BUILDING EMPATHY
THROUGH PSYCHOLOGICAL INTERVENTIONS

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Abstract

Empathy—the ability to share and understand others' emotions—is a social bridge that connects people to one another. It facilitates important outcomes including prosocial behavior, emotional wellbeing, and social centrality, and reduces harmful social forces like prejudice and bullying. Given these benefits, researchers have tried to increase empathy through intervention, often developing a person's empathy-related skills like emotion recognition and empathic communication. But skills-related interventions overlook an essential determinant of empathy: people's *desire* to empathize. I propose that increasing people's motivation to empathize through psychological intervention can create enduring and generalizable changes in empathy that practically benefit people's social and emotional lives.

In this dissertation, I design, administer, and evaluate novel, motivation-based empathy interventions within two populations undergoing significant life changes: college freshmen (chapter 2) and seventh graders (chapter 3). I find that these interventions addressing people's mindsets of empathy or their perceptions of the social normativity of empathy differentially elicit changes in empathy and social behavior in these two groups. These data suggest that shifting motivation related to empathy is a promising new tool for improving social and emotional outcomes during important developmental periods.

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You were right. All went well.

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CHAPTER 1: INTRODUCTION

"Humans aren't as good as we should be in our capacity to empathize with feelings and thoughts of others, be they humans or other animals on Earth. So maybe part of our formal education should be training in empathy. Imagine how different the world would be if, in fact, that were 'reading, writing, arithmetic, empathy."

-Neil deGrasse Tyson

1.1 Leveraging motivation to increase empathy

In spring of 2006, Senator Barack Obama stood in front of a sea of graduating Northwestern students and challenged them to cultivate empathy. "We live in a culture that discourages empathy," Obama cautioned. "A culture that too often tells us our principal goal in life is to be rich, thin, young, famous, safe, and entertained. A culture where those in power too often encourage these selfish impulses" (Obama, 2006).

Twelve years later, as international tensions escalate, as hateful rhetoric creeps into normal political discourse, walls are built, and isolationist policies propagated, empathy feels more important than ever. Empathy—the ability for one person (a perceiver) to share and understand the internal states of someone else (a target) is a social bridge that allows people to connect to one another. In addition to promoting prosocial behavior and cooperation between parties (Batson, 2008; Batson & Ahmad, 2009; Brewer, 1979; Sherif, 1958), it tracks important outcomes for individuals, like emotional well-being (Davis, 1983; Mehrabian, 1996) and social connectedness (Morelli, Ong, Makati, Jackson, & Zaki, 2017).

Given the benefits of empathy, researchers have endeavored to increase it through intervention. A recent meta-analysis suggests that empathy-training efforts produce changes on important outcome measures, including people's ability to identify others' emotions, people's ability to take others' perspectives, and people's ability to convey empathy during dyadic interactions (Teding van Berkhout & Malouff, 2016).

Although there is an abundance of research on empathy interventions, there is remarkably little consensus on what constitutes best practice for building empathy. This is due largely to methodological inconsistencies across existing work. Researchers have employed a vast range of techniques to build empathy, including role-playing exercises (Webster, Bowers, Mann, Marshall, & E, 2005), perspective-taking activities (Batson, Polycarpou, et al., 1997; Batson, Chang, Orr, & Rowland, 2002), virtual reality simulations of others' experiences (Bunn & Terpstra, 2009; Oh, Bailenson, Weisz, & Zaki, 2016), and multi-session compassion meditation courses (Jazaieri et al., 2013; Kok & Singer, 2017; Valk et al., 2017). There is also considerable variation in duration of training; some paradigms are brief whereas others span weeks or even months (Davis & Begovic, 2014). Crucially, there appears to be no relationship between intervention effect and treatment dose. In their meta-regression, Teding van Berkhout & Malouff demonstrated that the number of training hours did not affect an intervention's effect size (Teding van Berkhout & Malouff, 2016).

What makes an empathy intervention effective? In the following sections, I will examine existing empathy interventions, identifying features that contribute to their success or hinder their influence. I will then propose a novel strategy for building

empathy interventions based in a motivated framework of empathy, which aims to increase people's desire to empathize instead of addressing their ability to empathize.

1.2 Looking back: a brief review of existing empathy interventions

Most existing empathy interventions can be divided into two categories: experience-based interventions and expression-based interventions. *Experience-based interventions* feature tasks that encourage perceivers to attend to targets' internal states. *Expression-based* interventions teach participants to recognize targets' internal states and respond appropriately (Weisz & Zaki, 2017).

1.2.1 Experience-Based Interventions

Experience-based interventions attempt to increase the amount of empathy a perceiver feels for a target. These interventions often employ perspective-taking exercises, encouraging perceivers to explicitly consider targets' cognitive or emotional states. Some interventions immerse perceivers in targets' perspectives, allowing them to experience the world from someone else's vantage point. In a 2002 study, medical students stayed overnight in a hospital to better understand hospitalization from a patient's perspective. This intervention increased participants' interest in improving the doctor-patient relationship (Wilkes, Milgrom, & Hoffman, 2002). In another study, medical students underwent an auditory hallucination simulation while completing cognitive assessments in an effort to better understand patients' experiences. This intervention successfully elevated medical students self-reported empathy for people with mental illness (Bunn & Terpstra, 2009).

Similar immersive techniques have been used with other populations. College students engaged in "emotional role playing", travelling around campus in a wheelchair

to simulate the experience of disabled students. Compared to a control group, intervention participants had more positive attitudes toward people with disabilities even four months later (Clore & Jeffery, 1972). These interventions (and others like it, see Webster et al., 2005 and Jacobs, 1977) aim to increase empathy by creating a vivid and immersive experience for perceivers.

Other experience-based interventions call on perceivers' capacities to imagine targets' perspectives. In one study, perceivers were asked to explicitly consider the life and feelings of a target that was a member of a stigmatized group. Participants later reported more positive attitudes toward the stigmatized target, and also more positive attitudes toward other members of the group (Batson et al., 1997). In a similar study, imagining the thoughts and feelings of an individual struggling with drug addiction increased prosociality toward a group of people experiencing substance-related issues. Participants allocated more money to an addiction treatment agency after the intervention, suggesting that perspective-taking interventions are effective tools for increasing prosocial behavior (Batson, Chang, Orr, & Rowland, 2002). Previous experience-based interventions have also employed vignettes, videos, and narratives to help perceivers better understand targets' perspectives (e.g., Shechtman & Tanus, 2006).

An important theoretical assumption unifying these interventions is the idea that people will automatically empathize when they perceive a target's suffering. Consistent with Preston and de Waal's Perception-Action Model (2002), cultivating a vivid picture of a target's experience leads to a clearer understanding of their distress, which elicits greater empathy for them. In other words, these interventions treat empathy as an emotional reflex that will be triggered when a perceiver adequately understands a target's

internal states. Therefore, they aim to supply perceivers with information to give them a sufficient understanding of a target's experience. Expression-based interventions, conversely, take a different approach to building empathy. In the next section, I'll review a selection of expression-based interventions designed to increase a perceiver's empathic communication toward a target.

1.2.2 Expression-Based Interventions

Whereas experience-based interventions encourage perceivers to *feel* more empathy for targets, expression-based interventions encourage perceivers to *show* more empathy to targets. This approach is often favored in occupational settings that require empathy, like among healthcare practitioners (Back et al., 2007; Bonvicini et al., 2009). These interventions often teach perceivers to recognize and respond appropriately to targets' emotions. Back and colleagues (2003, 2007) designed a training to improve medical providers' communication with patients. In a 4-day workshop, participants learned to cultivate relationships with their patients, how to deliver bad news, and how to discuss difficult topics like the transition to palliative care. Practitioners who participated in the workshop had better communication skills during simulated patient conversations, as rated by blinded coders.

Another expression-based intervention taught physicians about the neurobiological mechanisms that support empathy, and about the heath benefits of empathic communication in the doctor-patient relationship. This training appealed to physicians' self-identities as scientists, encouraging empathy by providing scientific rationale for its utility. This training improved doctors' expressions of empathy as indicated by patient reports (Riess, Kelley, Bailey, Konowitz, & Gray, 2011).

Expression-based interventions have also been used to improve relations between romantic partners. Long and colleagues (1999) designed an expression-based intervention to improve empathic responding among romantic partners. Couples were encouraged to rephrase statements their partner made, trying to accurately summarize what they thought their partner was trying to convey. The experimenters used a shooting target to depict accuracy, moving a laser closer to a bull's-eye as participants accurately paraphrased their partner's statements. Following the intervention, participants rated their partners as showing more empathy to them (Long et al., 1999).

1.2.3 Critical Shortcomings in Existing Interventions

Though often successful, existing empathy interventions have several weaknesses. First, they are often highly specific. Rather than addressing a perceiver's empathy in general, they aim to increase empathy within a specific context or within a specific perceiver-target dyad. This specificity can restrict the range of impact an intervention has. As noted earlier, Riess and colleagues increased doctors' empathic communication toward patients by teaching them about the utility of empathy in promoting patient health. However, the intervention did not affect doctors' feelings of empathy toward their patients, nor did it change their experiences of empathy outside of the office (Riess, Kelley, Bailey, Dunn, & Phillips, 2012).

Because of this specificity, interventions often produce changes related to the training itself that fail to generalize to novel contexts. For instance, in several studies Back and colleagues find that skills training improves practitioners' empathic communication during simulated conversations with patients as rated by independent

coders and by practitioners themselves (Back et al., 2007; Brown et al., 2018). However, the training did not affect patients' perceptions of their providers' communication skills.

Second, many existing interventions are not methodologically rigorous. A recent meta-analysis searched electronic databases for empathy training studies. Of 322 matching records, only 19 studies met the criteria for inclusion, which were randomization, the presence of a control group, a measure of empathy, and the reporting of empirical information on the outcome of the training (van Berkhout et al., 2016). Similarly, a review examining efforts to increase physician empathy reported that 64 of 1,415 studies met inclusion criteria for scientific rigor. The authors notably described the included interventions as "characterized by relatively poor research design", with insufficient reporting of intervention procedures, efficacy assessments low in validity (e.g., low incidence of patient-report), and few evaluations of long-term impact (Kelm et al., 2014).

Third, even well-constructed, methodologically rigorous empathy interventions may be restricted in their applicability due to limitations in their underlying theoretical assumptions. Namely, most existing interventions imply that people will empathize more if they are taught how to empathize. In other words, these interventions assume that empathy reflect a perceiver's *ability* to empathize, and offer skills training or perspective taking exercises as a method for increasing it.

But empathy doesn't only reflect a perceiver's ability to empathize, it also reflects a perceiver's *desire* to empathize. In other words, empathy can be thought of as a motivated process, encompassing approach and avoidances motives that facilitate or inhibit empathy (Zaki, 2014). In the following section, I will review previous work

examining how different motives shape empathy. I will then describe how a motivated approach to building empathy offers a potential remedy for shortcomings in existing work that promises to create enduring and generalizable changes in empathy, emotional wellbeing, and social functioning.

1.3 Looking forward: improving interventions by incorporating motivation

Like many other psychological phenomena (Dweck & Leggett, 1988; Kahneman & Tversky, 1979; Kunda, 1990; Lewin, 1952), empathy represents the interplay of *approach motives*, which drive people toward empathizing, and *avoidance motives*, which drive people away from empathizing. Approach motives increase perceivers' willingness to empathize. These include instances where people want to feel more connected to someone else, like when they interact with close others (Waytz & Epley, 2012), when they interact with high-powered people (Cheng & Chartrand, 2003), or when they interact with attractive people (Ickes, Stinson, Bissonnette, & Garcia, 1990). People also experience empathy approach motives when they want to share others' positive emotions (Morelli, Lieberman, & Zaki, 2015), or when they want to behave in a socially desirable manner (Thomas & Maio, 2008).

Conversely, avoidance motives decrease perceivers' willingness to empathize. Avoidance motives include instances in which people expect empathy to be costly (Cameron & Payne, 2011; Pancer, Mcmullen, Kabatoff, Johnson, & Pond, 1979; Shaw et al., 1994) or painful (Davis et al., 1999). People also experience empathic avoidance motives when empathy conflicts with their important goals, like during zero-sum competition (Zaki & Cikara, 2015).

Empathy interventions that address perceivers' empathic ability but neglect empathic motives can have unanticipated negative outcomes. For example, perspective-taking techniques—which intuitively should increase empathy—often backfire in competitive contexts characterized by powerful empathic avoidance motives (Vorauer, 2013). During competition, perspective-taking can paradoxically promote selfishness (Epley, Caruso, & Bazerman, 2006) and increase unethical behavior (Pierce, Kilduff, Galinsky, & Sivanathan, 2013). Similarly, competition often stifles empathic responses and promotes counter-empathic emotions like *schadenfreude*, or the experience of pleasure over someone else's pain. (Cikara & Fiske, 2011; Lanzetta & Englis, 1989). In these contexts, increasing a perceiver's ability to empathize may not actually elevate empathy, and can actually harm social relations.

Understanding empathic motives is therefore critically important step toward improving empathy interventions. But which "motivational levers" are most relevant for changing empathy? In the following sections, I will describe two powerful motivational forces—mindsets and social norms—that are demonstrated to impact empathy. I will then discuss how they might be translated into psychological interventions to increase empathy.

1.3.1 Mindsets of Empathy

Decades of research demonstrate that beliefs about the nature of different attributes (including intelligence, emotion regulation, and personality) affect crucial behavioral outcomes (Dweck, 2012). Imagine a difficult math problem set. According to Dweck and colleagues, people with *malleable mindsets of intelligence*—those who believe that intelligence can grow over time—are more likely to construe the problem set

as an opportunity for intellectual development. They may feel motivated to understand it, and therefore engage more with the material in an effort to master it. They may spend more time working through the set, try new strategies and approaches, and seek additional support if they get stuck (Elliott & Dweck, 1988; Nussbaum & Dweck, 2008). Through these actions, they can expand their skillset and their problem-solving ability, ultimately increasing their intellectual abilities. Conversely, people with *fixed mindsets of intelligence*—those who believe that intelligence is trait-like and relatively stable—might feel threatened by academic challenge. Failure to solve difficult problems might make them look or feel unintelligent. They may therefore avoid the more challenging problems, and in doing so, ultimately deprive themselves of crucial opportunities for intellectual growth (Dweck & Leggett, 1988; Hong, Chiu, Dweck, Lin, & Wan, 1999).

