13 years	366	.40	.13	.16	.22	.09
Adults	994	.36	.08	.05	.34	.17
Age group	n	Works hard	Money motivates	Medicine is effective	Negative changes in natural	Miscellaneous
Justifications for acquired responses						
5 to 6 years	259	.59	.08	.19	.00	.14
8 to 10 years	331	.55	.06	.14	.10	.15
11 to 13 years	205	.53	.07	.15	.10	.15
Adults	437	.49	.03	.16	.08	.24

*Note.* In each age group, justifications that were “don’t know,” reiterations of the story, or left blank were excluded from the analysis and not scored. Eleven- to 13-year-olds gave fewer justifications overall due to classroom time constraints.

Most age groups, when they chose the acquired trait, attributed their choice of the acquired trait over the natural by referring to effort, even in the case where medicine was the change mechanism. Participants indicated that taking “yucky” medicine with bad side effects was a form of “working hard” to change. For those participants who endorsed traits acquired by medicine over the natural, medicine was perceived as being highly effective in controlling behavior, to the point where a person might be more consistent than if operating under his own free will (“Human growth hormone is powerful stuff”).

There were few developmental differences among justifications for responses favoring acquired traits. Older participants were more likely than the youngest age group to believe that some natural inclinations might change in a negative direction with age, particularly, if the natural had no experience facing challenges,  $\chi^2(3) = 26.5, p < .001$ . Also, adults were more likely than the other three age groups to give miscellaneous responses,  $\chi^2(3) = 16.7, p < .001$ .

## Discussion

Although stronger in the older groups, participants at all ages showed a bias for natural positive traits over acquired ones, judging that natural traits would be more strongly expressed and, with the exception of 8- to 10-year-olds, that natural traits would be more likely to persist over aging than acquired traits. All ages also thought natural traits would be more likely to be rewarded and that they would be more likely to befriend a natural. Participants were particularly likely to favor natural cheerfulness and nonaggressiveness, both of which might be important in interpersonal relationships.

Although a bias for the natural was present in the youngest children, the older children (8–13 years) and adults made sharper distinctions between internal and external mechanisms of change. They showed a strong preference for natural traits over traits acquired by medicine or bribes, which they perceived as more fleeting, less authentic, and, in the case of medicine, potentially toxic. Older children and adults viewed traits acquired through intrinsic effort as most similar to natural traits, particularly the 8-

to 10-year-olds, who were more likely to reward traits acquired by effort and to believe these traits would persist over development. The question now arises as to the perceived robustness of effortful changes when tested in challenging situations.

## Study 2: When Tried, Tempted, or Tired

Study 2 explored the persistence of natural traits and traits acquired through effort under challenging conditions. Although effort was judged as a more powerful mechanism of change than bribes and medicine in Study 1, we still may perceive limitations in the amount of effortful control we have over our behavior, particularly in challenging situations (Baumeister & Tierney, 2011). Effort might enable us to develop a positive trait and deploy it consistently in selected environments, but under conditions of duress, effort acquired traits may be seen as more fragile than natural traits. Consider, for example, a formerly violent person who works hard to be nonaggressive. He may be able to maintain this trait by surrounding himself with nonaggressive friends and by avoiding provocative situations, such as driving in rush hour traffic. However, when this person is faced with an unexpected challenge, such as being mercilessly teased by others, we may expect his old behavior patterns to resurface and believe he will lash out more at his provocateurs than someone who has always been naturally nonaggressive. Believing a trait acquired by effort will persist over time, as was explored in Study 1, may differ from believing it will persist under challenge.

In Study 2 participants were presented with stories in which one character displayed a positive trait naturally and the other character acquired the trait through effort. Both characters were then confronted with challenging situations over which they had little control. Participants were asked to choose which character would be most likely to continue to display the positive trait. We expected all ages to believe natural traits would persist more than effort acquired traits under challenging conditions and also predicted this belief would be strongest in the adults. In addition, we examined a preference for naturalness across several trait types (i.e., personality, skill, moral, and physical traits). Since participants were

more likely to give natural responses to the personality traits of cheerfulness and nonaggressiveness in the Study 1, we expected natural personality traits to be judged as more persistent than other types of traits under challenge.

## Method

**Participants.** Sixty 5- to 6-year-old children (30 females,  $M_{\text{age}} = 6:4$ , age range: 5:1–6:11), sixty 8- to 10-year-old children (30 females,  $M_{\text{age}} = 9:2$ , age range: 8:0–10:10), sixty 11- to 13-year-old children (34 females,  $M_{\text{age}} = 12:2$ , age range: 11:0–13:4), and 60 adults (30 females,  $M_{\text{age}} = 20:4$ , age range: 18–28) participated in the study. Children were recruited from public summer camps as well as elementary and middle schools in Connecticut, where median household incomes ranged from \$52,130 to \$104,000. The child sample included 84% European American children, 9% African American children, 2% Latino American children, and 5% Asian American children. Adults were university students whose ethnicity was 65% European American, 11.5% African American, 11.5% Asian American, 10% Latino American, and 2% “other.”

