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Authors

Yeager, David S
Dahl, Ronald E
Dweck, Carol S

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Why Interventions to Influence Adolescent Behavior Often Fail but Could Succeed

David S. Yeager[1], Ronald E. Dahl[2], and Carol S. Dweck[3]
[1]Department of Psychology, University of Texas at Austin; [2]School of Public Health, University of California, Berkeley; and [3]Department of Psychology, Stanford University

Abstract
We provide a developmental perspective on two related issues: (a) why traditional preventative school-based interventions work reasonably well for children but less so for middle adolescents and (b) why some alternative approaches to interventions show promise for middle adolescents. We propose the hypothesis that traditional interventions fail when they do not align with adolescents' enhanced desire to feel respected and be accorded status; however, interventions that do align with this desire can motivate internalized, positive behavior change. We review examples of promising interventions that (a) directly harness the desire for status and respect, (b) provide adolescents with more respectful treatment from adults, or (c) lessen the negative influence of threats to status and respect. These examples are in the domains of unhealthy snacking, middle school discipline, and high school aggression. Discussion centers on implications for basic developmental science and for improvements to youth policy and practice.

Keywords
adolescence, behavior change, puberty, testosterone, autonomy, status, interventions

Adolescence is a maturational period of tremendous learning, exploration, and opportunity (for reviews see Blakemore & Mills, 2014; Crone & Dahl, 2012; Steinberg, 2014; Telzer, 2016). It is also a time when behavioral and health problems can emerge or worsen, with consequences that "stick" long into adulthood (e.g., Paus, Keshavan, & Giedd, 2008). For instance, depressive symptoms rise substantially during adolescence (Andersen & Teicher, 2008; Merikangas et al., 2010), and most depressed adults suffer their first depressive episode during adolescence (e.g., Pine, Cohen, Gurley, Brook, & Ma, 1998). Likewise, school engagement often declines during the transition to high school (see Benner, 2011), and students who drop out of high school go on to earn substantially lower wages even if they later earn a GED (see Heckman, Humphries, & Kautz, 2014)

Educational interventions delivered broadly in schools (i.e., *universal preventative interventions*) are commonly implemented with the aim of preventing these and other problems, including bullying, violence, obesity, delinquency, substance abuse, and teen pregnancy (for a commentary, see Steinberg, 2015). The theory of change underlying many of these interventions comes out of behavioral decision-making theories (e.g., Albarracin, Johnson, Fishbein, & Muellerleile, 2001; Fischhoff, 2008; Fishbein, 2008), which propose that increasing knowledge of health risks, skills for achieving health goals, and awareness of societal values regarding healthy behavior will lead to positive behavior change. Traditional interventions rooted in these theories typically involve classroom presentations that present relevant health information and invite young people to practice implementing skills (via scenarios, skits, or homework), coupled with school-wide assemblies or announcements during which adults publicly endorse the values taught by the program (see descriptions in Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011; Stice, Shaw, & Marti, 2006; Yeager, Fong, Lee, & Espelage, 2015).

Unfortunately, during adolescence, a developmental stage during which universal prevention programs are greatly needed, traditional programs show reduced effectiveness. Indeed, Heckman and Kautz (2013), after

Corresponding Author:
David S. Yeager, 108 E. Dean Keeton, Stop A8000, University of Texas at Austin, Austin, TX 78712-1043
E-mail: dyeager@utexas.edu

a review of the literature, concluded that "programs that target adolescents have not been established to be as effective as programs that target earlier ages" (p. 35). Going a step further, Steinberg (2015) stated that adolescent "classroom-based health education is an uphill battle against evolution and endocrinology, and it is not a fight we are likely to win" (p. 711).

This perspective is justified given the data we review below. However, the limited success of many traditional prevention efforts might say more about their methods than about the impossibility of positive behavior change during adolescence.

In the present article, we propose an explanation for why comprehensive and lengthy school-based universal prevention efforts often go from being somewhat effective with children to being mostly ineffective with middle adolescents. Furthermore, we explore why some alternative interventions are showing promising effects in middle adolescence, even though they are relatively targeted and efficient (Cohen & Sherman, 2014; Lazowski & Hulleman, 2015; Walton, 2014; Wilson, 2011; Yeager & Walton, 2011). Our thesis is that, compared with children, adolescents are more sensitive to whether they are being treated with respect and accorded high status. Traditional programs might work against this sensitivity, but effective adolescent interventions allow young people to make choices that benefit their long-term future while also feeling that they are respected and have high status in the short term.

Overview

In this article, we first review evidence from multiple domains that show age-related declines in the efficacy of traditional adolescent problem-behavior prevention. Second, we offer a preliminary developmental model that could account for this. The model integrates emerging evidence in multiple areas of developmental science, including neuroscience, physiology, and the study of adolescent emotion and behavior. Third, acknowledging that we cannot definitively test this new model given the existing data, we provide evidence from interventions that have shown efficacy in adolescence and that support specific aspects of the model. Fourth, we discuss research ideas for further evaluating and extending the model—and ultimately creating the next generation of improved interventions.

Defining Adolescence

Following many past reviews, we define adolescence as the maturational period that begins at the onset of puberty and ends with a transition to an adult role in society (e.g., Blakemore & Mills, 2014; Crone & Dahl, 2012; Steinberg, 2014). Thus, adolescence is thought to have a biological onset and a sociocultural offset.

We focus mainly on "middle adolescence" because this is where the developmental patterns under review are most striking and where there are plausible developmental mechanisms that could account for them. Middle adolescence is defined as a period after the initial stages of pubertal maturation have begun but before young people have fully adjusted to the rapid developments in their bodies and before they have been accorded full adult status by society. In developed nations such as the United States, the middle adolescent period refers roughly to the ages of 13 or 14 to 17, or grades 7 or 8 to 11.

We acknowledge that chronological age is only a proxy for the relevant developmental processes. The onset of puberty occurs at different chronological ages for different individuals, and maturation can vary substantially across racial, ethnic, or socioeconomic groups. Moreover, pubertal maturation involves a series of cascading biological processes (increases in pubertal hormones and rapid physical changes, including body-hair growth, sexual maturation, height increase, and menarche) that can occur in a coordinated fashion, or not (see Mendle, 2014). Nonetheless, we describe findings in terms of *chronological age* or *grade level* because (a) the existing evidence base primarily reports these and (b) they covary with purported developmental mechanisms. As future intervention studies begin to include measures of pubertal maturation and other developmental processes, greater precision will become possible.

Evidence for Age-Related Declines in Traditional Intervention Efficacy

Effect sizes from meta-analyses of a variety of adolescent interventions suggest that average benefits are weaker among middle adolescents (ages 13–17) compared with young children or children transitioning into adolescence (ages 9–12). This is true for individual studies with large sample sizes (e.g., Karna et al., 2011), but we focus on meta-analyses.

Consider interventions to prevent obesity. A meta-analysis of 64 universal interventions (Stice et al., 2006) found that healthy-eating and exercise-promotion interventions were effective for young children and early adolescents, but not for middle adolescents. For the latter age group, effect sizes clustered around zero, and many effect sizes were negative, which means that adolescents in many programs tended to gain more weight when they received an antiobesity program than when they did not.

In the domain of depression prevention, one meta-analysis (Horowitz & Garber, 2006) reported that universal preventative interventions for middle adolescents

had a nonsignificant average effect of $d = .02$ at follow-up (p. 409) and weaker effects for adolescents than for adults. Another meta-analysis (Stice, Shaw, Bohon, Marti, & Rohde, 2009) showed nonsignificant effects of universal interventions at follow-up, $r = .07$. Furthermore, we conducted a between-study meta-regression of the Stice et al. (2009) results for children and adolescents only (using data reported in their Table 4, pp. 496–497) and found a negative correlation between effect size and age, $r = -.48$, such that middle adolescents showed smaller (and nonsignificant) effects compared with younger individuals.[1]

Or consider social-emotional skill training interventions in general, which teach an array of coping and social skills. Durlak et al. (2011) meta-analyzed 213 school-based, universal, social and emotional interventions delivered from kindergarten to 12th grade. A between-study analysis of moderators found a negative correlation between age and effect size, $r = -.27$: Middle adolescents showed smaller improvements in social-emotional skills relative to younger children.