Mindsets affect motivations and behavior across many domains, including willpower and self-control. Job and colleges (2010) found that lay theories of willpower predicted experiences of ego depletion (a state of mental fatigue and reduced self-control following cognitively demanding tasks). Specifically, participants with *limited resource theories* (those who believe that self-control is a limited resource) made more errors on a Stroop task—a standard measure of ego depletion—after completing a cognitively strenuous task than did participants with *non-limited resource theories* (those who believe that self-control is not limited). This effect was moderated by perceived exhaustion: the subjective experience of exhaustion predicted more mistakes among those with limited resource theories, but not among those with non-limited resource theories. The researchers suggested that feelings of fatigue serve as a signal to reduce effort among

those with limited resource theories of willpower, which ultimately impairs performance (Job et al., 2010).

Mindsets also affect evaluation and treatment of other people by shaping perceivers predictions about targets' future behavior. Specifically, mindsets influence the attributions perceivers make about other. People with fixed mindsets of personality, for example, tend to draw dispositional attributions of targets' behavior, presumably because they believe that personality traits are relatively stable. Conversely, people with malleable mindsets of personality rely less on information about disposition to make predictions about targets' future behavior (Chiu, Hong, & Dweck, 1997). Theories of personality have important implications for judgments and treatment of others. For example, those with fixed mindsets of personality empathize less with and endorse harsher punishment for wrongdoers, whereas those with malleable mindsets of personality empathize more and suggest more lenient punishments for wrongdoers (Erdley & Dweck, 1993).

Importantly, lay theories and beliefs regarding intelligence, personality and willpower can be changed through experimental manipulation and social-psychological intervention. For instance, Blackwell and colleagues found that instilling growth mindsets of intelligence improved academic achievement during seventh grade (Blackwell, Trzesniewski, & Dweck, 2007, Study 2). Beliefs about intelligence track students' learning goals (i.e., their desires to learn new things at school), which predict their use of positive, effortful strategies like spending more time studying for tests. This in turn increases academic performance and buffers against the normative decline in academic performance that occurs during seventh grade (Blackwell et al., 2007, Study 1).

Similarly, interventions targeting students' beliefs about personality shape their social functioning during adolescence. Teaching ninth graders that personality is malleable affects their responses to interpersonal transgressions like social exclusion. Students who underwent an intervention to promote growth mindsets of personality were less likely to engage in retaliatory aggression after being excluded by peers (Yeager, Trzesniewski, & Dweck, 2013). The authors suggest that this effect could be driven by attributions formed about others' behavior: students with incremental theories of personality are less likely to draw dispositional attributions about aggressive peers (i.e., less likely to think of bullies as "bad people"), and may therefore feel less motivated to retaliate against them. They often feel less hatred toward bullies and less shame about their victimization (Yeager, Trzesniewski, Tirri, Nokelainen, & Dweck, 2011), which could further reduce motivation to retaliate.

Recent research suggests that lay theories affect empathy as well. According to Schumann and colleagues (2014), people's fixed or malleable mindsets of empathy affect their willingness to empathize, especially when empathy seems challenging. If a perceiver has a fixed mindset of empathy (i.e., they think empathy is a stable trait), they might not try to empathize when it feels hard (for example, with a target who doesn't share their race or political views). They may view these *empathic challenges* as threats, making them feel or seem un-empathic. They may therefore avoid empathizing when it doesn't come naturally to them. In doing so, they miss out on opportunities to develop their empathy more broadly (Schumann, Zaki, & Dweck, 2014).

But when a perceiver has a malleable mindset of empathy and believes that it can grow over time, he or she may try harder to empathize when it's challenging. Beliefs

about malleability of empathy—whether measured or manipulated—tracked empathic effort and feelings of empathy for dissimilar targets. Importantly, this effect is observed across contexts when perceivers are asked to empathize with different kinds of dissimilar targets (i.e., a racial outgroup member or a political outgroup member). In one study, participants with malleable mindsets of empathy exerted more effort to empathize with a person of a different race, listening for longer as this person described a painful life event. In another study, people with malleable mindsets of empathy reported that they would try harder to empathize with a political outgroup member when discussing a sociopolitical issue that mattered most to them (Schumann et al., 2014).

These findings suggest that people can increase their empathy when they're motivated to do so. By exerting greater effort to empathize when it's challenging, people increase their empathy and expand the range of targets with whom they can readily empathize. But importantly, malleable mindsets will likely only affect motivation to empathize when people want to build their empathy. In other words, if a person doesn't *want* to empathize with a particular target, their mindset may not affect their empathy for the target. In such cases, leveraging other motivational forces—like normative influence—may be more effective in changing empathy.

1.3.2 Social Normativity and Desirability of Empathy

Group norms are powerful determinants of individual members' behavior. Norms convey information about which behaviors are typical within a group (Lewin, 1952; Miller, Brickman, & Bolen, 1975) or within a context (Goldstein, Cialdini, & Griskevicius, 2008; Schultz, Nolan, Cialdini, Goldstein, & Griskevicius, 2007). People regularly modify their beliefs and behavior to match those around them (Asch, 1956;

Cialdini, Reno, & Kallgren, 1990; Sherif, 1936). Norms are so powerful that people even endorse fictitious beliefs that they *think* their peers hold (Prentice & Miller, 1993).

Researchers have explored ways to harness normative influence to promote positive changes in people's lives. Norm-based interventions have been used to encourage voting (Gerber & Rogers, 2009) and to increase energy conservation (Nolan, Schultz, Cialdini, Goldstein, & Griskevicius, 2008). Norms have even been used to encourage helping behavior. In one study, a group of participants who believed their peers were donating generously to charity donated more money themselves as compared to a group who thought their peers were donating parsimoniously (Nook, Ong, Morelli, Mitchell, & Zaki, 2016, studies 1 and 2) .

Normative influence has been demonstrated to impact behavioral markers of empathy, including measures of *empathic accuracy* (or how accurate a perceiver is in reading a target's emotions). Klein and Hodges found that women's motivation to behave consistently with their gender elevated performance on an empathic accuracy task. Given that interpersonal skills like empathy are often central to women's self-concepts (Cross & Madson, 1997), they hypothesized that motivationally-relevant beliefs about empathy and gender normativity would increase women's effort on the task. Consistent with their expectations, they found that framing an empathic accuracy task as a measure of interpersonal abilities elevated women's performance. Connecting the task to stereotypically feminine abilities increases women's motivation to perform well, as it trades on their desire to behave in a gender-consistent manner (Klein & Hodges, 2001). Similar manipulations also improve men's ability to accurately infer others' emotions.

When men are told that empathy is attractive to women, they are more accurate in inferring others' emotions (Thomas & Maio, 2008).

Finally, beliefs about the normativity of empathy can help preserve empathy in cases when it's expected to fail, such as in intergroup contexts. In a 2009 study, participants were led to believe that members of their in-group were especially empathic toward out-group members. These participants later reported experiencing greater empathy for outgroup members themselves. They also reported having more positive attitudes toward outgroup members following this experimental manipulation. When an ingroup norm prescribes empathy for an outgroup, individual members' experience more empathy for the outgroup (Tarrant, Dazeley, & Cottom, 2009).

Finally, recent work suggests that empathy changes induced by normative influence generalize across contexts. Nook and colleagues presented participants with a vignette describing an injury sustained by a fellow participant. Participants then viewed responses to the vignette, ostensibly written by other study participants. When participants saw that their peers responded empathically (e.g., by expressing concern and care), they responded more empathically themselves. Participants also reported experiencing more empathic feelings and—in a subsequent task—donated more money to a homeless shelter, suggesting increases in empathy and prosocial behavior can generalize across contexts (Nook et al., 2016, studies 3 - 5).

1.4 Translating theory to intervention

Like many psychological interventions, the applicability of a motivation-based empathy intervention is expected to depend on the context in which it is administered.

Psychological research demonstrates that small, short interventions can produce powerful and long-lasting changes in behavior if administered in the right context and at the right time. For example, minority college freshmen who underwent an hour-long belongingness intervention at the start of college have higher grades and better health outcomes three years later (Walton & Cohen, 2011). This intervention and others like it illustrate the importance of psychological precision; intervening at a critical juncture can interrupt harmful behavioral patterns and set people on more adaptive paths (Yeager & Walton, 2011). So-called "wise interventions" address people's understanding of themselves and their social worlds (Walton, 2014), intervening over people's interpretation of personal qualities and social situations (Walton & Wilson, in press; Yeager & Walton, 2011).

We hypothesized that an empathy intervention would be most effective among people undergoing developmental transitions, before social and emotional experiences solidify into patterns or habits. We therefore administered our intervention to two groups undergoing significant life transitions: college freshmen and seventh graders. The transition to college is often characterized by major shifts in a young person's life, including changes one's geographical location, exposure to new ideas and perspectives, and a reformation of one's social network (Pittman & Richmond, 2008; Webster, Freedman, & Heist, 1962). Recent evidence highlights the importance of empathy during the transition to college; high levels of empathy predict increased social centrality (Morelli et al., 2017) and valuation by one's peers during freshman year (Morelli, Leong, Carlson, Kullar, & Zaki, under review). Empathy may therefore be an especially useful tool to people in this developmental period.

Similarly, seventh grade is a developmental period characterized by a host of changes, including physical changes, expansion of social networks, and new educational expectations (Wigfield, Lutz, & Wagner, 2005). These early adolescent years are marked by normative increases in aggressive behavior, increasingly complex social relations, and declines in self-esteem, school engagement, and grades (Blackwell et al., 2007; Eccles, 2009; Wigfield, Eccles, Mac Iver, Reuman, & et al, 1991). Because empathy tracks social and emotional adjustment (Nancy Eisenberg et al., 1994), an empathy intervention might buffer against some of the difficulties that arise in early adolescence.

In the following chapters, I will describe how we designed, administered and tested a series of motivation-based empathy interventions. In chapter 2, I will describe the three novel empathy interventions given to college freshmen. These interventions use mindsets and social normativity to create changes in empathy, emotional understanding, and social behavior. In chapter 3, I will describe how we adapted these interventions for seventh grade students. Finally, in Chapter 4, I will evaluate how findings from these projects inform our understanding of how to change empathy and related behavior through intervention. I'll conclude by addressing limitations of the present work, and propose next steps for this exciting and novel line of inquiry.

CHAPTER 2: BUILDING EMPATHY IN COLLEGE FRESHMEN

2.1 Background

A central question in the study of empathy is whether it can be meaningfully changed. Though some philosophical and psychological traditions regard empathy as a relatively stable trait (Gallese, Keysers, & Rizzolatti, 2004; Preston & de Waal, 2002; Smith, 1790/2002), other work demonstrates that it can be shifted through experimental manipulations (Coke, Batson, & McDavis, 1978; Jackson, Meltzoff, & Decety, 2005) and psychological intervention (Davis & Begovic, 2014; Weisz & Zaki, 2017). Previous research suggests that interventions can induce temporary changes in empathy (van Berkhout et al., 2016), but few studies address whether interventions can effect long-term empathy changes that practically affect people's social lives. For example, several perspective-taking interventions create short-term changes in empathy (Batson, Early, & Salvarani, 1997; Batson, Sager, & Garst, 1997; Oswald, 1996) but don't examine long-term impact. Furthermore, empathy interventions are often context-specific; they produce changes on measures closely related to the training itself, but their effects don't often generalize to novel situations or encounters outside of the experimental setting (Brown et al., 2018; Golan & Baron-Cohen, 2006; Riess et al., 2012). It's therefore unclear whether these techniques impart lasting changes on empathy that persist outside of the lab.

To address limitations in previous work, our aim was to design an empathy intervention that produced enduring changes in empathy and practical shifts in people's social lives. To this end, we took a different approach in building empathy: instead of developing empathy-related skills, we encourage empathy by shifting people's *empathic*

motives. Like many psychological phenomena (Lewin, 1943a, 1952), empathy is a motivated process reflecting an interplay of forces that push people toward or away from it (Zaki, 2014). Increasing people's desire to empathize or the perceived relevance of empathy for goal-related outcomes could produce long-lasting and durable changes in people's empathic tendencies, building empathy beyond a particular relationship or context and affecting social behavior more broadly (Weisz & Zaki, 2017).

To affect empathic motives, we leveraged classic techniques from social psychology proven to increase motivation across different domains. Decades of work demonstrate that *mindsets* shape people's motivation in the face of challenges and setbacks (Dweck & Leggett, 1988). People with malleable mindsets of empathy (those who believe that empathy is malleable and can grow over time) try harder to empathize when it feels challenging (Schumann et al., 2014). *Social norms* are also powerful determinants of behavior, as people often adjust their thoughts and actions to be consistent with those around them (Lewin, 1952). Previous research suggests that normative influence can promote empathy and prosociality. When people believe that others around them are empathic and prosocial, they are more empathic and prosocial themselves (Nook et al., 2016; Tarrant et al., 2009).

We developed and tested three novel motivation-based empathy interventions designed to improve social functioning and integration during an important time in development: the transition to college. College freshmen were randomly assigned one of four conditions: a malleable mindset condition, a social norms condition, a combined condition, and a control condition. Each condition featured a central message: in the malleable mindset condition, participants were taught that empathy is malleable and can

be developed with effort. In the social norms condition, participants learned that empathy was normative and valued in their new college environment. In the combined condition, participants received both malleable and social norms messages. Finally, participants in the control condition didn't learn about empathy, but rather were taught that intelligence is malleable and can be developed with effort. In each condition, participants completed three intervention sessions and a follow up visit.