**Stimuli.** Eighteen short stories were constructed in which one character naturally displayed a positive trait at ages 5 and 10 and a second character displayed the opposite, negative trait at the same ages but acquired the positive trait by working hard from ages 10 to 18. At age 18, both characters were described as *being behaviorally exactly the same* on the positive trait and showing it consistently. Later that year, the two characters are exposed to a tempting (e.g., money, food), trying (e.g., being teased, giving a public performance, learning a new sport), or tiring (e.g., no sleep, illness) condition. To control for response bias, participants were asked which character would be most likely (or not) to exhibit either the positive or the negative trait in that situation. Children were asked to justify their responses. See Appendix C in the online supplemental materials for an example of the stories used. The gender of the characters in the stories always matched the gender of the participant.

**Types of traits.** Eighteen traits of four trait types judged by a panel of adults to be desirable and modifiable by effort were used in the study: *Personality* (cheerfulness, outgoingness, nonaggressiveness, intelligence, attentiveness), *Specific Skill* (athletic ability, musical ability, math ability, artistic ability, comedic ability), *Moral* (nonstealer, obedient, truthful, noncheater, nonimpulsive rule follower), *Physical* (fit and thin, attractive, strong).

**Procedure.** Each participant received one of three questionnaires consisting of six stories that were constructed so that each

participant received a sampling of personality, skill, moral, and physical traits. A set of drawings accompanied each story (see Appendix D in the online supplemental materials for an example). Children were interviewed individually in a quiet place for 20 to 40 min. Older participants received the stories in a questionnaire format in a group setting.

**Scoring.** Responses favoring the persistence of the natural positive trait in challenging situations were scored 1 and those favoring the acquired trait were scored 0. Scores were summed across each participant, producing a total score of 0 to 6. In all analyses, higher scores indicate the belief that natural positive traits will persist over acquired traits under challenge.

## Results

Analysis of variance with total natural score as the dependent variable and Age group and Questionnaire type (the three sets of trait stories) as the fixed factors revealed a significant age effect,  $F(3, 228) = 3.95, p < .01$ . Adults and 5- to 6-year-olds were more likely than 8- to 10-year-olds to think that natural positive traits would persist under challenge: Adult  $M = 4.30$  ( $SE = 0.231$ ); 5–6  $M$  (3.97,  $SE = 0.231$ ) > 8–10  $M$  (3.21,  $SE = 0.231$ ),  $p < .03$ ; 11–13  $M$  (3.75,  $SE = 0.231$ ) > 8–10 ( $p < .10$ ). There was no significant effect of Questionnaire type or a significant Grade  $\times$  Questionnaire interaction, all  $F(2/6, 228) < 1.6, ns$ , so the three questionnaires were combined for further analysis.

In order to evaluate whether participants believed natural traits would be more likely to persist than effort-acquired traits under challenge, one sample  $t$ -tests using participants' total scores (0–6) with a test value of 3 were conducted. As predicted, all age groups, with the exception of 8- to 10-year-olds, believed naturals would be more likely than individuals who acquired the trait through effort to show the positive trait (or, conversely, not show the negative trait) when challenged: 5–6  $M = 3.97$  ( $SD = 1.79$ ),  $t(59) = 4.17, p < .001$ ; 8–10  $M = 3.21$  ( $SD = 2.04$ ),  $t(59) = 0.792, ns$ ; 11–13  $M = 3.75$  ( $SD = 1.91$ ),  $t(59) = 3.01, p = .004$ ; Adult  $M = 4.30$  ( $SD = 1.34$ ),  $t(59) = 7.49, p < .001$ .

The percentage of responses favoring the persistence of natural traits over effort-acquired traits was also calculated for each of the four trait types. Each child responded to six stories so there were 360 total responses in each age group. Table 3 shows the percentage of responses favoring the persistence of natural traits under challenge by trait type and age. All ages believed natural personality traits would hold up under challenge more easily than acquired personality traits (binomial, two-tailed, all  $p < .035$ ). All age groups, with the exception of 8- to 10-year-olds, also believed

Table 3  
Percentage of Responses Favoring the Natural by Age Groups and Trait Type

Age group	<i>n</i>	Trait type			
		Personality (100 responses)	Special skill (100 responses)	Moral (100 responses)	Physical (60 responses)
5 to 6 years	60	.70***	.65**	.73***	.50
8 to 10 years	60	.61*	.45	.51	.55
11 to 13 years	60	.68***	.64**	.59†	.57
Adult	60	.72***	.90***	.68***	.68**

Note. Binomial, two-tailed test.