These results, although informative, are potentially subject to ecological fallacies. Metaregressions compare different interventions given to children of different ages and therefore mask the possibility that the same intervention given to different age groups in the same study might show a different moderation pattern (for a commentary, see Cooper & Patall, 2009). However, a recent meta-analysis of antibullying interventions avoided this ecological fallacy. Yeager et al. (2015) obtained an effect size for each age group in a given study (72 effect sizes total) and then estimated within-study age-related trends. They found that traditional antibullying interventions were effective from early childhood to early adolescence ($d = .13$). When the interventions were delivered to middle adolescents (8th grade or later), however, there was a decline to a null effect ($d = .01$; see Fig. 1). That is, the interventions that are available to high schools for purchase have not yet been effective, on average, even though several U.S. states have mandated that schools purchase and implement antibullying programs (Bierman, 2010).

Pessimism about traditional intervention approaches delivered to middle adolescents also comes from meta-analyses of studies conducted only within this age group. Interventions to reduce recidivism for juvenile delinquents were summarized in a meta-analysis of 28 studies and 19,301 youths aged 12 to 16. It found no significant benefits, on average (Schwalbe, Gearing, MacKenzie, Brewer, & Ibrahim, 2012). There was heterogeneity, however, and one type of intervention, restorative justice, showed benefits (we will return to this later).

In sum, traditional interventions to prevent problematic behavior or health outcomes have shown some promise with children or early adolescents. There is not yet strong evidence that the traditional programs show benefits, on average, for middle adolescents, which in the United States spans the end of middle school and the first few years of high school.

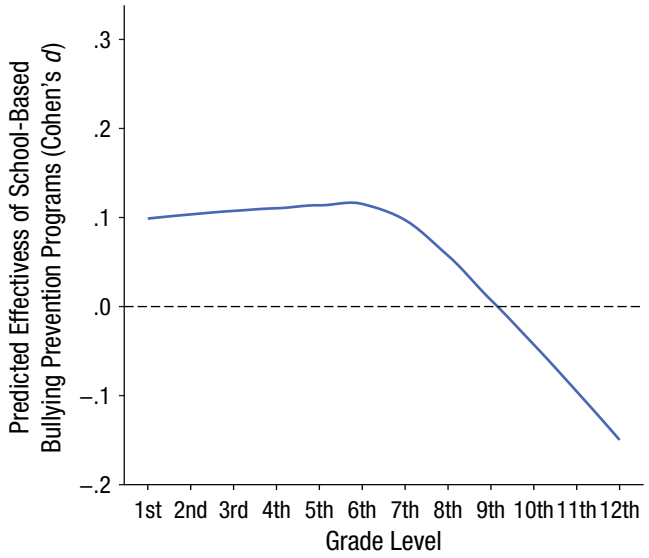

Fig. 1. Predicted effectiveness of school-based bullying-prevention programs (Cohen's *d*) as a function of grade level in school (Yeager, Fong, Lee, & Espelage, 2015). Values are estimated from a three-level meta-analysis. Higher values correspond to more beneficial effect sizes (i.e., less bullying). Grade levels are on the U.S. scale.

This summary is not the final word, however. First, only one of the meta-analyses we reviewed (Yeager et al., 2015) used within-study moderation by age. Second, there was often unexplained heterogeneity in past meta-analyses. We are not saying that no traditional intervention has ever been effective with middle adolescents or that no traditional intervention ever could be effective. We can conclude only that traditional interventions that have appeared in meta-analyses have not been effective, on average, for middle adolescents across multiple domains—including obesity prevention, depression prevention, bullying, recidivism, and social-emotional skill-building in general—even though evaluations of the same or similar programs found benefits for younger individuals.

A Proposed Framework for Understanding and Improving Adolescent Interventions

Do the discouraging results of traditional intervention evaluations mean that, by middle adolescence, we have missed our window for creating positive behavior change? That patterns of behavior have become set, like plaster? We do not think so.

Adolescence is a dynamic period of learning and change (Casey, 2015; Steinberg, 2014; Telzer, 2016), especially, we argue, when what adolescents are learning about is relevant to status and respect in their lives (see Blakemore & Mills, 2014; Crone & Dahl, 2012). We propose three hypotheses:

Hypothesis 1: Compared with younger individuals, middle adolescents show a greater sensitivity to status and respect, resulting from pubertal maturation (e.g., changes in hormones), changes in social context (e.g., school transitions), and social-cognitive developments.

Hypothesis 2: Traditional interventions do not sufficiently honor this greater sensitivity to status and respect, making the interventions less effective.

Hypothesis 3: Improved interventions could honor the sensitivity to status and respect and thereby capture adolescent attention and motivation to create behavior change.

Defining the sensitivity to status and respect

We define *sensitivity to status and respect* as a readiness to align attention, motivation, and behavior with the potentially rewarding feelings that come from attaining status or being respected. In turn, *status* is defined as one's relative rank in a social hierarchy (see Anderson, Hildreth, & Howland, 2015; Maner & Case, 2016; Mattan, Kubota, & Cloutier, 2017). Individuals discern their status in part on the basis of how others treat them, and in particular whether others treat them with *respect* (Anderson et al., 2015; Miller, 2001). Respect is a complex, gestalt social judgment that hinges on whether one is being granted the rights one expects to be granted in one's role in society (see Miller, 2001; Ruck, Abramovitch, & Keating, 1998; see also an analysis of naturalistic respectful language in Voigt et al., 2017). Reports from anthropological, evolutionary, and psychological perspectives have noted that individuals feel respected and that they have high status when they are treated as though they are competent, have agency and autonomy, and are of potential value to the group (e.g., when supporting self-determination rights, Ryan & Deci, 2000; see also a discussion of "prestige" in Maner & Case, 2016). Finally, status and respect-relevant experiences can be highly rewarding (e.g., L. E. Sherman, Payton, Hernandez, Greenfield, & Dapretto, 2016); they elicit social emotions such as pride and admiration, which makes them motivationally salient. Likewise, being disrespected or treated as low status can be painful and elicit social emotions such as shame or humiliation.

Compared with younger students, middle adolescents are more sensitive to status and respect

Evidence from three sources shows that middle adolescents have a greater sensitivity to status and respect than younger individuals.

Pubertal hormones. The first source of evidence involves hormones affected by pubertal maturation, such as testosterone, estradiol, cortisol, oxytocin, and dehydroepiandrosterone (DHEA; e.g., Klapwijk et al., 2013; for reviews, see Blakemore, Burnett, & Dahl, 2010; Peper & Dahl, 2013; Sisk & Zehr, 2005). We focus mostly on testosterone because more is known about its relevance to pursuit and maintenance of status.

Testosterone increases dramatically after the onset of puberty in both boys and girls (see Fig. 6 in Braams, van Duijvenvoorde, Peper, & Crone, 2015). Testosterone is often stereotyped as an "aggression" or "sex" hormone (Eisenegger, Naef, Snozzi, Heinrichs, & Fehr, 2010), but a growing line of research in both humans and animals suggests that it increases the motivation to search for, learn about, and maintain status in one's social environment (De Lorme & Sisk, 2013; Eisenegger, Haushofer, & Fehr, 2011; Josephs, Sellers, Newman, & Mehta, 2006; Mehta & Josephs, 2006; for a review, see Terburg & van Honk, 2013).

At an attentional level, endogenous levels of testosterone predict greater reactivity to status-relevant emotional stimuli (Goddings, Burnett Heyes, Bird, Viner, & Blakemore, 2012). Experimentally administered testosterone has increased adults' attention to status-relevant stimuli, such as cues of physical dominance (Goetz et al., 2014; Welling, Moreau, Bird, Hansen, & Carré, 2016; for a review, see Bos, Panksepp, Bluthé, & van Honk, 2012). Testosterone predicts a readiness to learn about the criteria for status and respect in a given context and then behave in ways that satisfy those criteria. In a classic study, adolescent males high in endogenous testosterone showed greater aggression when they had deviant friends but greater leadership when they did not have deviant friends (Rowe, Maughan, Worthman, Costello, & Angold, 2004). In a recent study with adults, experimentally administered testosterone promoted either antisocial or prosocial behavior depending on which type of behavior the experimenter led participants to believe would enhance status the most (Dreher et al., 2016; for a related Syrian-hamster study, see De Lorme & Sisk, 2013).