2.2 Methods

Participants. We recruited 292 college freshmen during their first two academic quarters (Fall 2015 and Winter 2016) at Stanford. Participants were randomly assigned to one of four conditions: a malleable mindset condition, a social norms condition, a combined condition, and a control condition (n = 73 per condition). In each condition, participants completed three intervention sessions and a follow up session eight weeks later. Of these, 13 participants dropped out before completing all three intervention sessions. The remaining 279 participants (95.55% of enrolled participants) completed all three intervention sessions. Of those, 221 participants (68.3% female) returned for the follow up visit eight weeks later (60 in the malleable mindset condition, 59 in the social norms condition, 53 in the combined condition, and 49 in the control condition), reflecting a retention rate of 75.68% of our enrolled participants. Participants were paid or given course credit for their involvement.

Participants' average age was 18.4. 1 participant identified as American Indian, 47 as East Asian, 2 as Pacific Islander, 22 as Black or African American, 70 as Caucasian, 31 as Hispanic or Latino, 6 as South Asian, 2 as Middle Eastern, 2 as Other, 33 as Mixed, and 2 did not provide information.

Intervention sessions. The three intervention sessions were structurally similar across all conditions. Modeled after work by Aronson et al. (2002), participants were introduced to our "Scholastic Pen Pals Program" for which they would be asked to write letters to adolescents experiencing difficulties at school, offering support and perspective. Though the adolescents were the ostensible beneficiaries of this program, the true purpose of the intervention was affect the college students' beliefs and motivation through manipulations embedded in their writing experience. This "Saying is Believing" framework is an effective tool for changing believes and motives; by endorsing a particular set of beliefs, study participants begin to internalize the beliefs themselves (Higgins & Rholes, 1978). Though structurally similar, the four intervention conditions differed in the content and exact instructions (see Appendix 1A for more detail on experimental sessions).

Mindset condition. During their first session, participants in the malleable mindset condition read a letter ostensibly written by high school freshmen who recently transferred to a new school. The letter describes the high school student's difficulties adjusting into the new high school setting, understanding his/her new peers, and caring about the same things they do (see Appendix 1C). Participants were then instructed to write a response to the high school student, and crucially were given instructions aimed at inducing a malleable mindset of empathy. Before writing the letter, participants were given the following message:

"Because empathy is malleable, humans are capable of increasing their connections to others at any time by exerting the effort needed to do so. Countless studies show that taking the time to put one's self in somebody else's shoes can expand empathy,

even for people from very different backgrounds. Imparting this message to young students is especially important when those students are struggling with empathy. If these students believe their capacity for empathy is fixed or limited, they may feel that they are incapable of connecting with others when they encounter difficulties. If students instead understand that empathy is expandable, they are more likely to put effort in to empathizing with others, and to succeed at this critical goal."

To bolster this idea, participants were given a summary of research (see Appendix 1B) supporting the idea that empathy can be developed with effort and a popular press article purportedly published in a psychology journal (from Schumann et al., 2014). This research was presented as background information for the letters to the adolescents, but was actually intended to strengthen participants' own beliefs about the malleable nature of empathy. This message was reinforced during the second and third intervention sessions.

In the second session, participants returned to the lab and were asked to write another letter for the Scholastic Pen Pals program. They were given the same background research, but this time were asked to write about a time when they experienced an empathic challenge and to describe how they were able to overcome it with effort. In the third session, participants were given the two letters they drafted in the previous intervention sessions as well as the background research they'd previously read and were asked to distill the contents of these materials into a speech for the Scholastic Pen Pals Program. Participants drafted the speech on a computer and then recorded themselves reciting the speech out loud.

Social Norms Condition. Following the general structure of the malleable mindset condition, participants in the social norms condition attended three intervention sessions in which they wrote letters and composed a speech intended for high school freshmen. Instead of writing about the malleable nature of empathy, however, participants in this condition received information about the normativity of empathy intended to induce beliefs about the social normativity and social desirability of empathy. During their first intervention session, they were told that empathy is valued in most communities—including among Stanford undergraduates—and that people generally want to be empathic. Before composing their letter during the first intervention session, participants were given the following message:

"Because empathy is valued in most communities, people want to show it whenever possible. Countless studies demonstrate that people strongly value empathy and expect others in their community to be empathic. Imparting this message to young students is especially important when those students are struggling with their own empathy. If they believe that empathy is not a valued or part of their community's culture, they may feel that acting empathically, especially when it is difficult, is simply not worth it. If they instead understand that empathy is valued and practiced within most communities (like ours here at Stanford, and theirs in their high school), they are more likely to put effort in to understanding and caring for others."

Similar to the malleable mindset condition, participants were given research supporting the notion that empathy is socially desirable and normative, and also given a page of "student testimonials" describing the prevalence of empathy within the Stanford community and the desirability of empathy among Stanford students. These student

testimonials were collected from Stanford undergraduates in a previous experiment. During the second intervention session, participants in the social norms condition were asked to describe why empathy is valued at Stanford, and how Stanford undergraduates show empathy to their peers. This prompt was designed to make participants reflect on their own experiences of empathy within the community they recently joined. Just like in the malleable mindset condition, participants in the social norms condition integrated their two letters and background materials into a speech for the Scholastic Pen Pals program, which they composed on a computer and then recited into an audio recording device.

Combined condition. This condition integrated the core messages of both the malleable mindset condition and the social norms condition. As in the other conditions, participants were asked to write letters and record a speech for the Scholastic Pen Pals program, but were given instructions to emphasize both the malleable nature and social normativity of empathy. Reading materials consisted of abbreviated versions of the research summaries, articles and student testimonials presented in the malleable mindset and social norms conditions so as to ensure similar session length across conditions. Before composing their letter during the first intervention session, participants were given the following message:

"Because empathy is valued in most communities, people want to show it whenever possible. Countless studies demonstrate that people strongly value empathy and expect others in their community to be empathic. Recent research also shows that empathy is malleable, and that humans are capable of increasing their connections to other people in their lives by exerting the effort to do so. Every time a person puts effort

into empathizing even when it is difficult, they ultimately shape their empathic tendencies in the long term, which can have important social outcomes. Imparting this message to young students is especially important when those students are struggling with their own empathy. If they believe that empathy isn't valued within their community, or if they believe that their capacity for empathy is fixed, they may feel that empathizing is simply not worth it or even that they're incapable of empathy. If instead they can be convinced that empathy is important and practiced within most communities (like ours here at Stanford, and theirs in their high school) and that empathy is malleable, they may be more likely to put effort into understanding and caring for others."

During their second intervention session, participants were asked to write about an empathic challenge they overcame with effort, and to write about why empathy is valued at Stanford. During their third intervention session they wrote and recorded speeches based on their two letters and background research mirroring the third session of the other experimental conditions.

Control condition. Designed to mimic the structural features of the three empathy intervention conditions, the control condition also featured two letter-writing sessions followed by a speech composing session. However, participants in this condition read and responded to letters written by adolescents experiencing academic difficulties at school, and were asked to read background research about and describe the malleable nature of intelligence in their letters (Blackwell et al., 2007). Participants saw the following message before writing their letter:

"Intelligence is malleable, and humans are capable of increasing their intelligence at any time in their lives by exerting the effort needed to do so. Countless

studies have shown that taking the time to understand concepts even when it's challenging can expand a person's intellectual ability. This means that people can build their intelligence, even those who come from very different academic backgrounds. Every time a person puts effort into understanding a difficult new concept, they ultimately shape their intellectual tendencies in the long term, which can have important outcomes on academic achievement over time. Imparting this message to young students is especially important when those students are struggling with performance in school. If these students believe that their capacity for intelligence is fixed, they may feel that they are incapable of learning when something feels too difficult. If students can instead be convinced that intelligence is malleable, they may be more likely to put effort in to understanding difficult concepts and persevere in the face of a challenge."

In their second session, participants were asked to describe an academic challenge they were able to overcome with effort in their letter. During their third session, participants wrote and recorded a speech incorporating content from their two letters and concepts from the background research.

Follow Up. 8 weeks after receiving the intervention, participants completed an online battery of tasks assessing empathy and changes in social functioning. The tasks differed in their relatedness to the intervention to assess generalizability of impact, and the follow up session took approximately one hour to complete.

Measures

Beliefs about the malleability of empathy. (Schumann et al., 2014). This 6-item scale assesses participants' beliefs about the malleable nature of empathy (e.g., *"No matter who somebody is, they can always change how empathic a person they are.")* using a 7-point agreement scale.

Number of friends. In order to assess students' social integration, we asked participants to list up to 10 friends they had made since coming to Stanford. Specifically, they were asked to name up to 10 people they see regularly, talk to often, and feel close to.

Empathic accuracy. To assess empathic accuracy, we used a video task developed by Zaki and colleagues (Zaki, Bolger, & Ochsner, 2008) in which participants watched four videos of people describing emotional life events. These videos were collected during a previous experiment, in which participants (heretofore called 'targets') were recorded while describing positive and negative life events. Targets then watched their videos while making continuous ratings of how negative or positive they felt at each moment while telling the story on a 1 – 9 scale, where 1 meant very negative and 9 meant very positive. We selected four videos that differed in valence (two positive and two negative), and showed them to participants in the current study (heretofore called 'perceivers'). We asked perceivers to rate how they thought the target was feeling continuously throughout the duration of each video, using the same 1 – 9 scale targets used.

Following the analytic strategy used in previous work (Devlin, Zaki, Ong, & Gruber, 2016; Zaki et al., 2008; Zaki, Weber, Bolger, & Ochsner, 2009), affect ratings from both perceiver and target were averaged across 2 second intervals, with each 2 second interval serving as a time-point in the subsequent analyses. Perceivers' affect ratings were then correlated with targets' affect ratings to yield a correlation coefficient for accuracy for each of the four videos. All correlation coefficients were r-to-*Z* transformed using the Fisher technique so that data were normally distributed (Devlin et al., 2016; Zaki et al., 2008, 2009).

Intergroup Empathy. To assess whether the intervention affected the capacity to empathize with outgroup members, we used a task in which participants read about positive and negative events befalling an outgroup member (adapted from Cikara, Botvinick, & Fiske, 2011). Participants read a passage ostensibly written by a political outgroup member describing his involvement with a campus political group. They then read 16 stories describing positive and negative events that ostensibly happened to this person. For each of the stories, they were asked to use a 1 – 9 scale to rate how bad the story made them feel and how good the story made them feel. Congruent valence between story and rating (e.g., a negative story and a "how bad" rating) provided a measure of empathy. Incongruent valence between story and rating (e.g., a negative story and a "how good" rating) provide a measure of counter-empathy (or schadenfreuede, Cikara, Bruneau, Van Bavel, & Saxe, 2014).

Empathic Effort. Adapted from Schumann and colleagues (2014), empathic effort was measured using an audio-based task. Participants were given to the opportunity to listen to an audio recording that featured a person describing a painful life event. Crucially, they were told that they could fast forward through as much of the audio recording as they wanted. Empathic effort was operationalized as the amount of time participants spent listening to the audio recording.

2.3 Results

We first examined whether participants' beliefs about the malleability of empathy were affected 8 weeks later, given that beliefs about malleability have been shown to impact empathic motivation (Schumann et al., 2014). We found that participants' beliefs about the malleability of empathy were elevated in the malleable mindset condition [b = 3.55 (95% CI, 1.12 , 5.99); t = 2.877 ; p = .004] and the combined condition [b = 3.087 (95% CI, .58, 5.59); t = 2.429; p = 0.016] as compared to the control condition (see **Figure 1**). Participants' beliefs about the malleability of empathy were also greater in the malleable mindset condition [b = 3.442 (95% CI, 1.12, 5.76); t = 2.93; p = 0.004] and the combined condition [b = 2.9763 (95% CI, 0.584, 5.369); t = 2.45; p = 0.015] as compared to the social norms condition (see **Figure 1**). Beliefs about the malleability of empathy did not differ between the social norms condition and control condition [b = 0.11 (95% CI, -2.33, 2.55); t = 0.09; p = 0.93].

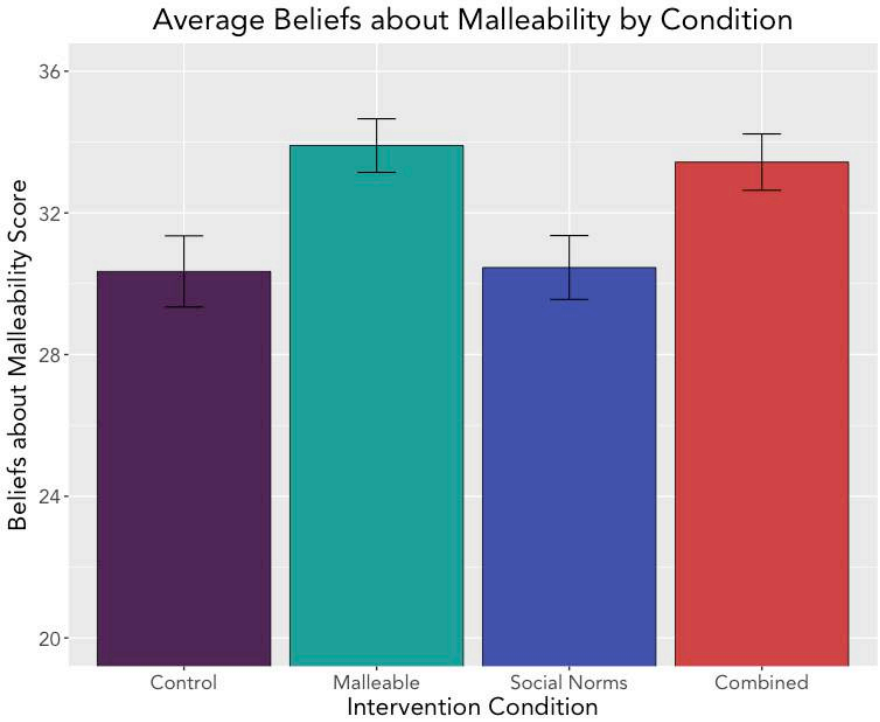

Figure 1. Beliefs about Malleability of Empathy by Condition. Mean beliefs about the malleability of empathy are displayed on the y-axis for each of the four intervention conditions. Error bars reflect standard error.