†  $p < .10$ . \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

natural skill traits would be more likely to persist under challenge than skills acquired by effort (binomial, two-tailed, all  $p < .007$ ). Beliefs about the persistence of natural moral traits showed a U-shaped function with only the youngest and oldest participants believing natural moral traits would persist (binomial, two-tailed, all  $p < .001$ ). Only adults differentiated the persistence of natural physical traits under challenge from those acquired by effort (binomial, two-tailed,  $p = .006$ ).

Chi square analysis revealed that 5- to 6-year-olds believed natural personality and moral traits would be more likely to persist under challenge than natural physical traits,  $\chi^2(3) = 9.80, p = .02$ . Adults believed that natural skill traits would be most likely to persist under challenge,  $\chi^2(3) = 16.6, p = .001$ . The other age groups did not significantly differentiate among the traits.

## Discussion

With the exception of 8- to 10-year-olds, naturals were judged as more likely to show a positive trait when challenged than were those who acquired traits through effort. As in Study 1, the 8- to 10-year-olds believed effort-acquired traits would be as likely as natural traits to persist. A bias for the natural appeared most consistently for personality and skill traits. Even 8- to 10-year-olds believed that natural personality traits would be more likely than effort-acquired traits to endure under challenge. Participants differentiated between a person's nature propelling him to behave in a certain way and a person choosing to behave in a particular way. In justifying their responses to moral traits, the older children (8–13 years of age) and adults often focused on choice, remarking that everyone could be tempted to act immorally under the right circumstances. In the United States, we may believe that free will can sometimes predominate over any natural tendency to be good or bad (DeSteno & Valdesolo, 2011). Natural physical traits were seen as more likely to persist under challenge with increasing age, reflecting beliefs in the greater stability of adults' physical states and an increased understanding of biological constraints on body type.

### Study 3: A Bias for the Late Bloomer

Study 3 explored children's beliefs about changes in negative traits that occur naturally with age through a "late blooming." Here late bloomers are defined as individuals who do not develop positive traits until later in development, but because of the ease with which they develop and express the traits, it is believed that the positive traits were always there, at least potentially, beneath the surface. In Study 1, the natural was always presented in a positive manner, whereas the other character initially manifested an undesirable trait and only later, after the intervention, a highly desirable one. Although their differential treatment of effort as opposed to other means of change seems to indicate otherwise, participants in Study 1 may have preferred the natural because of a general "halo effect," that is, the early positive trait may have colored later judgments (Nisbett & Wilson, 1977). To control for the initial state of both characters as well as the presence of change, Study 3 presented characters who both initially show a negative expression of the trait at ages 5 and 10 and who then both change, either (a) naturally through a late blooming or (b) through effort, bribes, or the use of medicine.

We predicted that participants would judge late blooming traits in a manner similar to early emerging natural traits. Thus, we expected all ages to like late bloomers more and to view late blooming traits as more strongly and persistently expressed than traits acquired through bribes or medicine. We also hypothesized that participants would view acquired changes brought about by medicine, bribes or effort as more fragile under challenging conditions than changes occurring through a natural late blooming. Finally, we expected a developmental shift similar to that found in the first study, with adults showing the strongest natural bias and 8- to 10-year-olds embracing intrinsic effort.

## Method

**Participants.** Fifty-four 5- to 6-year-old children (29 females,  $M_{\text{age}} = 6:2$ , age range: 5:2–6:11), fifty-four 8- to 10-year-old children (26 females,  $M_{\text{age}} = 9:1$ , age range: 8:0–10:11), and 60 adults (32 females,  $M_{\text{age}} = 19.7$ , age range: 18–27) participated. Children were recruited through cold calling and from elementary schools throughout Connecticut. The median household income was \$63,463. The child sample was 88% European American, 4% African American, 3% Latino American, and 5% Asian American. Adults were university students and staff recruited from a psychology subject pool and posted fliers. The adult sample was 57% European American, 18% Asian American, 11% African American, 11% Latino American, and 3% "other."