Illustrating our model, another recent laboratory experiment (Yeager, Hirschi, & Josephs, 2017) randomly assigned adults to be asked to carry out an unpleasant but healthy behavior (i.e., taking "medicine" that was

actually a spoonful of Vegemite, a yeast extract). Language was either respectful and honored autonomy and competence (e.g., "you might consider taking the medicine") or was disrespectful and threatened autonomy and competence (e.g., "just take the medicine"; see Vansteenkiste, Simons, Lens, Sheldon, & Deci, 2004). Respectful language increased adherence—participants consumed 60% more medicine—and sensitivity to respectful language was stronger among those high in endogenous testosterone (measured via saliva) and also among low-testosterone individuals who were administered testosterone (via nasal spray; Yeager, Hirschi, & Josephs, 2017). This is direct evidence for a key claim of our model: Testosterone—a hormone implicated in pubertal maturation—causes an increased behavioral responsiveness to respectful treatment.

Reactivity to social threat. Second, at multiple levels of analysis, middle adolescents have shown greater reactivity to experiences that threaten status. In one study, middle adolescents (age 15) showed a significant cortisol response when they faced a social threat (i.e., the Trier Social Stress Test or TSST; Kirschbaum, Pirke, & Hellhammer, 1993), but children and early adolescents (ages 9–13) did not (Gunnar, Wewerka, Frenn, Long, & Griggs, 2009). The exception was 13-year-old girls, who did show cortisol reactivity. This finding is consistent with the notion that pubertal maturation (which girls experience at earlier ages than boys do), and not chronological age, causes a greater sensitivity to status and respect threats. In another study, middle adolescents who suffered a threat to status (i.e., peer rejection) reported greater distress and showed more neural activation in regions associated with social cognition compared with children or younger adolescents (Gunther Moor, van Leijenhorst, Rombouts, Crone, & Van der Molen, 2010). Furthermore, the simple act of being watched by a peer elicited more embarrassment among middle adolescents than among younger individuals (Somerville et al., 2013; see also research on the adolescent "imaginary audience" by Elkind & Bowen, 1979).

Social-cognitive developments. Third, middle adolescents come to perceive adult authorities' efforts to influence their behavior, even when seemingly benign, as a sign that they are being disrespected or deprived of full adult status. Research on self-determination rights (Ruck et al., 1998; Ruck, Peterson-Badali, & Day, 2002; also see Ryan & Deci, 2000; Smetana & Villalobos, 2009) shows that adolescents, compared with children, come to disagree with adults' judgments that they are not ready to display agency and control over personal choices. In one study (Ruck et al., 1998), participants ages 8 to 16 responded to scenarios in which, for example, an adolescent wrote a story for the school newspaper that was critical of school rules, and the principal suppressed it. Only about half of the children and early adolescents (age 8–12) said the adult should have respected the adolescent's right to exert agency over the situation, compared with nearly three fourths of middle adolescents (ages 14–16; calculations conducted with statistics reported in Table 2 of Ruck et al., 1998, p. 208). More tellingly, eighth graders (roughly age 14) had the largest gap between their beliefs that adults should respect their right to make their own choices, on the one hand, and adults' beliefs about what adolescents are competent enough to do so, on the other (Ruck et al., 2002; also see Ruck et al., 1998; for a related perspective on the "maturity gap," see Moffitt, 1993).

Interventions can become ineffective when they fail to honor this adolescent sensitivity to status and respect

We argue that many universal school-based preventative interventions, both in what they say and in how they say it, insufficiently honor adolescents' desire to feel respected and accorded status. This can make the interventions less effective than they otherwise could be.

What the interventions say. What might ineffective interventions be saying that conflicts with adolescents' desire to feel respected and high status? Traditional interventions often focus on providing knowledge or self-regulation skills with the intent of suppressing short-term desires for the sake of long-term goals. In doing so, these interventions may ignore or fight against the powerful reasons why adolescents are engaging in the "problem" behavior in the first place (for a related argument, see Ellis et al., 2012).

Recall the ineffective antibullying interventions for adolescents (Yeager et al., 2015). Why do adolescents bully? It is not always because they fail to understand that aggression hurts others or because they categorically lack self-control. Although deficits in social and cognitive skills predict greater bullying in childhood, as expected, the same is not true for high school students (for meta-analytic evidence, see Cook, Williams, Guerra, Kim, & Sadek, 2010). Middle adolescents often bully to gain or demonstrate social status (Pellegrini & Long, 2002). Moderately or highly popular youths—who often have sufficient self-regulatory skills and knowledge of societal norms about aggression, but also have the requisite social competence to strategically undermine others' reputations—often bully the most (Faris & Felmlee, 2011; see Yeager et al., 2015 for a review). Hence traditional interventions that enhance social and cognitive skills among middle adolescents are not always addressing the underlying motivation—a desire to gain or demonstrate social reputation—and may even be increasing the social skills young people need to bully more effectively.

How the interventions say it. How do traditional interventions deliver their messages, and how might these modes of delivery be problematic? Heavy-handed methods of instruction—lectures, assemblies, homework—may backfire even when they are disseminating relevant information. Many adolescents are already aware that risky behaviors are bad for their health (for a review, see Reyna & Farley, 2006). Imparting information that adolescents feel they already have, repeatedly over multiple sessions and in multiple forms, may come across as infantilizing and therefore disrespectful.

We note that research has not definitively shown that how an intervention presents its message—its format or tenor—can threaten status or respect and undermine behavior change. However, research has shown that adult-delivered messages that come across as nagging can affect relevant adolescent brain activity. One study found that maternal nagging activated anger-related regions and reduced activity in regions related to planning how to change behavior (Lee, Siegle, Dahl, Hooley, & Silk, 2014).

Furthermore, skill-building programs that require high school students to risk social status to participate can reduce use of the program—even when adolescents know that the skills are useful for their long-term goals. For instance, one field experiment made an SAT-prep course seem to have low status. This decreased signups for the free course, even though students believed the course was helpful and knew that high SAT scores were critical for college admission and long-term success (Bursztyn & Jensen, 2015).

Finally, Allen, Philliber, and Herre (1994) showed that adolescents' reports that an intervention supported their feelings of autonomy—a key contributor to feelings of respect and status in adolescence—moderated the efficacy of a school-based preventative intervention on outcomes such as course failures, suspensions, and pregnancy. When adolescents felt "like the facilitator makes all the decisions" and "the facilitator doesn't listen to things they say," they benefitted less from the intervention, but when adolescents got "to help decide what the group will do" and felt that the "facilitator really listens to things they say," they benefitted more from the intervention (Allen et al., 1994).

More effective interventions honor the sensitivity to status and respect and promote attention, motivation, and behavior as a result

Last, we hypothesize that it may be possible to capitalize on adolescents' sensitivity to status and respect and redirect it toward positive behavior change.

Imagine interventions that make a young person feel that he or she is worthy of respect and is admired by others. In such interventions, young people would be treated in accordance with their worthwhile knowledge, their ability to exercise agency in life, and their potential to make a contribution and be of value to the group. Perhaps even time-limited exposures to such feelings of status and respect could, during this sensitized period of adolescence, be enough to start a meaningful change in behavior. In the remainder of the article, we discuss various methods to move programs closer to achieving this possibility.

Three Case Studies

Overview

We present concrete examples of interventions that, in various ways, were sensitive to adolescents' desire for status and respect. These illustrate three different approaches:

- Harnessing the adolescent desire for status and respect.
- Making interactions with adults more respectful.
- Lessening the influence of status and respect threats.