We also found condition-based differences on participants' performance on the empathic accuracy task on the two positively valenced videos (see **Figure 2**). Individual scores for each of the videos were averaged to create a composite accuracy coefficient for the two positive videos[1].

[1] Videos were presented in random order, and due to technical difficulties, some participants were not able to rate all of the videos and are therefore not included in this analysis. 16 participants did not have ratings for one of the positive videos, and 16 participants did not have ratings for the other positive video. If a participant was missing data for one of the two videos, their accuracy composite reflects the one score we collected from them. When participants who did not rate a video are excluded from analyses completely, the differences between groups are not statistically different from each other.

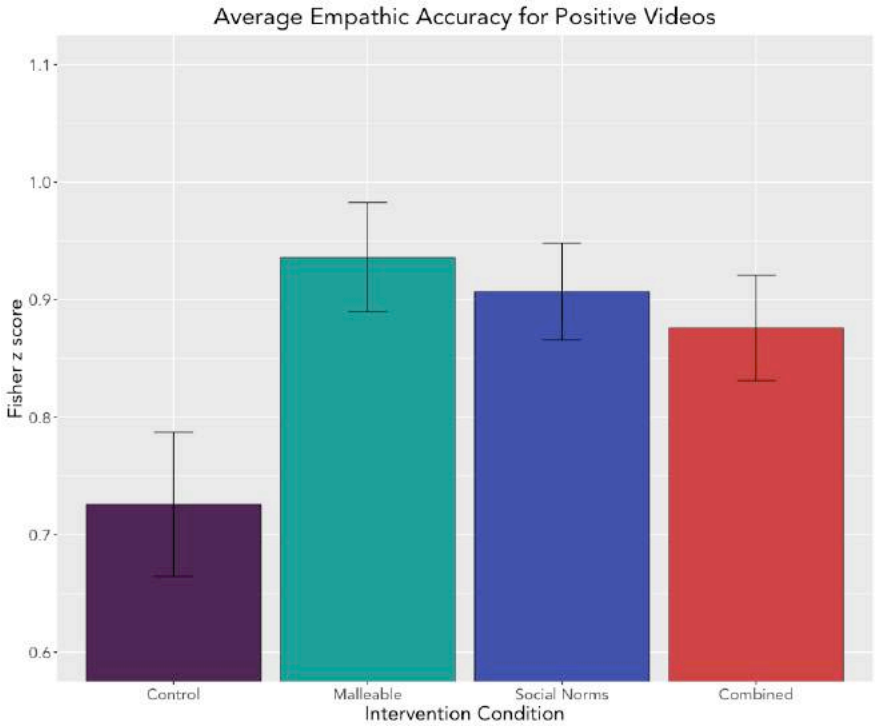

Figure 2. Empathic accuracy for two positive videos by condition. Mean empathic accuracy scores (fisher transformed Z-score) for the two positive video are displayed on the y-axis for each of the four intervention conditions. Error bars reflect standard error.

Specifically, participants in our malleable mindset condition [b = 0.21 (95% CI, 0.075, 0.346); t = 3.06; p =0.003], social norms condition [b = 0.18 (95% CI, 0.043, 0.319); t = 2.83; p =0.011] and combined condition [b = 0.15 (95% CI, 0.01, 0.291); t =2.56; p = 0.036] were more accurate than participants in our control condition on average. Differences between the three intervention conditions were not statistically significant.

We also found a relationship between intervention condition and the number of friends participants had 8 weeks after the intervention (see **Figure 3**). Participants in the combined condition had significantly more friends than participants in the control condition [b = 1.096 (95% CI, 0.254, 1.938); t = 2.566; p = 0.011]. Participants in the

malleable mindset condition also had more friends than participants in the control condition, but this difference was only marginally significant [b = 0.68 (95% CI, -0.149, 1.51); t = 1.617; p = 0.107]. Participants in the social norms condition did not have more friends than participants in the control condition [b = 0.1864 (95% CI, -0.631, 1.003); t = 0.45; p = 0.65].

There were no statistically significant differences between intervention conditions on measures of empathy or counter-empathy for outgroup members and experimental condition. Similarly, we did not find statistically significant differences between intervention conditions in empathic effort, as indicated by similar amounts of time participants spent listening to the audio recording. Finally, there were no statistically significant differences on empathic accuracy between the malleable mindset and social norms conditions as compared to the control condition for the two negatively valenced videos. However, the combined condition had lower accuracy scores on the two negatively valenced videos than participants in the malleable mindset condition [b = 0.086 (95% CI, 0.0046, 0.167); t = 2.084; p = 0.038], the social norms condition [b = 0.08794 (95% CI, 0.0044, 0.171); t = 2.076; p = 0.039], and the control condition [b = 0.132 (95% CI, 0.045, 0.219); t = 2.994 ; p = 0.0031].

In exploratory analyses, we examined how beliefs about malleability mediated two outcome variables, empathic accuracy and total friends. Although there was no relationship between beliefs about the malleability of empathy and empathic accuracy for positive videos, there was a significant relationship between beliefs about malleability and total friends [b = .053 (95% CI, 0.009, .096); t = 2.395; p = 0.0175].

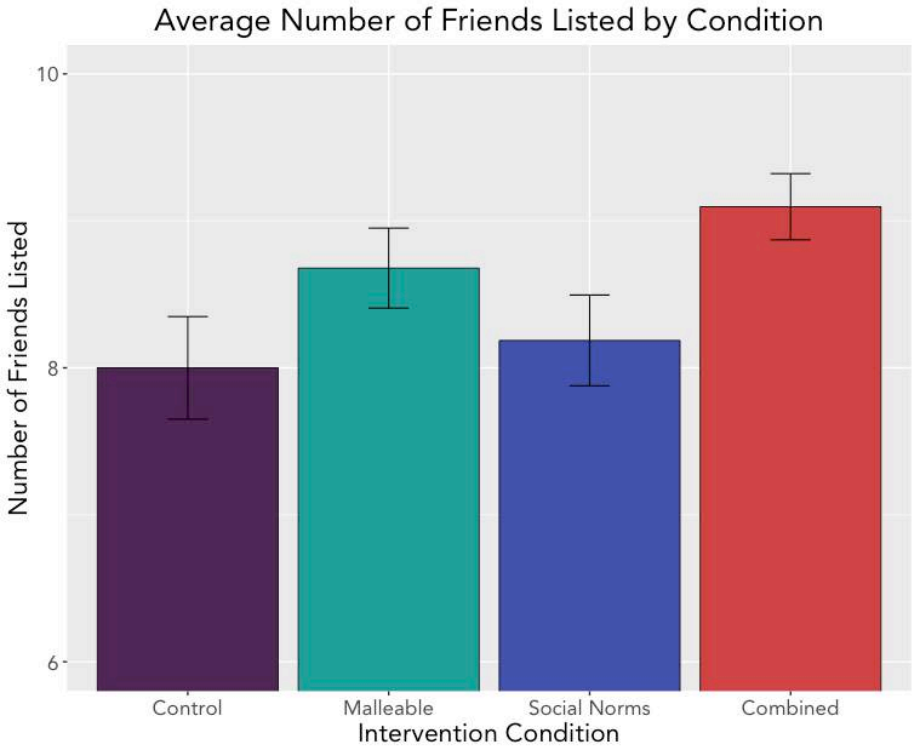

Figure 3. Average Number of Friends by Condition. Mean number of friends made since starting college are displayed on the y-axis for each of the four intervention conditions. Error bars reflect standard error.

Intriguingly, this relationship was different in the malleable mindset and combined conditions. In the malleable mindset condition, the marginally significant effect of condition assignment on total friends was fully mediated by beliefs about malleability, but this was not the case in the combined condition (see **Figure 4**). In other words, the relationship between condition assignment and total friends was still significant for participants in the combined condition even when controlling for beliefs about malleability of empathy [b = . 0.97 (95% CI, 0.122, 1.82); t = 2.25; p = 0.025].

Condition	Measure	Estimate	95% CI	t-statistic	p-value	Effect Size
Malleable Mindset						
	Malleability Beliefs	3.55	1.12, 5.99	2.87	0.004	0.554
	Empathic Accuracy (Positive Videos)	0.21	0.075, 0.346	3.06	0.003	0.553
	Empathic Accuracy (Negative Videos)	-0.046	-0.131, 0.038	-1.08	0.281	-0.214
	Friends	0.69	-0.149, 1.51	2.6	.107	0.304
	Empathic Effort (Audio Recording Time)	54.55	-50.21,159.31	1.026	0.306	0.183
	Outgroup Empathy (Positive Stories)	-0.377	-1.146, 0.393	-0.97	0.336	-0.186
	Outgroup Empathy (Negative Stories)	-0.178	-0.863, 0.506	-0.514	0.608	-0.098
Social Norms						
	Malleability Beliefs	0.1107	-2.33, 2.55	0.09	0.929	0.0158
	Empathic Accuracy (Positive Videos)	0.18	0.043, 0.319	2.83	0.011	0.51
	Empathic Accuracy (Negative Videos)	-0.044	-0.131 0.043	-0.996	0.3206	0.205
	Friends	0.19	-0.63, 1.00	0.45	0.653	0.078
	Empathic Effort (Audio Recording Time)	21.16	-84.42, 126.74	0.395	0.693	0.0801
	Outgroup Empathy (Positive Stories)	-0.28	-1.05, 0.49	-0.721	0.472	-0.135
	Outgroup Empathy (Negative Stories)	-0.15	-0.841, 0.533	-0.441	0.65	-0.085
Combined						
	Malleability Beliefs	3.087	0.58, 5.59	2.43	0.016	0.481
	Empathic Accuracy (Positive Videos)	0.15	0.01, .291	2.11	0.036	0.412
	Empathic Accuracy (Negative Videos)	-0.132	-0.219, -0.044	-2.994	0.003	-0.5997
	Friends	1.096	.254, 1.94	2.56	0.011	0.532

Empathic Effort (Audio Recording Time)	15.75	-92.16, 123.65	0.288	0.774	0.064
Outgroup Empathy (Positive Stories)	0.1246	-0.667, 0.916	0.310	0.757	0.059
Outgroup Empathy (Negative Stories)	-0.063	-0.771, 0.645	-0.175	0.861	-0.033

Table 1. Estimates, confidence intervals, t-statistics, p-values and effect size for each intervention condition as compared to the control condition on beliefs about malleability, empathic accuracy for the high two positive videos, and number of friends made since coming to college.

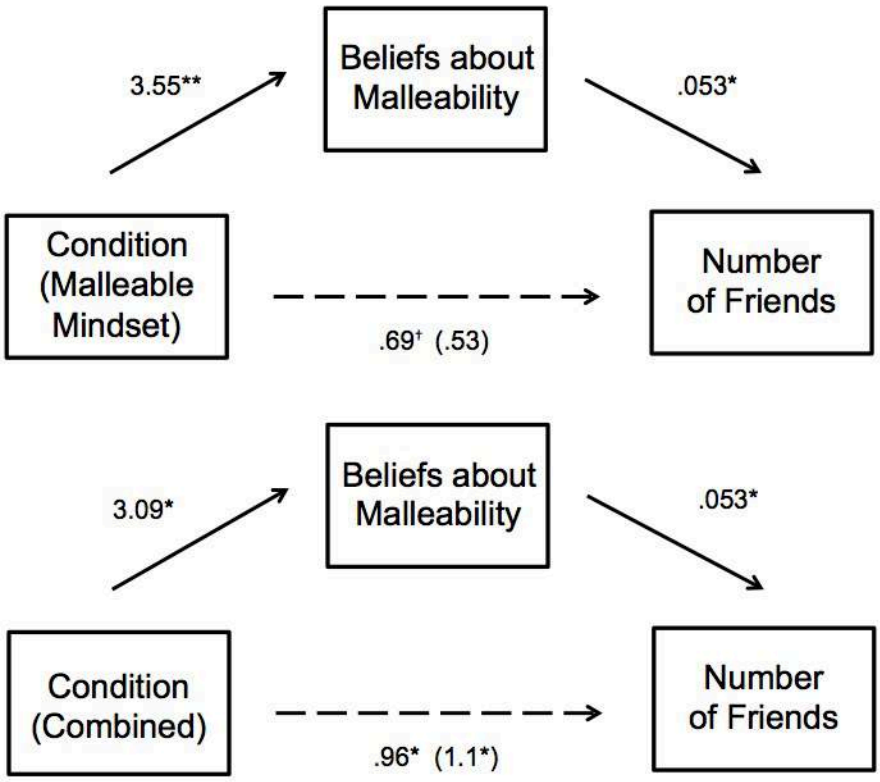

Figure 4. Mediation diagrams for beliefs about malleability and number of friends. Beliefs about malleability mediate relationship between condition assignment and number of friends in malleable mindset condition, but not in combined condition.

* < .05. ** <.01

2.4 Discussion

These exciting findings support the idea that empathy can be changed through motivation-based intervention. Our results demonstrate that participants in the malleable mindset and combined conditions showed long-term changes in their beliefs about empathy. They also showed improved performance on an empathic accuracy task (as did participants in our social normativity condition) as compared to our control group. Finally, participants in the malleable mindset and combined conditions reported having made more friends since coming to college than participants in the control group (though the difference is only marginal for those in the malleable mindset condition).

Each of these findings has important implications for participants' well-being during the transition to college. Beliefs about the malleability of empathy predict empathic effort when empathy feels challenging (Schumann et al., 2014). Empathic accuracy tracks emotional adjustment (Gleason Jensen-Campbell Ickes 2009) and relationship satisfaction (Sened et al., 2017). Finally, social integration promotes important outcomes like physical health (Seeman, 1996), psychological wellbeing (Kessler, Price, & Wortman, 1985), and academic achievement during college (Woosley, 2003).