### Stimuli.

**Types of traits and stories.** The six traits were the same as those used in Study 1, with the exception of athleticism, which replaced height. Six short stories were constructed each of which contained two characters who possessed the same undesirable trait at ages 5 and 10. The late blooming character was then described as naturally and easily acquiring the desirable trait from 10 to 18 years of age. The other character was also described as acquiring the desirable trait during the same period but did so either through (a) *Effort*: the character worked hard to enhance the undesirable trait; (b) *Bribe*: the parents wanted the character to change and paid the character for working hard to change the trait in the desired direction; or (c) *Medicine*: the character took medicine to enhance the trait. At age 18, both characters were described as possessing the desirable trait to the *exact same extent*. Participants were then asked which character (a) would express the desirable trait "just a bit" more strongly at age 18, even though they were essentially the same in trait expression (*Strength*); (b) would they like the most (*Like*); (c) would express the undesirable trait under challenge (*Challenge*); and (d) would express the desirable trait most strongly when they were much, much older (*Persistence*).

**Procedure.** The procedure was the same as in Study 1. The gender of the characters in the stories always matched the gender of the participant (see Appendices E and F in the online supplemental materials for a sample story and drawings).

**Scoring.** Responses favoring the late bloomer with respect to strength, likeability, and persistence of the positive trait under challenge and over aging were scored 1, and those favoring the character who acquired the trait through others means were scored 0. In all analyses, higher scores indicate a greater preference for late-blooming over acquired traits.

## Results

Table 4 shows the means scores and standard deviations for each age group by Question (strength, like, challenge, persistence) and Intervention Type (effort, bribe, or medicine).

**Late blooming versus acquired traits.** Using one sample  $t$  tests on participants' total scores (0–24), a significant preference for late blooming traits over acquired traits was found in all age groups as predicted: 5–6 years  $M = 15.22$  ( $SD = 4.5$ ); 8–10 years  $M = 15.47$  ( $SD = 6.1$ ); Adult  $M = 16.95$  ( $SD = 3.4$ ), all  $t(53, 53, 59) \geq 5.28$ ,  $p < .001$ , test value = 12. In order to assess more closely differences in participants' preferences for late blooming over acquired traits, one-sample  $t$  tests were conducted using participants' total scores (0–2) for each intervention within each question against a test value of 1.

**Strength.** As predicted, all ages overall believed late blooming traits would be expressed more strongly than acquired positive traits, see Table 4, all  $t(53, 53, 59) \geq 2.59$ ,  $p < .012$ . When broken down by type of intervention, all ages believed that late bloomers would express traits more strongly than characters who acquired positive traits through bribed effort, all  $t(53, 53, 59) \geq 3.98$ ,  $p < .001$ . Eight- to 10-year-old participants also believed late blooming positive traits would be more strongly expressed than traits acquired through medicine, and there was a trend for adults to believe this as well: 8 to 10  $t(53) = 3.50$ ,  $p = .001$ ; Adult  $t(59) = 1.69$ ,  $p = .096$ . In contrast to the first study, none of the three age groups differentiated between the strength of late blooming traits and those acquired by intrinsic effort.

**Like.** All ages overall liked characters with late blooming traits more than characters who acquired traits through intervention (see Table 4), all  $t(53, 53, 59) \geq 4.18$ ,  $p < .001$ . All ages liked

characters who showed late blooming positive traits more than those who acquired positive traits by taking medicine or being bribed, all  $t(53, 53, 59) \geq 3.04$ ,  $p < .004$ . Five- to 6-year-olds also liked late bloomers more than those who acquired traits through effort,  $t(53) = 2.37$ ,  $p = .022$ . Adults, on the other hand, liked those who acquired traits through intrinsic effort more than late bloomers,  $t(59) = -2.1$ ,  $p = .04$ .

**Challenge.** As a whole, all ages believed late blooming traits would be more likely to persist under challenging conditions (see Table 4), all  $t(53, 53, 59) \geq 2.97$ ,  $p < .005$ . Consistent with Study 2, the youngest and oldest age groups believed that late bloomers would be more likely to express the positive trait under challenge than those who changed by effort. All ages believed that the late bloomers would be more likely than characters who were bribed and, with the exception of 5- to 6-year-olds, more likely than characters who took medicine to show the positive trait under challenge: for Bribe, all  $t(53, 53, 59) \geq 2.87$ ,  $p < .006$ ; for Medicine, all  $t(53, 59) \geq 2.12$ ,  $p < .039$ .

**Persistence.** Overall, late blooming traits were seen as more likely to persist over aging than acquired traits (see Table 4), all  $t(53, 53, 59) \geq 3.64$ ,  $p < .001$ . Broken down by type of intervention, all ages believed late blooming traits would be more likely to persist over aging than traits acquired by bribes or by taking medicine, all  $t(53, 53, 59) \geq 3.21$ ,  $p < .002$ . The youngest children also thought that late blooming traits would be more likely than those acquired by effort to persist,  $t(53) = 4.60$ ,  $p < .001$ .