This list is illustrative, not exhaustive. Examples come from the domains of unhealthy snacking, school discipline, and aggression. All of the interventions were evaluated with participants who were between the second semester of 7th grade and the second semester of 10th grade, which is the age range during which traditional interventions lose effectiveness, on average.

Because these represent relatively new approaches, the interventions are more limited in scope, and the data are usually from shorter-term demonstrations of efficacy (sometimes 1 day to a few weeks). However, each case we present shows initial promise, speaks to the theoretical model proposed here, and includes evidence of mechanisms. Therefore, each may serve as a guide for the development or improvement of future interventions.

The examples come primarily from studies that we or our colleagues conducted, because we know them intimately and, more importantly, because they included measures of our proposed mechanisms. However, many other examples could have illustrated similar points, most notably in the domain of academic achievement (J. M. Aronson, Fried, & Good, 2002; Blackwell, Trzesniewski, & Dweck, 2007; Cohen, Garcia, Purdie-Vaughns, Apfel, & Brzustoski, 2009; Destin & Oyserman, 2009; Eskreis-Winkler et al., 2016; Gehlbach et al., 2016; Good, Aronson, & Inzlicht, 2003; Hulleman & Harackiewicz, 2009; Paluck & Shepherd, 2012; D. K. Sherman et al., 2013; Stephens, Fryberg, Markus, Johnson, & Covarrubias, 2012; for a review, see Wilson, 2011).

Table 1. Programs to Promote Healthy Eating

Program characteristic	Common features of traditional interventions	An intervention that harnesses the desire for status and respect
What they say	• This is how your body processes unhealthy foods. • Eating healthy (and avoiding junk) now will make your body healthier later when you're older.	• Food companies pay scientists to make junk food addictive to children's brains. • Companies hired former tobacco executives to market addictive junk to children and poor people. • Those executives won't let their own children eat the junk food. • Every time you buy junk food, you give money to rich people who think you don't know any better.
How they say it	• Classroom lectures from teachers • Whole-school assemblies • Colorful diagrams or videos • Skits and role plays • Parent training, so kids get the message at home • Homework	• Exposé of harmful food industry practices • Quotes from outraged high-status upperclassmen who vowed to change their habits • Writing a persuasive essay to future students

Note: Common features of traditional interventions are abridged from descriptions of materials often disseminated in schools (Let's Move, 2017) or described in past meta-analyses (Stice, Shaw, & Marti, 2006).

Finally, each of the interventions reviewed in detail required relatively little time for participants to complete. This does not mean that they took relatively little time to *develop*; R&D can last several years and involve thousands of participants (e.g., Yeager, Romero, et al., 2016). Nor does the brevity of the interventions we highlight mean that longer and more comprehensive interventions cannot be attuned to the adolescent desire for status and respect. We review successful, longer interventions after the three main cases.

Harnessing the adolescent desire for status and respect: the case of unhealthy snacking

Can the adolescent desire for status and respect be harnessed and put to use in the service of healthy behavior? Bryan and colleagues (2016) recently developed a behavioral approach to reduce junk-food snacking among 8th-grade students. Bryan et al. (2016) began with the presumption that, for many adolescents, healthy eating is construed as low status—for instance, adolescents may believe that "healthy eaters are lame nerds who do what their parents tell them." To combat this, Bryan et al. (2016) sought to redefine what it meant to be a healthy eater so that it had greater social-status appeal, by creating the impression that "healthy eaters are independent-minded people who make the world a better place."

What did the intervention say to make healthier eating seem to have high status? The Bryan et al. intervention took the form of an exposé of industry practices (see Table 1, rightmost column). It used journalistic accounts (e.g., Moss, 2013) to describe how food companies pay scientists to make junk food addictive to children's brains; how companies hired former tobacco executives to use cartoons to market the food to children so they could become addicted; and how food executives themselves will not eat the junk food or let their children eat it, making them hypocrites.

Hence, the intervention led to the conclusion that people who buy junk food are giving money to executives who are disrespecting young people by thinking they will not stand up for themselves. Viewed from this perspective, being the kind of person who stands up to these executives by eschewing junk food enhances one's status—it allows one to join a social movement, and it affords the chance to demonstrate one's competence and mastery over adult authorities.

The Bryan et al. (2016) approach was inspired in part by the "truth" antismoking campaign (https://www.thetruth.com; Farrelly, Davis, Haviland, Messeri, & Healton, 2005; Farrelly et al., 2002; Henriksen, Dauphinee, Wang, & Fortmann, 2006). In the truth campaign, television advertisements depicted rebellious, autonomous adolescents flooding the streets, screaming into megaphones at rich, old tobacco executives in high-rise buildings in Manhattan, telling them to "take a day off" from tricking and harming children for the sake of profit. This harnessed the desire for status and respect. In an evaluation study, teens exposed to the truth campaign said "not smoking is a way to express independence" and disagreed that "smoking makes people your age look cool" (Farrelly, Davis, Duke, & Messeri, 2009). The truth campaign was estimated to have prevented 450,000 adolescents from initiating smoking (Farrelly, Nonnemaker, Davis, & Hussin, 2009).

How did the Bryan et al. (2016) intervention convey its message? It used now-common methods for social-psychological interventions, which, in retrospect, appear to offer respect and high status (Cohen, Garcia, & Goyer, 2017; Cohen & Sherman, 2014; Walton, 2014; Yeager & Walton, 2011). These social-psychological intervention methods do not tell adolescents what to do and what not to do, so much as they invite adolescents to discover the meaning of the messages for their own lives, which honors adolescents' expectation that they not be treated like children.

For instance, the Bryan et al. (2016) exposé article takes the form of a news article that the food industry does not want consumers to read—giving it an illicit status. Next, adolescents, after reading the article, read quotes from irate, high-status older adolescents (e.g., high school football players) who previously read the article and vowed not to eat junk food out of protest. This capitalizes on the psychology of *descriptive norms*—or the notion that individuals may conform to the choices of relevant others when presented with consensus information about their behaviors (Cialdini, 2003). Descriptive norms directly influence adolescents' willingness to conform to behavior, especially when norms come from high-status peers (see Helms et al., 2014).

Adolescents were next asked to author a letter to a future student (i.e., to engage in self-persuasion) in which participants explained how they planned on rebelling against the food companies by eating healthy food and avoiding junk food (for a review of self-persuasion, see E. Aronson, 1999). First, self-persuasion respects a person's potential for personal agency—the prompts do not say "you have to believe this" but rather "would you mind choosing to write an argument for why someone might want to believe this?" (see Vansteenkiste et al., 2004). Second, self-persuasion respects a person's competence—it implies that they "have wisdom and experience to share with a peer that we adults may not have," as opposed to "we know the facts and you do not." Third, self-persuasion respects a person's purpose and value to the group by allowing adolescents to engage in a prosocial act of helping future students learn important information.

Bryan et al. (2016) call the exposé article a "values-harnessing" treatment. It showed efficacy in an initial, double-blind, randomized, behavioral experiment with over 450 eighth-grade students (Bryan et al., 2016). The evaluation involved two control conditions: a no-treatment control and a traditional healthy-eating control that used materials from contemporary government antiobesity efforts (i.e., http://www.choosemyplate.org) and appealed to the long-term benefits of eating healthy (See Table 1). All conditions included self-administered reading and writing exercises, lasted approximately 30 min, were randomized at the student level, and were administered in sealed, individualized packets during class.

The key behavioral outcome was measured the next day. The principal announced that the entire 8th-grade class would get a "snack pack" as a reward for good behavior during state testing; students received a menu that had healthy food options (fruit, nuts, water) and unhealthy food options (Hot Cheetos, Oreos, Coca-Cola).

The Bryan et al. (2016) values-harnessing treatment reduced the total sugar content of the selections by 3.6 g, or 9% (d = .20) compared with the two control conditions, which did not differ. And, more important for the framework advanced here, a mediational analysis showed that the values-harnessing treatment caused adolescents to construe healthy eating as more aligned with the desire for status and respect. The treatment increased the social-status appeal of the healthy behavior ("I respect healthy eaters more than unhealthy eaters"), and this mediated the effects of the treatment on behavior (Fig. 2).