This study is one of the first empathy interventions to measure changes in empathy-related beliefs over time. Even eight weeks after the intervention, participants in the malleable mindset and combined conditions showed changes in their beliefs about the malleability of empathy. This is an exciting demonstration of the potential of psychological interventions to elicit long-term changes in empathy that confer real-world benefits to participants.

Participants in the malleable mindset condition, social norms condition, and combined condition showed improved empathic accuracy on the two positively valenced videos as compared to participants in the control condition. This difference likely reflects increases in participants' motivation to perform well on the task. Previous work supports the idea that performance on measures of empathic accuracy is shaped by perceivers' motivation. For example, when an empathic accuracy task was framed as a measure of interpersonal abilities, women's accuracy scores increased because they were motivated to perform in a gender-consistent manner (Klein & Hodges, 2001). Similarly, men's accuracy scores increased when they were told that women liked empathic men, presumably because they wanted to appear attractive to women (Thomas & Maio, 2008). It is therefore possible that participants in the malleable mindset condition, social norms condition and combined condition felt greater motivation to perform well on the task than did control group participants.

Importantly, this group-based effect was only significant for the two positive videos, not for the two negative videos. This pattern has been observed in previous research, such that perceivers show greater accuracy for rating a target's positive emotions than a target's negative emotions (Lee, Zaki, Harvey, Ochsner, & Green, 2011; Morrison et al., 2016). Previous work suggests that positive facial expressions are recognized faster than negative facial expressions (Leppänen & Hietanen, 2004), which could have important implications for performance on a task like this that employs time-series correlations to derive empathic accuracy scores. Notably, in our measure of empathic accuracy, perceivers and targets were strangers. Previous measures of empathic accuracy have used dyads who are familiar with each other, like romantic partners and

married couples (Kilpatrick, Bissonnette, & Rusbult, 2002; Simpson, Ickes, & Blackstone, 1995). Future research should examine how and when motivation is affects perceivers' inferences of targets' emotions, for instance, whether motivation differentially affects empathic accuracy depending on social proximity between perceiver and target.

Participants in the malleable mindset condition and combined condition both reported having more friends eight weeks after the intervention compared to participants in the control condition, though this difference was only marginal for participants in the malleable mindset condition. Participants in the social norms condition had a comparable number of friends to participants in the control group. Why were the malleable mindset and combined interventions most effective in increasing participants' number of friends? One possibility is that interventions that promote malleable mindsets of empathy could be especially resonant among college freshmen given their recent experiences. The first year of college is a time of great transition and personal growth (Webster et al., 1962). College freshmen often move away from home, meet new people with diverse backgrounds, and get exposed to new perspectives and ideas. Personality research indicates that there is a sharp increase in people's openness during this stage of life (Roberts, Walton, & Viechtbauer, 2006). This could make college freshmen especially receptive to a mindset-based empathy intervention, in that the message of malleability likely aligns with growth they're already experiencing.

Furthermore, whereas beliefs about malleability mediated the relationship between condition assignment and number of friends in the malleable mindset condition, the relationship remained significant for participants in the combined condition.

Although we can only speculate about mechanisms driving this intriguing pattern in our data, one possibility is that the malleable mindset and social norms components of the combined condition activate different aspects of participants' motivation to empathize. Recently, psychologists identified distinct basic motives related to *meaning-making*, or how people interpret their personal qualities and social situations. These motives include *self-integrity*, or the desire to see oneself as adequate, competent, and moral, and *belonging,* the desire to feel accepted in our social groups (Walton & Wilson, in press). It is possible that the malleable mindset intervention and social normativity intervention appeal to different motives. Given that people view empathy as a positive and desirable trait (Schumann et al., 2014), it's possible that the malleable mindset intervention trades on people's desire for self-integrity, especially the desire to see oneself as moral. The social normativity intervention, conversely, likely addresses participants' need to belong. During the transition to college, it is possible that an intervention that appeals to both of these motives is most effective in fostering social connections, as was the case among participants in our combined intervention condition.

We did not see effects on two outcome measures that we anticipated would be affected by empathic motives: empathy for an outgroup member, and empathic effort. Previous work has found short-term effects of experimental manipulations on such "empathic challenges" (Schumann et al., 2014). Whereas it is possible that our intervention doesn't affect participants' responses to empathic challenges eight weeks later, these null results could also reflect important features of the task design. Specifically, it is possible that we failed to create perceptions of an empathic challenge in both of these measures. With regard to the outgroup empathy task, we presented these

stories as having occurred to a single outgroup member instead of having occurred to several undifferentiated outgroup members, inconsistent with previous work (Cikara, Botvinick, & Fiske, 2011). It is possible that our task individuated this person from their group, which has been shown to drive more enhanced mental representations of individual outgroup members (Fiske & Neuberg, 1990) and to reduce intergroup discrimination (Wilder, 1978).

Similarly, our measure of empathic effort—the audio-recording task—was adapted in a manner that differed from its original administration. In their 2014 paper, Schumann and colleagues used this measure to assess perceivers' empathic effort when interacting with a racial outgroup member or a racial ingroup member. Before the task began, white participants were told that the speaker in the audio recording was of the same race or of a different race than they were. In the original version of this task, the authors found that beliefs about malleability predicted increased effort only when the target was of a different race (Schumann et al., 2014). Given that our participants were of many different races, we could not employ this same manipulation. Consequently, we may not have created an empathic challenge for participants, which may explain why our findings differed from those of Schumann and colleagues.

Limitations and future directions. This study is an exciting first step into the development of motivation-based empathy interventions. However, it has several limitations that could be addressed in future work. First, our control condition was a mindset intervention intended to promote beliefs about the malleability of intelligence. It is possible that this intervention inadvertently promoted beliefs about the malleability of constructs beyond intelligence, including empathy. Emphasizing the capacity for growth

as a feature of human nature—as was done in the control condition—confers benefits across many domains (Dweck, 2012). These domains include academic performance (Aronson et al., 2002; Blackwell et al., 2007), social relationships (Erdley, Cain, Loomis, Dumas-Hines, & Dweck, 1997; Yeager et al., 2011) and intergroup relations (Halperin, Russell, Trzesniewski, Gross, & Dweck, 2011), making our control condition especially rigorous. It is possible that highlighting the capacity for growth in one domain elicits growth in other domains, and that teaching college students about the malleable nature of intelligence affects their beliefs about the nature of empathy. To eliminate this possibility, future work could employ a no-treatment control. However, it is important to not that previous work indicates that people can hold different theories about different phenomena (Dweck, Chiu, & Hong, 1995; Schroeder et al. 2016). More work is needed to establish whether theories of empathy track with theories of other attributes like intelligence, personality, and emotion regulation.

Second, the intervention was spread over participants' first two quarters of college. Ideally, we would have recruited all participants in fall quarter, their very first quarter of college. We necessarily had to recruit over two quarters in an effort to accommodate our sample size, given that the intervention was comprised of three one-hour sessions. Timing is a crucial component of intervention success (Walton, 2014), and the first few weeks of college have been identified as a critical period for social adjustment predicting important outcomes like degree completion (Woosley, 2003). A mindset intervention to affect empathy may therefore be especially impactful when administered at the start of the year or even before students commence.

Third, we do not have baseline measures of beliefs about empathy or empathic motives. This decision was made to maintain believability of our cover story. We therefore cannot conclude that our intervention actually changed beliefs, improved participants' empathic accuracy, or increased the number of friends participants made (though random assignment reduces likelihood that our groups differed systematically). However, given that participants in our intervention conditions consistently outscored control-group participants on all of these measures, we are confident that the intervention had some impact in shaping these outcomes. Future work could quantify how much motivation-based empathy interventions change these outcomes by collecting baseline measures.

Finally, our motivation-based intervention likely shapes approach motives, which are only one flavor of empathy-related motives. Avoidance motives—motives that encourage people away from empathy—are highly influential in determining empathy. In some contexts, they may be more appropriate targets for psychological intervention. For example, sometimes *motivating* a behavior (adding forces to encourage people toward a behavior they're not already inclined to perform) is less effective than *licensing* a behavior (removing forces that discourage people from behaviors they privately feel inclined to perform) (Miller & Effron, 2010). For instance, the very successful "Friends Don't Let Friends Drive Drunk" campaign is thought to have been so effective because it removed barriers inhibiting people from preventing others' drunk driving. It reduced avoidance motives related to interfering with friends' choices, licensing people to perform an action they already wanted to do (Miller & Prentice, 2013).

Our intervention likely increased approach motives, but this strategy may be ineffective in contexts where empathy failures are characterized by powerful avoidance motives, like during intergroup conflict (Zaki & Cikara, 2015). Indeed, previous research suggests that direct attempts to improve attitudes toward an outgroup in long-standing conflict can actually backfire (Bar-tal & Rosen, 2009). Instead, interventions that subtly reduce avoidance motives may be more effective, lowering resistance to outgroup empathizing (Weisz & Zaki, 2017). One study found that addressing Israelis' and Palestinians' perceptions of group malleability improved attitudes toward outgroup members and increased willingness to compromise for peace (Halperin et al., 2011). This intervention—which deliberately made no mention of the Israeli-Palestinian conflict—artfully circumvented defensive reactions that often arise when conflict is addressed directly. These findings emphasize the importance of understanding the entire suite of motivational forces that facilitate or inhibit empathy when designing and implementing empathy interventions.

Conclusion

Social adjustment predicts important outcomes, including well-being (Lyubomksky, Sheldon, & Schkade, 2005) and academic achievement in college (Walton & Cohen, 2007). Given that empathy predicts social adjustment and relational success (Davis & Oathout, 1987; Miller & Eisenberg, 1988; Morelli, Ong, Makati, Jackson, & Zaki, 2017), many have sought to build empathy through skills training programs. Though existing interventions have successfully engendered changes in empathy and related behavior, the changes they elicit are often short lived or domain-specific (Golan & Baron-Cohen, 2006;

Riess et al., 2012). The present research suggests that motivation-based empathy interventions create longer-lasting and generalizable changes in empathy, which confer practical social and emotional benefits to participants. These findings have exciting implications for researchers aiming to improve the social and emotional functioning during challenging periods like the transition to college.

CHAPTER 3: BUILDING EMPATHY IN MIDDLE SCHOOL

3.1 Background

Early adolescence is a developmental period characterized by a host of important changes. At this age, people experience intense physical changes related to puberty (Sisk & Zehr, 2005; Wigfield et al., 2005). They also face new educational challenges associated with the transition from elementary to middle school (Eccles, 2009), which can negatively affect attitudes toward school and views of the self (Eccles, Midgley, & Adler, 1984). Finally, people this age experience significant changes in their relationships with family and friends, shifting attention away from parents and toward peers (Berndt, 1982; Fuligni & Eccles, 1993).

Given these many changes, considerable research has sought to identify factors related to adjustment during early adolescence (Dubois et al., 1992). Empathy, the ability to share and understand others' emotions, has been identified as one such factor. It is positively associated with adaptive outcomes like prosocial behavior and social competence (Eisenberg et al., 2005; Eisenberg et al., 1996; Mayberry & Espelage, 2007). It's also negatively associated with harmful social behavior like bullying and aggression (Gini, Albiero, Benelli, & Altoe, 2007; van Noorden, Haselager, Cillessen, & Bukowski, 2014).

Given these benefits, researchers have sought to increase socio-emotional competencies related to empathy among early adolescents. Most extant intervention involve skills-training programs that develop socio-emotional competencies, for instance, teaching participants to recognize and regulate emotions (Castillo, Salguero, Fernández-Berrocal, & Balluerka, 2013) and honing their ability to take others' perspectives (Jacobs, 1977) . A recent meta-analysis suggests that social and emotional learning (SEL) programs generally improve socio-emotional skills, attitudes, behavior, and academic performance among children and adolescents (Durlak et al., 2011). However, skill-based empathy training programs may not be the most effective way to bolster empathy among early adolescents. As mentioned previously, ability-based interventions are likely to fail when people are not motivated to empathize (Zaki & Cikara, 2015).

We therefore took a novel approach to building empathy, informed by a *motivated framework* of empathy. According to this framework, empathy and its failures don't necessarily reflect an individual's *ability* to connect with others. Rather, they often reflect an individual's *desire* to connect with others. By increasing people's desire to empathize, interventions could create long-lasting, generalizable changes in people's empathic tendencies (Zaki, 2014). Instead of training any empathy-related ability or skill, we therefore aimed to shift early adolescents' motivation to empathize.

Based on previous work (Weisz & Zaki, in preparation), we designed two interventions for seventh-grade students employing psychological techniques demonstrated to affect empathy-related motivation. Our first intervention aimed to change students' mindsets about empathy. Decades of work show that the mindsets shape how people respond to challenges across different domains (Dweck, 2012). Mindsets also

affect empathy, such that people who have a malleable mindset about empathy (those who believe that empathy can be developed over time) tend to exert more effort to empathize when it's challenging. Conversely, those with a fixed mindset of empathy (those who believe that empathy is a stable trait that doesn't shift much throughout the lifetime) avoid empathy when it doesn't come naturally. Importantly, these mindsets can be changed through experimental manipulation (Schumann et al., 2014).

The second intervention aimed to shift perceptions of the social normativity and desirability of empathy. Normative social influence is one of the most well-known techniques for changing behavior (Asch, 1956; Lewin, 1943b, 1952; Schultz et al., 2007). Recently, researchers have intervened over social norms to promote desirable behaviors like protecting the environment (Cialdini et al., 1990; Goldstein et al., 2008) and behaving prosocially toward others (Nook et al., 2016).