**Differences between age groups, interventions, and questions.** Having shown that participants' preference for late blooming traits was greater than chance, a repeated-measures ANOVA with Age as the between-subjects variable and Question

Table 4  
Late Bloomer Scores by Age, Questions, and Interventions

Question	Intervention	Age group						Total ( $n = 168$ )	
		5 to 6 years ( $n = 54$ )		8 to 10 years ( $n = 54$ )		Adults years ( $n = 60$ )		$M$	$SD$
		$M$	$SD$	$M$	$SD$	$M$	$SD$	$M$	$SD$
Strength	Effort	1.13	0.80	0.91	0.87	0.98	0.77	1.01	0.82
	Bribe	1.35	0.65***	1.39	0.68***	1.63	0.55***	1.46	0.64***
	Medicine	1.09	0.76	1.33	0.70**	1.17	0.76†	1.20	0.74**
	Mean total	1.19	0.52**	1.21	0.59*	1.26	0.44***	1.22	0.52***
Like	Effort	1.26	0.80*	1.02	0.79	0.82	0.68*	1.02	0.77
	Bribe	1.33	0.64***	1.61	0.66***	1.73	0.48***	1.57	0.62***
	Medicine	1.30	0.72**	1.61	0.68***	1.87	0.34***	1.60	0.64***
	Mean total	1.30	0.52***	1.41	0.56***	1.47	0.31***	1.40	0.48***
Challenge	Effort	1.24	0.75*	1.04	0.82	1.42	0.67***	1.24	0.76***
	Bribe	1.28	0.71**	1.43	0.72***	1.62	0.55***	1.45	0.67***
	Medicine	1.13	0.75	1.28	0.76*	1.20	0.73*	1.20	0.75**
	Mean total	1.22	0.51**	1.25	0.61**	1.55	0.42***	1.35	0.53***
Persistence	Effort	1.37	0.59***	1.10	0.83	1.10	0.77	1.19	0.75**
	Bribe	1.33	0.70**	1.35	0.80**	1.73	0.52***	1.48	0.70***
	Medicine	1.41	0.69***	1.41	0.74***	1.68	0.57***	1.51	0.68***
	Mean total	1.37	0.45***	1.29	0.58**	1.51	0.44***	1.39	0.50***
Mean total	Effort	1.25	0.50**	1.02	0.68	1.08	0.49	1.11	0.57*
	Bribe	1.32	0.46***	1.44	0.56***	1.68	0.32***	1.49	0.47***
	Medicine	1.23	0.52**	1.41	0.56***	1.48	0.39***	1.38	0.50***
	Mean total	1.27	0.37***	1.29	0.51***	1.41	0.28***		

Note. Range of scores = 0 to 2, with higher scores favoring the natural. One-sample  $t$  test (test value = 1).

†  $p < .10$ . \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

and Intervention Type as the within-subject variables was conducted to examine differences between age groups, interventions, and questions. As expected, adults were more likely than the youngest age group to favor late bloomers,  $F(2, 165) = 3.58, p = .03$  (see Table 4). As in Study 1, participants overall were more likely to treat traits acquired by effort as more similar to the late bloomer than traits acquired by bribes or medicine (see Table 4),  $F(2, 330) = 44.23, p < .001$ , Bonferroni,  $p < .05$ . Consistent with the first study, the youngest children did not differentiate among the methods of trait acquisition, whereas all other age groups favored traits acquired by intrinsic effort over other means of trait acquisition (see Table 4),  $F(4, 330) = 9.71, p < .001$ , Bonferroni,  $p < .05$ .

In contrast to Study 1, participants were less likely to favor late bloomers in response to the strength question than the other three questions, which did not differ from one another (see Table 4),  $F(3, 495) = 8.41, p < .001$ , Bonferroni,  $p < .05$ . A significant Grade  $\times$  Question interaction (see Table 4),  $F(6, 495) = 2.56, p = .019$ , Bonferroni,  $p < .05$ , revealed that the adults were more likely than the other two age groups to favor the late bloomer under challenging conditions. Overall, participants did not differentiate between bribes and medicine in their responses to questions, although they were more likely to favor the natural under the bribe than the medicine and effort conditions when asked about strength of the trait (see Table 4),  $F(6, 990) = 7.92, p < .001$ , Bonferroni,  $p < .05$ .