The Bryan et al. (2016) values-harnessing intervention is, of course, not the whole solution to adolescent obesity. The follow-up was only 1 day after the intervention, and the intervention would mostly likely need to be coupled with programs to increase the availability of healthy foods, especially in low-income communities. Instead, the Bryan et al. (2016) approach is an early-stage investigation that helps develop theory. It illustrates one way that adolescents' prioritization of status and respect-relevant learning can be harnessed for positive change. This approach may well prove useful in other domains of health behavior.

Making interactions with adults more respectful: the case of race disparities in middle school discipline

The values-harnessing approach tries to make adolescents more aware of how some adults were disrespecting them and then channels the resulting feelings into positive behavior change. A second approach is to change the environment and reduce adolescents' experiences of being disrespected by the adults around them, which can engender greater adherence with rules and procedures. Our second case focuses on methods to address discipline infractions, with particular attention to disparities in the rates at which Latina/Latino or African American youths are disciplined compared with their White or Asian peers (see Carter, Fine, & Russell, 2014; Crenshaw, Ocen, & Nanda, 2015; Losen, 2014; Okonofua, Walton, & Eberhardt, 2016; Tyler, Goff, & MacCoun, 2015).

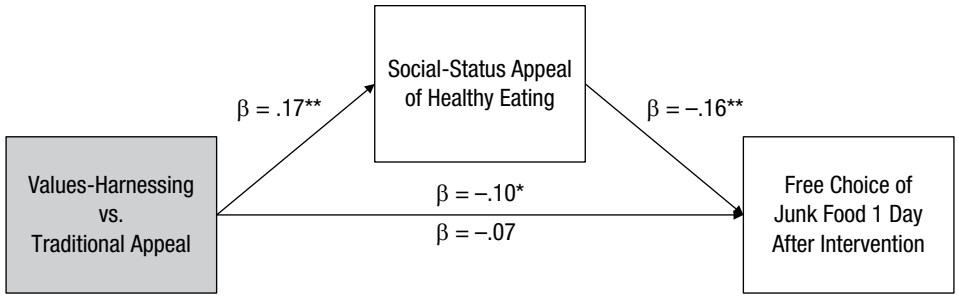

Fig. 2. Mediation model showing the effect of values-harnessing versus traditional appeals on the free choice of junk food 1 day after the intervention, as mediated by the social-status appeal of health eating (N = 468). On the path from values-harnessing versus traditional appeals to the free choice of junk food 1 day after the intervention, the values above the arrow are for the unconditional direct effect (path c), and the values below the arrow are from the model that included the mediator (i.e., the indirect effect; path c'). Asterisks indicate significance of path coefficients (*p < .05, **p < .001). Figure adapted from Bryan et al. (2016), copyright © 2016 by the National Academy of Sciences of the United States of America.

Intuitively, one might expect that school discipline problems could be solved by creating strong threats to deter deviant behavior in school (i.e., zero-tolerance policies; see Table 2, left column). This zero-tolerance approach, however, has produced very few benefits in numerous evaluations. In some cases, zero tolerance has increased racial disparities, perhaps by licensing authorities to rely on stereotypes when doling out harsh punishments (American Psychological Association Zero Tolerance Task Force, 2008; Heitzeg, 2009).

An alternative approach stems from the possibility that disparities in discipline infractions are due, in part, to daily experiences of disrespect that come from being targeted by stigma and stereotypes (Okonofua, Walton, et al., 2016). When individuals are disrespected by authorities, they perceive it to be unjust (see Miller, 2001). When individuals perceive injustice, it undermines the legitimacy of an institutional authority and erodes a willingness to comply (see Tyler, 1990).

A potential method to reduce school discipline problems among adolescents, then, is to make the environment more respectful (for a related argument in criminology, see Tyler, 2006). Recall that programs that implement *restorative justice*—or the tendency to work collaboratively with a young person to repair relationships and reputation after an offense, such as through conferences or victim-offender mediation—were among the only traditional programs to reduce recidivism in the juvenile justice system (Gregory, Clawson, Davis, & Gerewitz, 2014; Schwalbe et al., 2012). Restorative-justice

Table 2. School Discipline Interventions

Program characteristic	Common features of traditional interventions	An approach that increases displays of respect from authorities
What they say	• We have zero tolerance for misbehavior. • Any misbehavior will be met with harsh punishment. • Punishments for repeat offenses will escalate.	• There is a high standard for behavior and achievement here. • We believe you have the potential to meet this standard. • If you make mistakes, it is part of the learning process. • Here is how we plan to support you as we work together to meet this high standard.
How they say it	• Clearly communicating prohibitions (e.g., "no fighting" signs on the walls) • Systems for accounting for bad behavior (e.g., demerit systems, token economies) • Vigilant supervision by in-school police officers, hall monitors, etc.	• Creating a context of respect with multiple adults, in which adults know students' core values and are empathic about underlying causes of behavior • Procedural justice: fair application of rules • Opportunities to learn and grow after mistakes

Note: Common features of traditional interventions are abridged from published descriptions of programs (American Psychological Association Zero Tolerance Task Force, 2008; Heitzeg, 2009).

interventions honor young people's ability to self-govern and they presume their good intentions, perhaps creating an experience of respect and encouraging rule following.

In a similar spirit, two studies, which we review in detail, illustrate how adults might create respectful environments in schools and how these environments can reduce the prevalence of disciplinary infractions. First, Okonofua, Paunesku, and Walton (2016) evaluated an intervention for middle school that was designed to change teachers' beliefs about discipline—that discipline should be empathic, not zero tolerance. Treated teachers were encouraged to see students' subjective psychologies—students' "back-stories" for their misbehavior—and try to find other ways to help students meet their goals of doing well and being happy in school.

The Okonofua, Walton, et al. (2016) empathy-training intervention took roughly 30 min for teachers to complete and was evaluated in a randomized trial with roughly 35 teachers and 1,200 students. Official records showed that students who took a class with treated teachers showed half as many suspensions in school (9% of students vs. 4.5%), and effects generalized beyond the class with the treated teacher. In results supporting the model proposed here, previously suspended students reported that their classrooms were now more respectful when they had a teacher who completed the empathy intervention. That is, students responded to greater respect by following school rules and meriting fewer suspensions (also see Gregory et al., 2016).

Second, Yeager, Purdie-Vaughns, et al. (2014, 2017) have tested the hypothesis that an intervention to make an academic interaction with a teacher feel more respectful can reduce disciplinary infractions, even without directly targeting students' misbehavior or teachers' views of students' misbehavior. Cohen, Steele, and Ross (1999) developed a technique called *wise feedback* (see Goffman, 1963), in which an authority figure justifies critical feedback on someone's work with an appeal to high standards (conveying respect for one's competence by setting a high bar), accompanied by an assurance of one's potential to reach the high standards (conveying respect for one's competence by implying that one can improve and develop; see Lepper & Woolverton, 2002; Treisman, 1992; see also research on natural mentors, Hurd, Sánchez, Zimmerman, & Caldwell, 2012).

Yeager, Purdie-Vaughns, and their colleagues evaluated wise feedback in late middle school using a small-sample, double-blind field experiment in two consecutive cohorts of White and African American youths (Yeager, Purdie-Vaughns, et al., 2014, Yeager, Purdie-Vaughns, et al., 2017). Students nearing the end of the 7th grade wrote first-draft essays that were critiqued by their social studies teachers, all of whom were White. When essays were returned, they were accompanied by randomly assigned notes, handwritten in advance by their teachers. Half received a control note ("I'm giving you these comments so that you'll have feedback on your paper") and half received a wise-feedback note ("I'm giving you these comments because I have very high expectations and I know that you can reach them").