Several studies aim to build empathy among special populations of early adolescents, such as those with behavior or conduct problems (e.g., Fahringer, 1996; Feshbach & Feshbach, 1982), . However, remarkably little research tries to increase empathy in a general population of early adolescents. Given the social and emotional difficulties that characterize this developmental period, it seems highly important to design and test interventions to bolster empathy in this age group. Here we test the efficacy of two novel motivation-based interventions in a large sample of seventh grade students. To our knowledge, this is one of the first large-scale, theory-based empathy interventions for early adolescents.

3.2 Methods

Participants. Participants were 973 students (52% female) in 5 Bay Area middle schools. Participants' average age was 12.1. 1.81% as Pacific Islander, 4.01% as Black or African American, 16.3% as White of Caucasian, 19.28% as Hispanic or Latino/a, 3.1% as South Asian, 1.29% as Middle Eastern, 8.02% as Other, 24.97% as more than one race, and 15.27% did not provide information.

Conditions. This intervention featured three experimental conditions: a malleable mindset condition, a social norms condition, and a control condition. Each of the intervention conditions featured a core message that was presented across the three sessions. In the malleable mindset condition, students learned that empathy is malleable and can be developed over time. In the social norms condition, participants learned that empathy is socially desirable and normative among seventh graders. In the control condition, participants learned that intelligence is malleable and can be developed over time.

Intervention. The intervention was administered over three sessions during a two-week period, with sessions at least one day apart, over October and November 2016. Sessions were held during a normal class period, and were approximately 50 minutes in length (though most students completed the intervention modules before the end of the class period). The intervention was computer-based, allowing randomization at the level of the individual. Students were randomly assigned to one of the three intervention conditions at

the start of the first intervention session. Each of the sessions was structurally similar. The composition of the intervention sessions was as follows:

Session 1: Through a series of computer-based modules, which featured animated videos[2], reading passages, and reflective writing activities, students in the two empathy conditions learned about empathy, including information about what empathy was and why it is important for relationships. They were then asked to describe why they value empathy and a recent time they had empathized with someone. In the control condition, students learned about the brain and how it develops as people acquire new skills. They were asked to describe an example of something they learned how to do (e.g., riding a bike, multiplication or division, etc.) and to explain how the brain's ability to form new connections helped them develop that skill.

Session 2: In another set of computer-based tutorials, students in the malleable mindset condition watched a video describing the malleable nature of empathy (namely, that empathy can grow with effort, and that practicing empathy makes brain regions that support empathy grow stronger). They were the asked to describe a time they were able to overcome an "empathic challenge", or difficulty empathizing with someone. At the end of the session, students were asked to try to overcome an empathic challenge by increasing their empathy for someone during an interaction when empathizing felt challenging.

Students in the social norms condition watched a video describing how empathy tends to increase in seventh grade due to brain development and normative changes in

[2] For a detailed description of all animated videos used in the intervention, please see Appendix 2A.

social structure. Next, they read testimonials written by their peers about why they value empathy (selected from the reflective writing activity in during Session 1). After reading their peers' descriptions of why they value empathy, participants in the social norms condition were asked to summarize how people in their grade felt about empathy in general. Finally, they were asked to pay attention to their feelings of empathy and to look for instances where their peers empathized with each other over.

Students in the control condition watched a video describing how intelligence is malleable and can grow over time. After watching the video, they were asked to write about an academic challenge they were able to overcome with effort. At the end of the module, they were asked to try working through a school-related challenge using some of the strategies described in the video (e.g., asking a teacher for help).

Session 3: In the third session, students in the malleable mindset condition were asked to describe their experience trying to increase empathy. Then they were asked to generate three potential empathic challenges they anticipated facing during seventh grade, and then describe how they planned to overcome these challenges.

Students in the social norms condition were asked to reflect on their observations of their own and other's empathy. Then, they read some of their peers' pro-empathy responses to the prompt from session two, describing how students in their grade valued and practiced empathy. Based on their peers' responses, they were asked to write a paragraph summarizing how people at their school felt about empathy.

Students in the control condition were asked to describe an experience they had overcoming an academic challenge. They were then asked to generate three potential

academic challenges they anticipated experiencing in seventh grade, and finally to describe how they would overcome these challenges.

Empathic motives. At the end of the third session, we assessed students' empathic motives using a 9-item questionnaire (Schumann et al., 2014). Each item was on a 9-point scale ranging from strongly disagree to strongly agree. The scale assessed participants willingness to empathize with others, for instance through the item "I want to be an empathic person."

Follow Up. Follow up sessions were held in December 2016 and occurred during a regular class period. During these sessions, students completed a number of tasks and questionnaires to assess empathy and related constructs. These sessions were scheduled based on school availability. Consequently, the amount of time between the final intervention session and the follow up session varied. The amount of time elapsed between the final intervention session and the follow up was approximately 4.7 weeks, with a minimum spacing of 18 days and a maximum of 52 days. The amount of time between the final intervention session and the follow up session did not affect scores on the manipulation checks we administered at follow up.

Peer nominations: Students' friendships and prosocial behavior were measured using a peer-nomination procedure (Crick & Grotpeter, 1995). Students were asked to nominate up to five of their closest friends, selecting friends' names from a drop-down list containing their peers' names. Students were also asked to nominate people who were the

most prosocial at their school, choosing up to five peers on three measures of prosocial behavior (peers who do nice things for others, peers who include others, and peers who cheer each other up others up, Crick & Grotpeter, 1995).

Self report. Students completed several questionnaires assessing their beliefs about empathy, their social and emotional well-being, and their social behavior.

Malleability of Empathy Scale (Schumann et al., 2014). This 6-item scale assesses participants' beliefs about the malleable nature of empathy (e.g., "No matter who somebody is, they can always change how empathic a person they are") using a 7-point agreement scale where 1 meant strongly disagree and 7 meant strongly agree.

Social Normativity of Empathy Scale. This 6-item scale was designed to be structurally similar to the malleability of empathy scale. Items assess beliefs about the social normativity and desirability of empathy (e.g., "For the most part, people want to be empathic and experience empathy for others."), and also used a 7-point agreement scale where 1 meant strongly disagree and 7 meant strongly agree.

Perceived stress scale (Cohen, Kamarck, & Mermelstein, 1983). This 10-item scale measures feelings of stress. Participants rated their agreement with each statement (e.g., How often have you felt that you were unable to control the important things in your life?) using a 7-point scale from 1 (never) to 5 (very often).

Asher-Wheeler loneliness scale (Asher, Wheeler, Steven, & Valerie, 1985). This 16-item scale was used to measure feelings of loneliness at school (e.g., "I have nobody to talk to in my classes"). Students rated the items on a scale from 1 (always true) to 5 (not true at all). Items were coded such that higher scores indicated more loneliness.

Children's Social Behavior Scale – Self Report. This measure assesses students' tendencies to engage in prosocial behavior and aggressive behavior at school. Three subscales were used to assess social behavior at school, a prosocial behavior subscale (4 items, e.g., "Some kids say or do nice things for other kids. How often do you do this?"), a relational aggression subscale (5 items, e.g., Some kids tell lies about a classmate so that the other kids won't like the classmate anymore. How often do you do this?) and a physical aggression subscale (2 items, e.g., Some kids push and shove other kids at school. How often do you do this?)

Brief Interpersonal Reactivity Index (Ingoglia, Lo Coco, & Albiero, 2016). This is an abbreviated version of the Interpersonal Reactivity Index (or the IRI, Davis, 1983), a standard measure of trait empathy. This abbreviated version is 16-items long (instead of 28 items long) and features four items for four subscales: an empathic concern subscale, a perspective taking subscale, an personal distress subscale, and a fantasy subscale. We included 3 of 4 subscales, the empathic concern subscale (sample item: I often have tender, concerned feelings for people less fortunate than me), the perspective taking subscale (I try to look at everybody's side of a disagreement before I make a decision) and the personal distress subscale (sample item: Being in a tense emotional situation

scares me). Participants indicate the extent to which each item describes them on a 5-point Likert scale ranging from 0 (does not describe me at all) to 4 (describes me very well).

3.3 Results

Analyses examining school climate revealed that the five schools differed considerably on several important dimensions, including socioeconomic status, suspension rates, and performance on state assessments in math and English/language arts (see Table 2). For instance, 63.9% of students at School 1 are considered socioeconomically disadvantaged, whereas only 14.3% of students at School 5 are considered socioeconomically disadvantaged. Similarly, more than half the students in our sample at School 1 failed to meet state standards on an annual math assessment, whereas only 16.61% of students failed to meet the state standard for math at school 5.

In addition, we found school-related differences across important socio-emotional constructs, including stress, loneliness, self-reported relational aggression, and self-reported physical aggression (see **Figure 5**). For this reason, we used mixed effects models with random intercepts for each of the five schools using the R package lmerTest (Kuznetsova, Brockhoff, & Christensen, 2017).

	School 1	*School 2*	*School 3*	*School 4*	*School 5*
Grades	6 – 8	6 – 12	6 - 8	6 – 8	5 - 8
n	141	92	211	289	240
Percent Socioeconomically Disadvantaged	63.9%	63% (2013-2014 SARC report)	55.2%	50.2%	14.3%
Suspension Percentage	5.9%	3.2% (Personal correspondence)	5.9%	5.6%	3.3%
CAASP ELA Standard Not Met (Level 1)	46.67%	31.37%	31.32%	25.54%	11.27%
CAASP Math Standard Not Met (Level 1)	53.89%	35.92%	41.57%	36.61%	16.61%

Table 2. School differences in grades enrolled, sample size, percentage of students who are socioeconomically disadvantaged, percentage of students who are suspended, and percentage of students who failed to meet statewide standards on assessments of math and literacy. Data are from cde.ca.gov DataQuest and School Accountability Report Cards (SARC reports), 2016-2017 academic year unless otherwise noted.

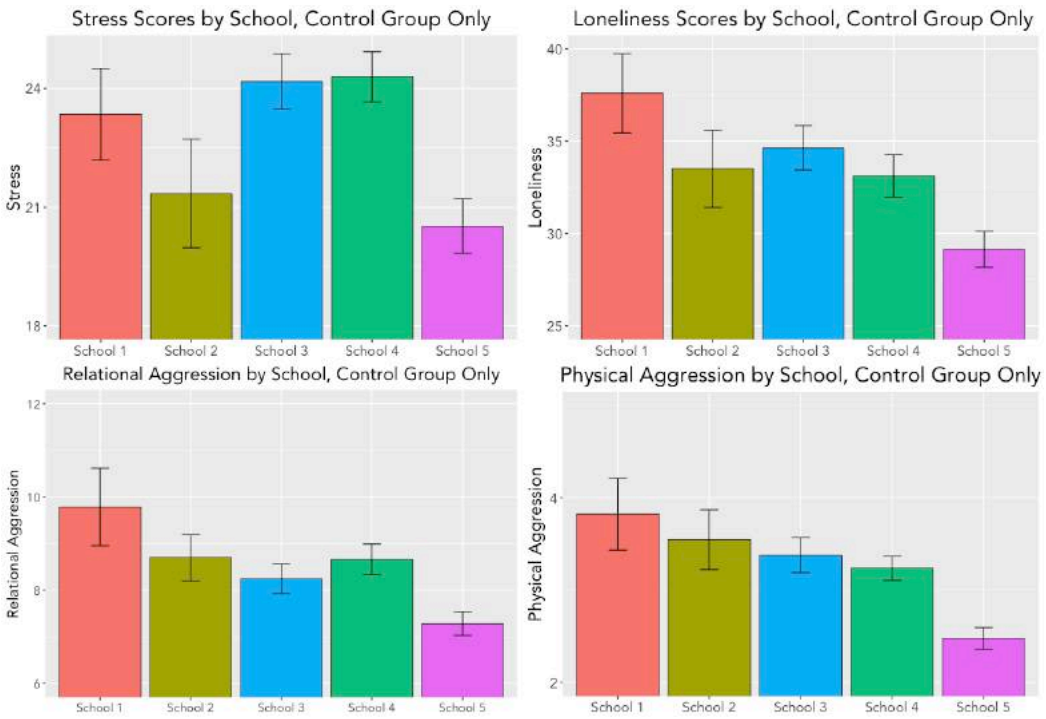

Figure 5. Differences in Socio-emotional Constructs in Schools (Control Condition Only). Mean scores for perceived stress scale, loneliness scale, self-reported relational aggression and self-reported physical aggression displayed on the y-axis for each of the five schools. These data are from control group participants only. Error bars reflect standard error.

We began by assessing effectiveness of the intervention by testing students' beliefs about the malleability and social normativity of empathy during the follow up session, which served as a manipulation check for our interventions. There was a significant effect between conditions on beliefs about the social normativity of empathy, such that participants in the social norms condition endorsed higher beliefs about the normativity and desirability of empathy compared to those in the control condition [b = 1.45 (95% CI, .547 , 2.35); t = 3.15 ; p < .002] and those in the the malleable mindset condition [b = 1.2231 (95% CI, 0.302, 2.143); t = 2.605; p < .01]. Participants in the malleable mindset condition endorsed similar beliefs about the malleability of empathy compared to those in the control condition [b = .138 (95% CI, -1.14, 0.865); t = -0.269; p

= 0.788], and numerically higher beliefs about the malleability of empathy than those in the social norms condition (but the difference was not statistically significant, see **Figure 6**) [b = 0.8038 (95% CI, -0.199, 1.81); t = 1.569; p = 0.12].