**Differences between specific traits.** At all ages, participants gave late-bloomer responses to all traits at above chance levels (binomial, two-tailed, all  $p < .017$ ; Percentage of late bloomer responses by 5–6, 8–10, and Adults, respectively: Athletic—69%, 68%, 65%; Attractive—58%, 69%, 80%; Brave—71%, 64%, 68%; Cheerful—61%, 63%, 70%; Intelligent—61%, 61%, 72%; Nonaggressive—61%, 63%, 68%). Five- to 6-year-olds were most likely to give late-blooming responses for the trait of bravery,  $\chi^2(5) = 11.4, p = .03$ ; adult participants gave late blooming responses most often to the trait of attractiveness,  $\chi^2(5) = 16.8, p = .005$ . Eight- to 10-year-olds did not distinguish between the traits in their likelihood of giving late-blooming responses.

**Late blooming (Study 3) versus natural traits (Study 1).** In order to assess whether late-blooming natural traits were treated in a manner similar to early emerging natural traits, participants' total scores based on the three questions, Strength, Like (Friend), and Persistence, that were similar in Study 1 (Natural) and Study 3 (Late Blooming) were compared. Participants' total scores for the three questions in each study ranged from 0 to 18. The mean total scores for each age group did not differ significantly between the two studies: 5–6 years: *Natural* ( $N = 54$ )  $M(11.47, SD = 4.3) =$  *Late Blooming* ( $N = 54$ )  $M(11.57, SD = 3.3)$ ; 8–10 years: *Natural* ( $N = 54$ )  $M(10.78, SD = 3.6) =$  *Late Blooming* ( $N = 54$ )  $M(11.73, SD = 4.5)$ ; Adult: *Natural* ( $N = 90$ ):  $13.26 (SD = 2.7) =$  *Late Blooming* ( $N = 60$ )  $M(12.72, SD = 2.8)$ , all  $F(1, 106/106/148) < 1.45, ns$ .

## Discussion

Although the bias was strongest in the adults, participants of all ages favored late blooming characters over characters who acquired positive traits through other means, showing a similar preference for late bloomers as they did for naturals. Thus, the

preference found for the natural in the first study was not simply due to a halo effect from the natural always manifesting a positive trait, or due to the belief that, since the person with the acquired trait had changed before, he would be most likely to change again. Late bloomers were seen as more likeable than characters who acquired traits by bribes or medicine. Also, all ages thought that late blooming traits would be more likely to persist over aging than traits acquired by bribes or medicine.

Again, fewer differentiations were made between late bloomers and characters who changed through intrinsic effort, suggesting that intrinsic effort might be seen as a more natural process or a type of natural trait. Adult participants may have liked "the hard worker" more than the natural in this study because of this confluence of "natural effortfulness" with an additional positive trait. People who acquire traits by exerting high amounts of effort also may be less threatening to our feelings of self-worth than people who acquire traits easily and naturally (Covington, 1984). Even some older children said they would like late bloomers less than hard workers because of possible negative social comparisons: "I wouldn't want a friend who naturally was a lot prettier than me."

## General Discussion

Studies 1 and 2 demonstrate that, even from an early age, natural positive traits are favored over positive traits acquired through other means. Participants viewed early emerging natural traits as more potent and, with the exception of 8- to 10-year-olds, more persistent over time and across challenging situations. Participants also liked naturals more, especially when compared to characters who acquired traits through biological intervention or externally rewarded effort. Moreover, this bias for the natural was found to grow stronger with age, as adults are even more likely to embrace naturals than elementary school children.

The bias for the natural also occurred for traits that might not be manifested early in life. In the late bloomer study, when young protagonists had negative traits, if they changed to a positive expression of the trait in a "natural way," the natural bias still held. Children and adults alike seem to understand that some traits, like beards, can appear late but still represent a natural propensity. The preference for late bloomers may engender the assumption that all late emerging positive traits reflect a natural inclination, even when effort is heavily involved. This assumption may then foster the development of invalid stereotypes. For example, a person with a natural bias might infer that males have a "natural" propensity relative to females for math and science given their overrepresentation in these fields (Spelke, 2005).

In Studies 2 and 3, participants believed that, when challenged, natural traits would be more likely to persist than traits acquired by other means. As one middle-school child remarked, "Because in a tough situation, Betty will be able to pull through . . . because of her natural talent." This belief may arise from participants' desire for consistency in behavior (Guadagno & Cialdini, 2010). Natural traits were also perceived as fixed essences, ensuring predictability not only across situations but also across time. All age groups except the 8- to 10-year-olds believed that natural traits, even when they are late blooming, would be more likely to persist over aging than acquired traits. These results mirror other studies in which early appearing, positive traits are seen as remaining highly stable over development and aging (Lockhart et al., 2008). Beliefs about

natural trait stability may explain why all age groups preferred to be friends with characters exhibiting natural traits. Expecting that your cheerful and nonaggressive friends will always be that way makes the world a more predictable and navigable place.