Yeager, Purdie-Vaughns, et al. (2014) expected that wise feedback would be most effective for African American youths, who, surveys showed, were more likely than their White peers to have experienced disrespect as a result of either negative stereotypes and to have been subjected to inequitable discipline. The experiment was replicated across two cohorts in the same classrooms. In the first cohort (n = 44; Study 1), relative to the control note, the randomly assigned wise-feedback note increased African American students' willingness to revise the essay from 17% to 72% (covariate-adjusted values; Yeager, Purdie-Vaughns, et al., 2014). In the second cohort (n = 44; Study 2), the wise-feedback note increased the scores on the revisions when everyone was required to revise. In both cohorts, treatment effects were small and nonsignificant for White students. The wise-feedback note most strongly changed behavior and feelings of being respected by teachers in general among those African American students who, over the previous 2 years, had felt disrespected—i.e., who repeatedly disagreed that "teachers and other adults treat me with respect" (Yeager, Purdie-Vaughns, et al., 2014).

Critically, over a year later, Yeager, Purdie-Vaughns et al. (2017) found that the wise-feedback note resulted in a reduction in discipline problems for African American students, even though students had moved on from the teachers who delivered the wise feedback. That is, averaging across the two cohorts, African American students in the group who received the wise-feedback note in the spring of the 7th grade showed fewer 8th-grade discipline incidents across all classes, halving the discipline gap (Yeager, Purdie-Vaughns, et al., 2017). As in the short-term results, there were no benefits for White students, who were also far less likely to be disciplined (see Fig. 3).

The studies by Okonofua, Paunesku, et al. (2016) and Yeager, Purdie-Vaughns, et al. (2017) illustrate a few points about adolescent behavior change. First, it is not always necessary to stoke the fire of reactance to achieve adolescent behavior change, as was done in the values-harnessing healthy-eating treatment (Bryan et al., 2016) or the truth campaign (Farrelly et al., 2005). A credible show of dignity and respect, during a period

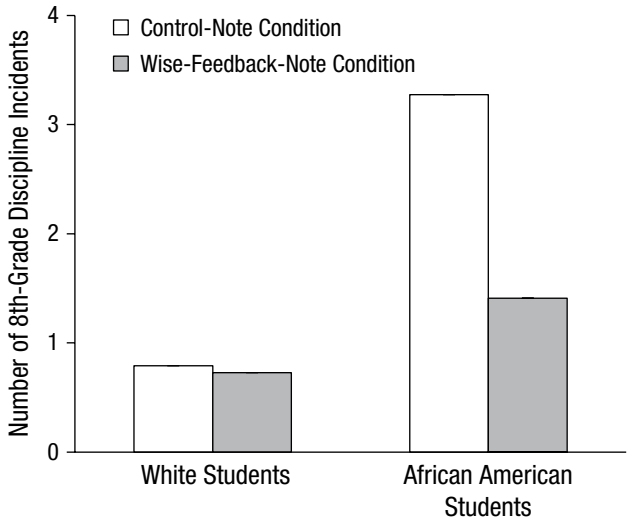

Fig. 3. The relationship between number of 8th-grade discipline incidents for White students and African American students, displayed separately for students in the control-note condition and students in the wise-feedback-note condition ($N = 88$). The students were given the notes in the spring of their 7th-grade year, and 8th-grade discipline incidents were calculated 1 year later. Data are from Yeager, Purdie-Vaughns, Hooper, and Cohen (2017).

of status sensitivity, dampened adolescents' feelings of being disrespected by authorities.

Second, the research in this section highlights the importance of relationships with adults, not only peers (see also research on natural mentors; Hurd et al., 2012). Some research has rightly emphasized adolescents' heightened concern with peers (Chein, Albert, O'Brien, Uckert, & Steinberg, 2011; Crosnoe & McNeely, 2008; Larson & Richards, 1991) and adolescents' tendency to ignore adults' requests to change behavior (Lee et al., 2014). However, adolescents also value the opinions of respected adults and willingly comply under the right conditions (Engelmann, Moore, Capra, & Berns, 2012). Said another way, going through the peer group is not the only way to improve adolescent behavior. Relationships with valued adults can be transformative for young people as well (see also Allen, Moore, & Kuperminc, 1997).

Lessening the influence of status and respect threats: the case of high school aggression

Sometimes it will not be possible to use these first two methods (harnessing values or changing environments), and so a third approach may be useful: lessening the influence of threats to status and respect by changing mind-sets. Adolescents should not be oblivious to social threats, of course, but they may benefit from perceiving the threats as less definitive. We illustrate this third approach in the context of high school aggression—an area in which, as noted, it has been difficult to identify programs that show average benefits for middle adolescents (Yeager et al., 2015; see also Table 3, left column).

Our analysis starts with the observation that the threat of losing status or being disrespected may be more influential when it feels diagnostic of a lasting future as a lonely, isolated, dominated, or low-status person. From the perspective of a new high school student, being left out of a party or ridiculed on social media might not be only a temporary inconvenience. It could seem to mean that you will have no friends or will be ridiculed for the 4 years of high school and beyond.

Our research has shown that adolescents' beliefs that people's socially relevant traits and labels are fixed and unchangeable—called an *entity theory of personality*—can predict whether social difficulty makes one feel permanently disrespected (see Yeager, 2017; Yeager & Dweck, 2012; also see Dweck, Chiu, & Hong, 1995; Erdley & Dweck, 1993; Heyman & Dweck, 1998). For example, studies have found that a survey measure of an entity theory of personality predicts adolescents' responses to social adversity. Research participants reporting more endorsement of an entity theory also reported greater shame and humiliation when they imagined being excluded or made fun of (Yeager, Trzesniewski, Tirri, Nokelainen, & Dweck, 2011).

Fortunately, teaching the belief that traits and labels are malleable and have the potential to change—called an *incremental theory of personality*—lessens the influence of social conflict (Yeager, 2017; Yeager, Johnson, et al., 2014; Yeager, Miu, Powers, & Dweck, 2013; Yeager et al., 2011). Interventions involving incremental theories of personality demonstrate that implicit theories have a causal impact on coping with status and respect threats. Incremental theory interventions teach that people have the potential to change—that if bad things happen, you are not stuck having a low-status label forever (e.g., as a "loser" or a "victim"). This different worldview can alter the meaning of social events and what emotions social events elicit (Yeager et al., 2011).

Experiments have found that teaching an incremental theory can improve adolescent coping after status and respect threats. An incremental-theory-of-personality intervention—for example, the Cyberball exclusion (Yeager, Johnson, et al., 2014) or the TSST (Yeager, Lee, & Jamieson, 2016)—has reduced self-reported stress, anxiety, and feelings of threat after negative social evaluation experience that occurred moments after the intervention. As one example, when high school students were asked to give a speech about what makes teenagers popular, in front of judgmental, older peers,

Table 3. Interventions to Reduce High School Aggression

Program characteristic	Common features of traditional interventions	An intervention that lessens the influence of a threat to status or respect
What they say	• Bullying and aggression are not allowed. • You should not be mean, call people names, hit people, exclude people, or start rumors about people. • If those things happen to you, you should think positively and use positive coping skills.	• People have the potential to change themselves or their social places in life. • Therefore people are not stuck being one kind of person—a loser or a bully.
How they say it	• Classroom lectures from teachers • Online activities to reinforce the message • Whole-school assemblies • Token economies for good behavior • Skits and role plays • Parent training, so kids get the message at home • Homework	• Stories of formerly aggressive people or shy people who learned other ways to be • Scientific evidence for how this was possible, drawing on neuroscience and field experimentation • Stories from peers who found this information helpful • Self-persuasion writing exercises

Note: Common features of traditional interventions are abridged from descriptions of programs in past meta-analyses (e.g., Yeager, Fong, Lee, & Espelage, 2015).

those who received the incremental-theory intervention (i.e., the TSST) showed reduced threat-related cardiovascular responses (lower total peripheral resistance and higher stroke volume) and hypothalamic-pituitary-adrenal-axis reactivity (lower cortisol; Yeager, Lee, & Jamieson, 2016). Similar findings appeared in a study of adolescents with elevated internalizing symptoms (Schleider & Weisz, 2016). Moreover, an incremental-theory intervention reduced high school students' salivary cortisol 1 week later, especially on days when they reported social-evaluative threats (Yeager, Lee, & Jamieson, 2016).