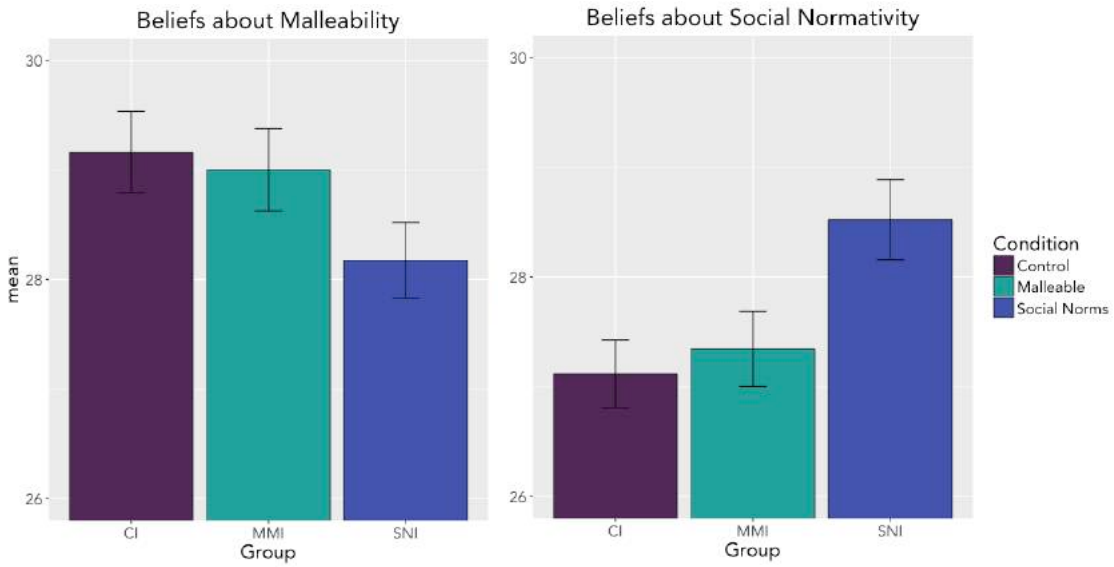

Figure 6. Beliefs about Malleability and Social Normativity of Empathy. Mean scores for beliefs about the malleability of empathy (left) and the beliefs about the social normativity of empathy (right) for each of the three intervention conditions. Error bars reflect standard error.

We created a composite score from 6-items in the empathic motives scale, consistent with previous work[3] (Schumann et al., 2014). We found that participants in the social norms intervention condition endorsed significantly greater motivation to be empathic as assessed by this scale than participants in the malleable mindset group [b = 1.597 (95% CI, 0.278, 2.92); t = 2.37; p = .018] and participants in the control group [b =

[3] At School 2, students were given an abbreviated version of this questionnaire. Specifically, students at School 2 saw one of the six items used to calculate the composite empathic motives score described above. Data from the other four schools suggests that scores on this single item correlates with the overall composite scores at the level of .77 (School 1), .80 (School 3), .80 (School 4) and .81 (School 5). Though scores on this item are higher for participants in the social norms intervention condition (M = 5.6, sd = 1.2) as compared to participants in the malleable mindset condition (M = 5.0, sd = 1.6) control intervention condition (M = 5.3, sd = 1.4), these differences were not significant at the $p < .05$ level.

2.8595 (95% CI, 1.56, 4.16); $t = 4.302$; $p < .001$]. Participants in the malleable mindset intervention condition had marginally higher scores on this scale than participants in the control condition [$b = 1.2625$ (95% CI, -0.055, 2.58); $t = 1.877$; $p = .061$], see **Figure 7**.

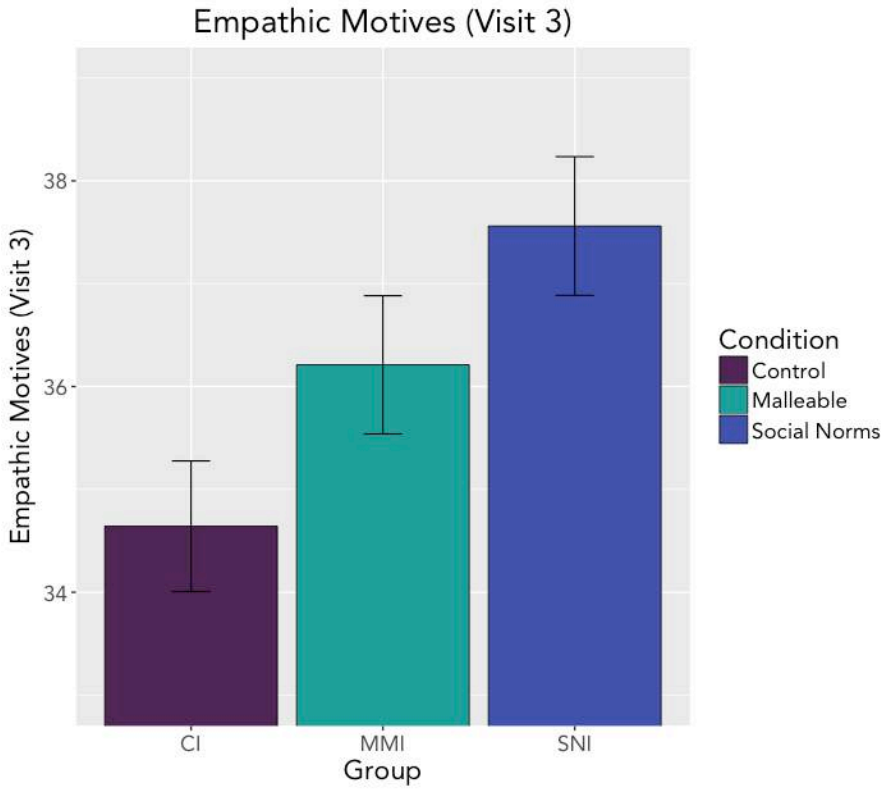

Figure 7. Empathic Motives at the End of Visit 3 by Condition. Mean scores for empathic motives questionnaire are displayed on the y-axis for each of the three intervention conditions. Error bars reflect standard error.

There was no relationship between group assignment and stress, loneliness, relational aggression, the perspective taking subscale of the IRI, the personal distress subscale of the IRI, peer-reported prosocial behavior, empathic accuracy and affect contagion. There was a marginally significant relationship between condition and empathic concern scores such that participants in the social norms condition reported marginally lower empathic concern as measured by the IRI than participants in the

control condition group [b = -0.496 (95% CI, -1.039, 0.047); t = -1.79; p = 0.074]. There was also a relationship between group assignment and self-reported physical aggression, such that participants in the malleable mindset condition reported engaging in more physical aggression than those in the control condition group [b = 0.32 (95% CI, 0.0714, 0.567); t = 2.526; p = 0.012].

Finally, there was a relationship between group assignment and prosocial behavior such that participants in the malleable mindset condition [b = -0.404 (95% CI, -0.891, 0.083) ; t = -1.63; p = .104] and social norms condition [b = -0.57 (95% CI, -1.052, -0.088); t = -2.32; p = 0.021] had lower scores on a self-reported measure of prosocial behavior than those in the control condition.

Exploratory analyses revealed that empathic motives tracked positively with self-reported prosocial behavior [b = 0.147 (95% CI, 0.124, 0.168); t = 13.7 ; p < .001] and peer-reported prosocial behavior [b = 0.12 (95% CI, 0.031, 0.118); t = 4.241; p < .001], and negatively with physical aggression, [b = -0.035 (95% CI, -0.046, -0.0236); t = -6.25; p <.001], relational aggression [b = -0.0389 (95% CI, -0.06, -0.017); t = -3.4; p <.001], and loneliness [b = -0.16 (95% CI, -0.234, -0.08); t =-4.38; p < .001].

Because empathic motives were positively associated with peer-nominated prosocial behavior, we examined whether there was a significant indirect relationship between group assignment and peer-reported prosociality using the lavaan package in R for structural equation modeling (Rosseel 2012). We found a marginally significant indirect effect of participants' group assignment on their peer-reported prosocial behavior, via increases in their empathic motives among participants in the social normativity condition (**Figure 8**), ab = 0.17, p = *.077*.

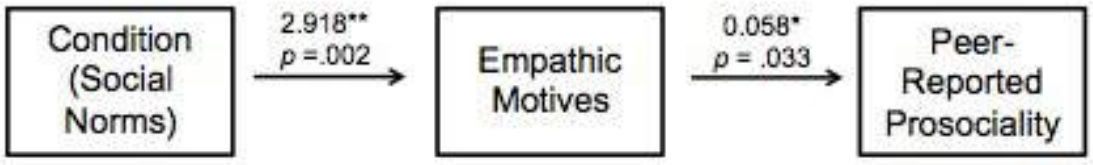

Figure 8. Indirect effect of empathic motives. Assignment to the social normativity condition indirectly affects peer reported prosocial behavior by increasing participants' empathic motives, *ab = 0.17, p = .077.*

Ethnicity	***School 1***	***School 2***	***School 3***	***School 4***	***School 5***
African American	5.4%	14.6%	5.0%	5.0%	1.8%
American Indian/ Alaska Native	0.6%	0.4%	0.5%	0.7%	0.2%
Asian	6.3%	22.2%	8.1%	11.1%	10.6%
Filipino	5.0%	15.6%	3.7%	3.8%	2.3%
Hispanic of Latino/a	62.7%	16.4%	62.5%	49.8%	11.9%
Pacific Islander	0.9%	1.0%	0.8%	0.5%	0.6%
White	14.8%	21.6%	15.9%	23.4%	64.9%
Two or More Races	2.9%	7.1%	2.3%	3.9%	7.5%
Not Reported	1.4%	0.0%	1.1%	1.7%	0.0%

Table 3. Ethnicity enrollment rates at each of the five schools for the 2016-2017 School Year (data from cde.ca.gov).

Measure	*School 1*	*School 2*	*School 3*	*School 4*	*School 5*
Empathic Motives	*M* = 37.41 *SD* = 8.65	*(N/A)** *(N/A)**	*M* = 37.91 *SD* = 9.44	*M* = 39.13 *SD* = 9.03	*M* = 39.86 *SD* = 8.4
Beliefs about Malleability of Empathy	*M* = 26.96 *SD* = 4.21	*M* = 27.85 *SD* = 6.99	*M* = 28.01 *SD* = 5.67	*M* = 30.1 *SD* = 7.1	*M* = 29.25 *SD* = 5.74
Beliefs about Social Normativity of Empathy	*M* = 25.4 *SD* = 4.91	*M* = 27.86 *SD* = 5.3	*M* = 26.41 *SD* = 5.42	*M* = 28.2 *SD* = 5.84	*M* = 29.32 *SD* = 5.66
Physical Aggression	*M* = 3.7 *SD* = 1.91	*M* = 3.68 *SD* = 1.83	*M* = 3.3 *SD* = 1.67	*M* = 3.23 *SD* =1.56	*M* = 2.67 *SD* = 1.3
Relational Aggression	*M* = 9.38 *SD* = 4.23	*M* = 8.83 *SD* = 3.22	*M* = 8.47 *SD* = 3.3	*M* = 8.38 *SD* = 3.12	*M* = 7.49 *SD* = 2.62
Stress	*M* = 23.47 *SD* = 4.69	*M* = 22.2 *SD* =6.41	*M* = 24.55 *SD* =5.71	*M* = 23.01 *SD* = 6.83	*M* = 21.88 *SD* = 6.31
Loneliness	*M* = 35.06 *SD* = 10.6	*M* = 34.37 *SD* = 11.6	*M* = 34.17 *SD* = 10.7	*M* = 32.51 *SD* = 11.1	*M* = 31.71 *SD* = 10.1
Self-Reported Prosocial Behavior	*M* = 13.58 *SD* = 3.62	*M* = 13.49 *SD* = 2.96	*M* = 14.1 *SD* = 3.24	*M* = 14.73 *SD* = 3.14	*M* = 14.66 *SD* = 2.67
Peer-Reported Prosocial Behavior	*M* = 10.09 *SD* = 7.53	*M* = 11.55 *SD* = 10.6	*M* = 11 *SD* = 8.62	*M* = 10.99 *SD* = 7.86	*M* = 10.92 *SD* = 10.9
IRI: Empathic Concern	*M* = 8.72 *SD* = 3.61	*M* = 9.17 *SD* = 3.15	*M* = 9.59 *SD* = 3.6	*M* = 9.51 *SD* = 3.4	*M* = 10.4 *SD* = 3.16
IRI: Perspective Taking	*M* = 8.27 *SD* = 3.68	*M* = 7.76 *SD* = 3.42	*M* = 8.79 *SD* = 3.53	*M* = 8.8 *SD* = 3.4	*M* = 9.56 *SD* = 2.81
IRI: Personal Distress	*M* = 6.69 *SD* = 3.4	*M* = 6.1 *SD* = 3.08	*M* = 7.02 *SD* = 3.41	*M* = 6.29 *SD* = 3.41	*M* = 6.63 *SD* = 3.25

Table 4. School differences in empathic motives, beliefs about malleability of empathy, beliefs about social normativity of empathy, physical aggression, relational aggression, stress, loneliness, self-reported prosocial behavior, number of prosocial nominations received from peers, and IRI subscale scores. These data are school-wide averages, collapsed across all three experimental conditions.

**Please see footnote 3 for information about empathic motives at School 2*

In subsequent analyses, we examined changes in normativity beliefs (see **Figure 9**) and empathic motives (see **Figure 10**) across each of our five schools. We found that the overall changes in beliefs about normativity and empathic motives were driven by changes at three of our five schools. In other words, the social norms intervention did not affect beliefs or motives surrounding empathy at Schools 1 and 2, but did at Schools 3, 4, and 5. When looking only at these three schools, the indirect relationship between experimental condition assignment and prosociality is statistically significant (*ab* = 0.571, 95% CI [.249, .955], $p < .01$).