In their justifications to the strength question, participants viewed naturals as having higher ceilings for trait expression. Since the natural was described as expressing the trait easily without an intervention, naturals were seen as having more inherent potential than someone for whom trait expression required great effort, medicine or bribes. The following adult comment was similar to others given at all ages: "If she can do this well easily, without really trying—if she tries at all, she'll do much, much better." This pattern of reasoning about ability has been found even in preschool children, suggesting that a bias for natural traits may exist in children even younger than those included in the present study (Heyman et al., 2003).

Participants' justifications also revealed a preference for characters with natural traits because they are not "contaminated" by interventions, consistent with other studies showing that entities such as food are perceived as less desirable as they undergo more "unnatural" transformations (Rozin, 2005). Moreover, participants were just as troubled by bribes as they were by the use of medicine, suggesting that our uneasiness with the use of trait enhancing medication is not due simply to a lack of human agency but also due to the "unnaturalness" of the transformation process (Sandel, 2004).

The bias for the natural has a value-laden side. Participants often saw characters who took medicine to better themselves as cheating, even when the protagonists were trying to remedy a deficit. Although our culture increasingly uses medications to treat deficits ranging from the cognitive to the emotional, those who take such medications seem morally suspect. Adulterated traits may violate our intuitions about moral purity (Haidt, 2007), as seen in some participants' focus on the toxic nature of medicine as well as on the inauthentic behavior of changes produced by bribes. The one exception is when taking a medicine incurs a sizeable cost. When the medicine is seen as unpleasant in taste or as having bad side effects, some participants perceived the protagonist as more virtuous. If one has suffered and perhaps "worked hard" at taking the medicine, there may be a partial redemption.

In considering mechanisms of change, participants other than the youngest children consistently favored changes that occurred through intrinsic effort, which might be considered a more natural intervention, over changes produced by bribes or medicine. Intrinsic effort was seen as an internal process, coming from within and therefore a natural part of the person. Many participants shifted the predicate "works hard" to the noun phrase "hard worker." Because characteristics described as nouns are more likely to be treated as fixed essences (Gelman & Heyman, 1999), these participants may have viewed "industriousness" as a natural trait that persists in its influence over time. Even though effort-acquired traits were highly valued by participants, they were seen as more fragile when protagonists were put in challenging situations.

An appreciation of the merits of intrinsic effort relative to extrinsically motivated effort did not appear strongly until about 8 years of age. Younger children may have believed that authentic effort was part of all types of transformations because of their lack of skepticism about the behavior of others (Mills & Keil, 2005; Heyman, Fu, & Lee, 2007). Young children's failure to distinguish

intrinsic from extrinsic effort may also reflect their tendency to defer more to adults as appropriate experts (Harris & Corriveau, 2011) and therefore assume that extrinsically rewarded efforts are being validated by the parents (Miller & Aloise, 1990). Young children are more motivated when intrinsically rewarded (Deci, Koestner & Ryan, 1999; Lepper, Green, & Nisbett, 1973), but as observers they may not have an awareness of this effect early on, as opposed to when they are embedded in the action themselves.

By 8 years of age, children have a negative view of persons who work hard to change in order to gain rewards. This finding has implications for the use of rewards, particularly monetary ones, in the school and in the home. Although there is a vast literature on the relationship between extrinsic rewards and motivation (Deci et al., 1999), this is one of the first studies to examine perceptions of extrinsically motivated individuals. Older children and adults acknowledged the power of monetary rewards to shape behavior, but they preferred naturals and intrinsically motivated characters, whose behaviors they saw as more authentic and more likely to persist over aging. The distinction between "working hard for money" and simply "working hard" became more pronounced with age, reflecting the growing impact of cultural values.

Eight- to 10-year-olds viewed traits acquired by intrinsic effort more positively than either younger children or adults in Studies 1 and 2. This U-shaped developmental curve may reflect the enormous emphasis many elementary schools put on effort and also the decline in intrinsic motivation with age (Folmer et al., 2008; Nicholls, 1978; Lepper, Corpus, & Iyengar, 2005). Teachers and coaches are often telling students that they can all be "superstars" if they just work hard enough. Yet, in North America at least, this positive regard for the fruits of effort may fade as adolescents become more aware of intrinsic limitations that cannot be surmounted by effort alone (Covington, 1984; Folmer et al., 2008). As one 9-year-old girl poignantly remarked, "I wish I knew how she (the character) did it. I work really hard, but I never do as good as the really smart kids." Despite the often intense praise of effort and effort-created skills, many schools offer little guidance on how to actually use effort productively, such as for individual growth (Dweck, 2007). Focusing on social comparisons rather than on mastery can also reduce intrinsic motivation (Corpus, Ogle, & Love-Geiger, 2006), and leave a legacy of disillusionment in older children, who often see natural ability as the real key to success (Covington, 1984). This may be particularly true in a culture such as the United States where natural proclivities are strongly emphasized, and where, with the focus on celebrity and the self (Twenge & Campbell, 2009), "being the best" has become more important than "doing your best."