More directly relevant to our model, incremental-theory interventions have reduced aggressive retaliation. In one field experiment conducted by Yeager, Trzesniewski, and Dweck (2013), facilitators taught the incremental theory of personality through six classroom workshops that used autonomy-supportive language, opportunities for self-persuasion, and capitalizing on descriptive norms (stories from upper classmen who found the messages helpful; see Walton, 2014). In a double-blind field trial conducted in 9th- and 10th-grade classrooms, the incremental-theory intervention was compared with a traditional coping-skills intervention that taught the best available content (analogous to interventions meta-analyzed by Durlak et al., 2011) and with a no-treatment control.

In the Yeager, Trzesniewski, et al. (2013) experiment, the coping-skills control group did not try to lessen the influence of a status or respect threat by changing its meaning. Instead, like many traditional interventions reviewed earlier, the coping-skills control emphasized the need to think positively and not overgeneralize from one bad event to one's life in general. These messages were delivered in a respectful way, however—including using descriptive social norms, autonomy-supportive practices, and self-persuasion. The control group's developmentally attuned delivery mechanism allowed for an unconfounded test of the impact of the message and its delivery.

At 1-month follow-up, adolescents in the Yeager, Trzesniewski, et al. (2013) experiment responded to a threat to peer status and respect: exclusion in a Cyberball game (Williams & Jarvis, 2006; Williams, Yeager, Cheung, & Choi, 2012). Aggression was measured by allowing participants to allocate unpleasantly spicy hot sauce to a peer who had just excluded them. Adolescent participants (temporarily) believed that the peer disliked hot sauce and would have to consume the entire sample (see Lieberman, Solomon, Greenberg, & McGregor, 1999). (Participants were debriefed afterward.)

Adolescents who received the traditional coping-skills intervention did not allocate any less hot sauce (i.e., were not any less aggressive) compared with the no-treatment control group (Fig. 4). What adolescents in the coping-skills group learned was not relevant to the meaning of a peer status or respect threat, and so it did not change aggressive retaliation (see Yeager et al., 2015). Inert content, even when delivered in a respectful way, should not change behavior.

Meanwhile, adolescents who received the incremental-theory-of-personality intervention allocated 40% less hot sauce (representing less aggressive retaliation) than did the adolescents in the combined coping-skills and no-treatment control groups (Yeager, Trzesniewski, et al., 2013; Fig. 4). The benefits of the intervention for aggressive behavior were confirmed 3 months after the intervention, when teachers (blind to condition) were

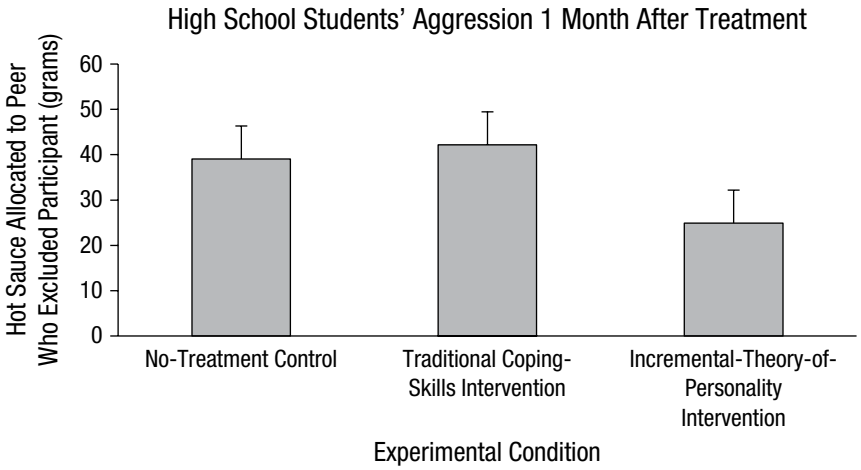

Fig. 4. Changing the meaning of a threat to status/respect reduced aggression for high school adolescents, whereas a traditional antiaggression intervention that taught coping skills did not. Bars represent 1 standard error of the mean.
Source: Yeager, Trzesniewski, and Dweck (2013).

more likely to nominate treated students as having improved their behavior compared with the students from the combined control groups (Yeager, Trzesniewski, et al., 2013).

Interventions involving implicit theories of personality can change the meaning of status and respect threats and thereby lessen the impact of such threats. This approach can be useful in reducing important and undesirable responses to status threats, such as aggression. More generally, it is not always necessary or advisable that interventions only help adolescents "win the status game." Sometimes it is desirable to help adolescents feel as though they do not have to play the status game so vigorously.

Is shorter always better?

The effective interventions highlighted here usually required less time from participants than traditional interventions. This could be important to their effectiveness. Stice and his colleagues found in two meta-analyses that shorter interventions had stronger effects (Stice et al., 2006, 2009). Perhaps shorter interventions have an easier time maintaining treatment fidelity, or perhaps shorter interventions are less likely to imply to recipients that they are viewed by adults as lacking in competence.

And yet our model does not require shorter interventions; longer interventions can be attuned to status and respect. For instance, in past studies, intervention designers have created multisession educational workshops that involve a high-social-status "brand," endorsed by influential peers, in support of the targeted behavior. This has reduced teen smoking and bullying (compare Biglan, Ary, Smolkowski, Duncan, & Black, 2000, and Gordon, Biglan, & Smolkowski, 2008; for an example with antibullying program, see Paluck, Shepherd, & Aronow, 2016). Programs have also respected adolescents' autonomy and desire to "matter" to others by wrapping psychoeducational content in a relatively long volunteer service program (i.e., the Teen Outreach Program; Allen, Philliber, Herrling, & Kuperminc, 1997). This program reduced female teen pregnancy from 9.8% to 4.2%, reduced suspensions from 29% to 13%, and reduced course failure rates from 47% to 27%.[2]

One multisession intervention, called Becoming a Man (BAM), reduced youth violence. Instead of being didactic, BAM used a democratic discussion group (see also Lewin, Lippitt, & White, 1939) that focused on finding ways besides violence to maintain high status and peer respect, and it did so without adults "tell[ing] youth the 'right' thing to do" (Heller et al., 2015, p. 6). In Chicago, Illinois, BAM reduced arrests among youths of color by 28% to 35% and violent crime by 45% to 50%, and it increased high school graduation by 12% to 19% at long-term follow-up (Heller et al., 2015). In general, programs that reduce aggression by offering adolescents the opportunity to take on meaningful roles in their communities (e.g., Ellis, Volk, Gonzalez, & Embry, 2016) exemplify many of the principles we have tried to summarize here because they honor adolescents' sensitivity to experiences of status and respect.

Discussion

We have argued that traditional interventions sometimes work against adolescents' prioritization of experiences of status and respect, in terms of both what those interventions say and how they say it (Tables 1–3). Yet adolescents' heightened sensitivity to feelings of status

and respect need not thwart adult-delivered interventions. Effective interventions work with those sensitivities and can inspire internalized behavior change.

Our perspective resonates with the Lewinian tension-system approach to behavior change (Lewin, 1952). Like Lewin, we emphasize that sometimes it can be easier to achieve behavior change by taking advantage of motives people already have rather than trying to convince them to have a different source of motivation. In adolescence, effective interventions can align the long-term, healthy choice with short-term feelings of status and respect rather than try to make adolescents care about long-term health more than short-term social success.

Our recommendation is consistent with the arguments of many scholars in educational psychology (Eccles, Lord, & Midgley, 1991), developmental neuroscience (Blakemore & Mills, 2014; Crone & Dahl, 2012; Steinberg, 2014; Telzer, 2016), social psychology (Walton, 2014; Wilson, 2011), sociology (Coleman, 1961; Crosnoe, 2011), evolutionary psychology (Ellis et al., 2012), and community psychology (Watts & Flanagan, 2007), who have emphasized the importance of adolescents' social success for motivation and behavior change. What the present analysis adds is an integration of the relevant developmental science of adolescence with the behavioral evidence emerging from intervention experiments.