The U-shaped bias for effort in middle childhood may also be related to a stronger essentialist bias in young children that falls off and then begins to reappear in adults, a pattern that has been found in other studies (Gelman et al., 2007). An early essentialist bias may be a cognitive default reflecting a desire for continuity that then gets tempered by early successes with effort and a growing understanding of how environmental factors can shape behavior (Heyman & Gelman, 2000). Essentialist beliefs may then reemerge as adolescents and adults begin to incorporate more biological constraints into their understanding of individual differences. Effort early on can seem quite effective, especially when paired with rapidly developing abilities (Lockhart et al., 2008), but when more extreme levels of performance are expected in later years, we may

become more aware of the limits imposed by our particular biology.

The bias for the natural bears directly on a paradox found in American culture: On the one hand, we desire dramatic transformations, as seen in our billion-dollar self-improvement industry; on the other hand, we are often skeptical about whether such personal changes are real or long-lasting, as seen in our reactions to “jail house conversions,” the distinction commonly made between surface versus deep changes in psychotherapy (Shedler, 2010), and the continuing debate about whether people “really” can change. These studies suggest that natural traits might always be seen as more robust than positive improvements that occur through other means. Moreover, changes that are natural or come from within may be viewed as more authentic, enduring and morally acceptable than changes that are driven by external forces.

### Limitations and Future Directions

Some limitations in the present studies could be addressed in future research. Our studies used a forced choice paradigm, which limited our ability to assess the degree to which natural traits are preferred over traits acquired by other means. Although the justifications suggest otherwise, participants may have thought positively about all the characters in the stories and, only when forced to choose, picked the natural. Studies using scaled responses could explore this further. Also, a longitudinal design could elucidate the evolution of the natural bias in individual children over development and clarify what factors drive changes.

The youngest children might not have fully understood how interventions such as effort, medicine or money change behavior, and this may have influenced the results. It is unlikely, however, that such misunderstandings are the primary reason for the observed developmental patterns. Even the youngest children strongly endorsed the belief that the three interventions significantly changed the characters. In addition, their justifications generally demonstrated a clear grasp of each intervention: “He’s just doing it for money,” “He got tired of working hard to be happy,” or “Medicine helped my brother do better in school so she’ll do better too.”

These studies only examined changes taking place during a specific part of the developing period, 10 to 18. Future research might investigate children’s beliefs about changes that take place earlier or later in development. For example, participants might believe a “late blooming” that occurs later in development produces a weaker expression of the trait than one that occurs earlier. Similarly, medicine might be viewed as more efficacious in producing lasting changes when it is used early in development. Other studies might examine beliefs about when change is thought to be most likely to occur. Although positive changes are believed to occur over both development and aging (Lockhart et al., 2008), more substantial, robust changes might be expected to occur earlier than later.

Future research might examine variations in the natural bias across a wider range of socioeconomic groups and cultures. Lareau (2002) has described how middle-class parents engage in concerted cultivation, exposing their children at a young age to a variety of activities and experiences in order to “grow” their talents. Poor and working-class parents, on the other hand, allow their children’s talent to develop more “naturally.” These differ-

ences in socialization might result in working-class children developing a stronger natural bias; and by the time they reach junior high, when ability is valued more than effort as the source of achievement, working-class children might be more susceptible to self-handicapping (Arkin & Oleson, 1998). Comparing themselves to middle-class children, who through early exposure and fervent practice may appear to be “naturals,” working-class children might decide to deflect any assessments of their ability by limiting their efforts. If they then fail, their self-worth is protected because they exerted no effort (Covington, 1984). Similarly, we might expect some cultures or ethnic groups to be less likely to embrace the natural bias than others. For example, Japanese people, whose culture highly values effort as a mechanism of change, might not prefer naturals to those who change through other means.

### Conclusion

Although science and technology have allowed us to become more Godlike in our ability to transform and to control the expression of inherent tendencies, we still have a preference for positive natural and late blooming characteristics. For both children and adults, it is hard to escape the feeling that natural traits are stronger, more durable, and morally more acceptable. Our preference for natural traits even trumps traits acquired through natural willpower in that we have greater faith in the persistence of the natural under challenge. Indeed, even though natural talents may be greatly overrated as real predictors of future achievement, our bias for the natural may blind us to this reality.

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