We have limited ourselves to universal, school-based preventative interventions in three problem areas—unhealthy snacking, school discipline, and peer aggression. However, it will be important to test which aspects of our model apply to other domains. Could direct efforts at status and respect enhancement improve academic motivation? Could it enhance compliance with medical treatments? We are excited to find out.

We are not arguing that adult-delivered interventions represent the only method for influencing adolescent behavior. There is clearly promise in peer networks (e.g., Paluck et al., 2016) or "nudges" that bypass intentional deliberation or habit (e.g., Hanks, Just, Smith, & Wansink, 2012). Furthermore, in some cases, policies that constrain adolescents' freedoms—such as those regarding age-graded driver's licenses—can prevent death and injury (see Steinberg, 2015).

Yet the model we present here suggests that it would be premature to give up on adult-delivered, school-based universal prevention. Such interventions can play a role in positive youth development, and the alternatives have limitations of their own. Intervening by leveraging peer social networks can have unpredictable or even harmful effects if it causes peers' deviant behavior to become more "contagious" (see Valente et al., 2007, who found that a social network-based intervention increased cocaine use among students who had drug-using peers; see also Helms et al., 2014). "Nudge" strategies are not designed for situations in which one cannot control the relevant environmental cues shaping behavior—as is the case for many of the free-choice behaviors discussed here. Laws that take away rights might prevent risky behavior in the short term, but one must always consider how such laws might deprive youths of opportunities for learning how to be independent and autonomous in the long term, which might slow the transition from child status to adult status in society (for a philosophical discussion of this issue, see Schapiro, 1999).

Nevertheless, we agree with the commentators who have challenged the field's prevailing intuitions about the traditional education and skills-based approach to intervention. Our hope is that the present model encourages mechanism-focused research on improved means for creating internalized, lasting positive behavior change for adolescents by supplementing (but not replacing) social networks, nudges, and wiser laws. Next, we outline several ways that developmental science can push the present framework forward.

From initial motivation to sustained behavior change

The model presented here has not yet established the feedback loops through which an intervention that honors the adolescent desire for status and respect might translate into sustained, internalized changes in behavior (however, see Fig. 1 in both Yeager, 2017, and Yeager, Purdie-Vaughns, et al., 2017). The question of how time-limited interventions can sustain impact is an emerging topic of investigation in the social and behavioral sciences more generally (Bailey, Duncan, Odgers, & Yu, 2017; Fiske, Frey, & Rogers, 2014; Miller, Dannals, & Zlatev, 2017)

The present analysis can contribute to this discussion in two ways. First, we speculate that feelings of respect and status could serve as a gateway to the self—a view that "I am now the kind of person who does this behavior because it makes me feel the way I want to feel"—and therefore create internalization and maintenance of change (see Gerrard, Gibbons, Houlihan, Stock, & Pomery, 2008; also see McAdams & Olson, 2010; Oyserman & Destin, 2010).

Second, initial behavior changes, if timely, can open channels into different social environments or formal structures (for a related perspective, see Bailey et al., 2017; Cohen et al., 2017). A seemingly small initial behavior might alter relations with teachers or peers or involvement with extracurricular activities, which might encourage the behavior further. An initial change in

motivation could place one in institutional pathways (e.g., taking advanced courses or participating in out-of-school activities) that create access to adult mentors or other beneficial resources (for an example in sociology, see Frank et al., 2008). Extending the model presented here and explicitly testing the processes for sustained change—both within the person and between the person and the affordances in the environment—represents an exciting area for innovation.

Advancing a perspective on interventions that is rooted in developmental science

Future studies can test developmental mechanisms for the differences in responsiveness to the interventions described here. We have focused on the rough labels of "middle adolescence" or "childhood" and considered chronological age or grade level as predictors of developmental trends because of the state of the evidence. As noted, however, chronological age is imprecise. In fact, anthropological studies of adolescence largely ignore chronological age and focus instead on the milestones of pubertal maturation and adult role acquisition (e.g., Schlegel & Barry, 1991).

A falsifiable prediction that follows from our framework is that pubertal maturation (in particular, gonadarche) and levels of testosterone (or estradiol, or a combination of these and other pubertal hormones) will moderate responsiveness to traditional interventions (see Yeager, Hirschi, & Josephs, 2017). That is, if pubertal maturation causes an increased coupling of motivation to change and experiences relevant to status and respect, as a result of changes in testosterone and the associated reward-learning systems in the brain, then individuals who show advances in the gonadal aspects of puberty or who have higher testosterone levels should be more strongly resistant to traditional programs that threaten status or respect. Chronological age, indicators of adrenarche, or DHEA, meanwhile, may be less consistent predictors of variability in treatment impacts, especially during ages with great variability in pubertal timing and tempo. We look forward to explicit tests that either confirm or falsify these predictions.

Our predictions are less clear for status-sensitive interventions. On the one hand, individuals who are more gonadally mature and have higher testosterone levels might show greater responsiveness to status-sensitive approaches such as values harnessing (consistent with the findings with adults reported in Yeager, Hirschi, & Josephs, 2017). On the other hand, early adolescence (often ages 10–13) may prove to be an opportune stage for creating enduring change via status-sensitive interventions. Perhaps early adolescents could be taught the notion that healthy behavior conveys high status, and this association might be intensified by pubertal maturation.

Comparisons with children and adults

We are not arguing that status and respect matter only to adolescents and do not matter for children or adults. Even young children can be attuned to status (Rizzo & Killen, 2016), and both children and adults are motivated by the opportunity for self-determination (see Ryan & Deci, 2000). Instead, we argue that during middle adolescence, three things come together: a new meaning of taking away choice or undermining competence (which violates status and respect), the high likelihood of being treated like a child (which violates status and respect), and the motivational prioritization of feelings related to status and respect.

Many of the universal preventative interventions we discuss here may also simply be less relevant at later ages. Problem behaviors have often already begun—or not—by middle adolescence. For instance, almost no one starts smoking for the first time as an adult, and the wages of adults who earn a GED do not match those of peers with an on-time high school diploma (Heckman et al., 2014). Once the school-to-prison pipeline has given one a criminal record or exposed one to deviant peers, the damage is difficult to undo (Heitzeg, 2009).

Furthermore, universal interventions can be easier to deliver during middle adolescence. Before age 17, young people are required by law to be in school, so societies can give beneficial messages to almost entire cohorts of young people. Hence, even if the psychological processes described here remain present in adulthood, it is still critical to study them among adolescents.

Program evaluation research

Last, we see many opportunities for the proposed model to inform program evaluation research. For decades, researchers have focused primarily on whether a program evaluated in a randomized, controlled trial shows main effects. Yet, as null treatment effects of interventions have become more the rule than the exception, researchers have begun to prioritize the study of treatment heterogeneity, defined as the differential effectiveness of interventions across individuals, contexts, or program implementations (Bryk, 2009; Gelman, 2015; Hulleman & Cordray, 2009; Weiss, Bloom, & Brock, 2014). Might students' reports of whether the program made them feel respected predict

heterogeneity in intervention effect sizes? Future evaluations studies could find out.

Conclusion

Our perspective has been that when adults honor adolescents' sensitivity to feelings of high status and being respected, we may find that adolescents show far greater self-regulation, ability to think about the future, and capacity to change than we imagined. The present article provides the beginning of a roadmap for tapping into this powerful source of motivation—one that might result in improvements to both developmental science and societal welfare.

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The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

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Notes

1. The average effect size for universal interventions was not reported in the article by Stice et al. (2009), but we calculated a weighted average using the effect sizes in their Table 4. Stice et al. (2009) also reported a between-study metaregression for age that was not relevant because it combined indicated (i.e., for at-risk youths) and universal interventions; our interest was in universal interventions. In that metaregression, they found a positive effect of age (p. 498), but it was driven by the college-student studies, which were only indicated and not universal.
2. Attempts to replicate the Teen Outreach Program have met with mixed results (Francis et al., 2016). In four of the five replications, the control group received key features of the treatment; in the one replication in which this was not true, the Teen Outreach Program benefits were replicated.

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