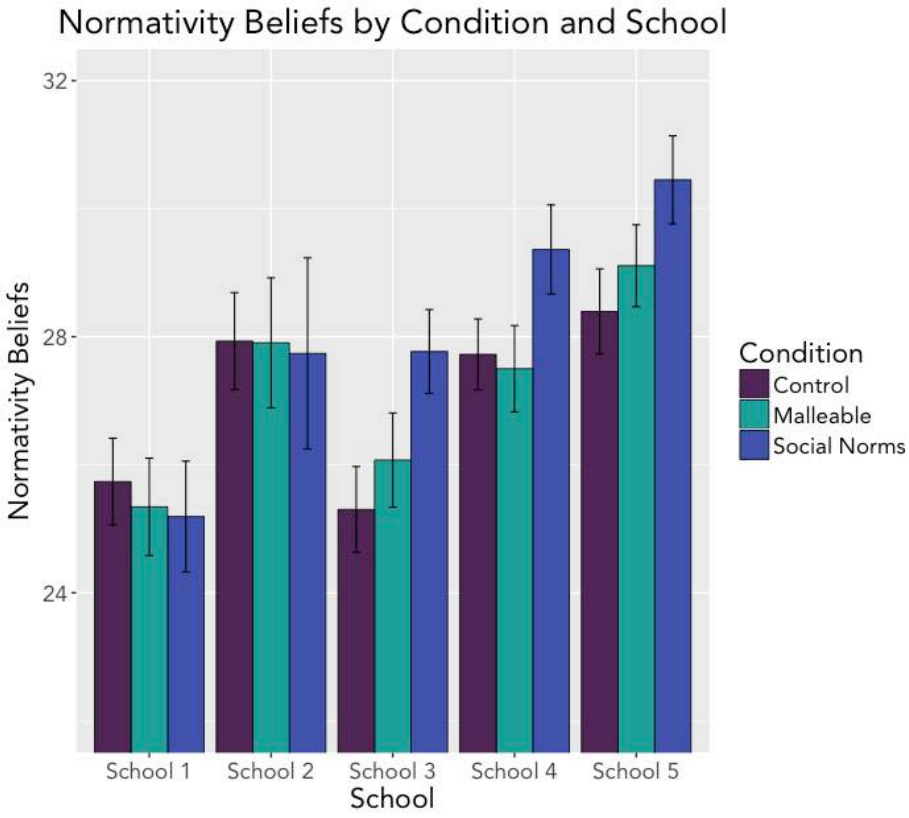

Figure 9. Beliefs about Normativity of Empathy by Condition and School. Mean scores for beliefs about the normativity of empathy scale are displayed on the y-axis for each of the five schools on the x-axis, color-coded to reflect intervention condition (purple = control intervention, green = malleable mindset intervention, blue = social norms intervention). Error bars reflect standard error.

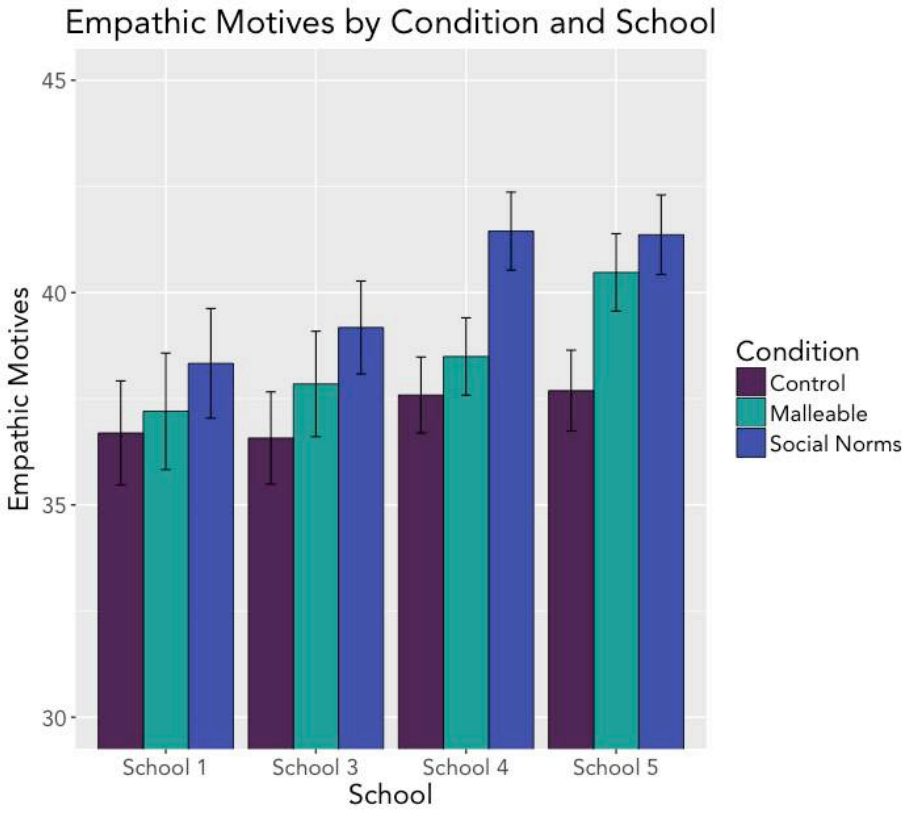

Figure 10. Empathic Motives at Visit 3 by School and Condition Mean. Scores for beliefs about the empathic motives questionnaire are displayed on the y-axis for each of the schools on the x-axis, color-coded to reflect intervention condition (see legend). Note that data from School 2 are not presented on this graph, because these students received an abbreviated version of the questionnaire as mentioned earlier. Error bars reflect standard error.

School	***Outcome Measure***	***Control Condition***	***Malleable Mindset Condition***	***Social Norms Condition***
School 1	Empathic Motives	*M* = 36.7, *SD* = 8.3	*M* = 37.2, *SD* = 9.09	*M* = 38.33, *SD* = 8.66
	Malleability Beliefs	*M* = 27.6, *SD* = 4.5	*M* = 26.66, *SD* = 4.05	*M* = 26.66, *SD* = 4.14
	Social Normativity Beliefs	*M* = 25.74, *SD* = 4.18	*M* = 25.34, *SD* = 4.87	*M* = 25.19, *SD* = 5.61
	Physical Aggression	*M* = 3.47, *SD* = 1.87	*M* = 3.83, *SD* = 1.89	*M* = 3.79, *SD* = 1.99
	Relational Aggression	*M* = 8.55, *SD* = 3.9	*M* = 9.69, *SD* = 4.51	*M* = 9.93, *SD* = 4.24
	Stress	*M* = 23.1, *SD* = 5.3	*M* = 23.53, *SD* = 4.75	*M* = 23.76, *SD* = 4.08
	Loneliness	*M* = 37.1, *SD* = 11.47	*M* = 34.07, *SD* = 10.55	*M* = 34.05, *SD* = 9.53
	Self-Reported Prosocial Behavior	*M* = 13.53, *SD* = 3.61	*M* = 13.66, *SD* = 3.46	*M* = 13.54, *SD* = 3.85

	Peer-Reported Prosocial Behavior	*M* = 9.53, *SD* = 7.09	*M* = 10.83, *SD* = 8.18	*M* = 9.89, *SD* = 7.39
	IRI: Empathic Concern	*M* = 8.58, *SD* = 3.41	*M* = 9.36, *SD* = 3.42	*M* = 8.2, *SD* = 3.94
	IRI: Perspective Taking	*M* = 8.39, *SD* = 3.48	*M* = 8.73, *SD* = 3.78	*M* = 7.7, *SD* = 3.76
	IRI: Personal Distress	*M* = 6.49, *SD* = 3.21	*M* = 7.23, *SD* = 3.5	*M* = 6.34, *SD* = 3.54
School 2	Empathic Motives	*(N/A)**	*(N/A)**	*(N/A)**
	Malleability Beliefs	*M* = 28.07, *SD* = 6.56	*M* = 28.45, *SD* = 6.7	*M* = 27.04, *SD* = 7.92
	Social Normativity Beliefs	*M* = 27.93, *SD* = 4.08	*M* = 27.9, *SD* = 4.66	*M* = 27.74, *SD* = 7.16
	Physical Aggression	*M* = 3.42, *SD* = 1.85	*M* = 4.19, *SD* = 1.54	*M* = 3.52, *SD* = 1.99
	Relational Aggression	*M* = 8.76, *SD* = 2.93	*M* = 8.86, *SD* = 2.45	*M* = 8.87, *SD* = 4.11
	Stress	*M* = 22.28, *SD* = 7.82	*M* = 21.2, *SD* = 4.64	*M* = 22.92, *SD* = 5.93
	Loneliness	*M* = 33.55, *SD* = 11.57	*M* = 34.1, *SD* = 9.36	*M* = 35.48, *SD* = 13.42
	Self-Reported Prosocial Behavior	*M* = 14.54, *SD* = 2.65	*M* = 13.14, *SD* = 2.77	*M* = 12.65, *SD* = 3.17
	Peer-Reported Prosocial Behavior	*M* = 11.66, *SD* = 10.07	*M* = 10.25, *SD* = 8.37	*M* = 12.61, *SD* = 12.82
	IRI: Empathic Concern	*M* = 17.25, *SD* = 4.39	*M* = 16.54, *SD* = 3.93	*M* = 16.43, *SD* = 3.99
	IRI: Perspective Taking	*M* = 14.84, *SD* = 4.55	*M* = 14.79, *SD* = 3.24	*M* = 14.24, *SD* = 3.76
	IRI: Personal Distress	*M* = 11.67, *SD* =3.9	*M* = 11.3, *SD* = 4.28	*M* = 11.89, *SD* = 4.67
School 3	Empathic Motives	*M* = 36.58, *SD* = 8.82	*M* = 37.85, *SD* = 10.08	*M* = 39.18, *SD* = 9.34
	Malleability Beliefs	*M* = 28.35, *SD* = 6.27	*M* = 27.89, *SD* = 5.83	*M* = 27.8, *SD* = 4.98
	Social Normativity Beliefs	*M* = 25.3, *SD* = 5.32	*M* = 26.07, *SD* = 5.46	*M* = 27.77, *SD* = 5.28
	Physical Aggression	*M* = 3.3, *SD* = 1.59	*M* = 3.39, *SD* = 1.88	*M* = 3.2, *SD* = 1.54
	Relational Aggression	*M* = 8.1, *SD* = 2.53	*M* = 8.49, *SD* = 3.78	*M* = 8.81, *SD* = 3.49
	Stress	*M* = 24.18, *SD* = 6.01	*M* = 24.31, *SD* = 5.09	*M* = 25.11, *SD* = 5.97
	Loneliness	*M* = 34.55, *SD* = 10.24	*M* = 32.48, *SD* = 11.01	*M* = 35.31, *SD* = 10.83
	Self-Reported Prosocial Behavior	*M* = 14.56, *SD* = 3.07	*M* = 14.36, *SD* = 3.45	*M* = 13.44, *SD* = 3.14
	Peer-Reported Prosocial Behavior	*M* = 10.68, *SD* = 8.69	*M* = 11.93, *SD* = 10.35	*M* = 10.45, *SD* = 6.62
	IRI: Empathic Concern	*M* = 9.84, *SD* = 3.35	*M* = 9.94, *SD* = 3.88	*M* = 9.06, *SD* = 3.65
	IRI: Perspective Taking	*M* = 8.72, *SD* = 3.05	*M* = 9.28, *SD* = 3.99	*M* = 8.42, *SD* = 3.5

	IRI: Personal Distress	*M* = 6.84, *SD* = 3.23	*M* = 7.26, *SD* = 3.72	*M* = 6.99, *SD* = 3.33
School 4	Empathic Motives	*M* = 37.59, *SD* = 9.04	*M* = 38.49, *SD* = 8.8	*M* =41.45 , *SD* = 8.9
	Malleability Beliefs	*M* = 30.15, *SD* = 7.22	*M* = 30.44, *SD* = 7.3	*M* = 29.7, *SD* = 6.83
	Social Normativity Beliefs	*M* = 27.72, *SD* = 5.16	*M* = 27.5, *SD* = 5.87	*M* = 29.36, *SD* = 6.36
	Physical Aggression	*M* = 3.15, *SD* = 1.21	*M* = 3.41, *SD* = 1.92	*M* = 3.15, *SD* = 1.5
	Relational Aggression	*M* = 8.5, *SD* = 3.02	*M* = 8.27, *SD* = 3.37	*M* = 8.37, *SD* = 2.95
	Stress	*M* = 24.41, *SD* = 6.5	*M* = 22.57, *SD* = 7.44	*M* = 21.92, *SD* = 6.37
	Loneliness	*M* = 32.73, *SD* = 11.09	*M* = 34.13, *SD* = 12.05	*M* = 30.67, *SD* = 9.81
	Self-Reported Prosocial Behavior	*M* = 15.12, *SD* = 2.93	*M* = 14.54, *SD* = 3.57	*M* = 14.51, *SD* = 2.89
	Peer-Reported Prosocial Behavior	*M* = 11.2, *SD* = 8.08	*M* = 9.86, *SD* = 7.14	*M* = 11.87, *SD* = 8.53
	IRI: Empathic Concern	*M* = 9.95, *SD* = 2.75	*M* = 9.38, *SD* = 3.79	*M* = 9.18, *SD* = 3.63
	IRI: Perspective Taking	*M* = 9.36, *SD* = 2.93	*M* = 8.44, *SD* = 3.84	*M* = 8.55, *SD* =3.42
	IRI: Personal Distress	*M* = 6.52, *SD* = 2.93	*M* = 8.44, *SD* = 3.84	*M* = 8.55, *SD* = 3.42
School 5	Empathic Motives	*M* = 37.69, *SD* = 8.4	*M* = 40.47, *SD* = 8.06	*M* = 41.36, *SD* = 8.38
	Malleability Beliefs	*M* = 29.89, *SD* = 5.96	*M* = 29.79, *SD* = 5.72	*M* = 28.04, *SD* = 5.41
	Social Normativity Beliefs	*M* = 29.39, *SD* = 5.61	*M* = 29.11, *SD* = 5.46	*M* = 30.45, *SD* = 5.8
	Physical Aggression	*M* = 2.46, *SD* = 1.05	*M* = 2.89, *SD* = 1.42	*M* = 2.64, *SD* = 1.36
	Relational Aggression	*M* = 7.28, *SD* = 2.26	*M* = 7.82, *SD* = 3.25	*M* = 7.38, *SD* = 2.25
	Stress	*M* = 20.52, *SD* = 5.75	*M* = 23.52, *SD* = 6.84	*M* = 21.44, *SD* = 5.94
	Loneliness	*M* = 29.14, *SD* = 8.52	*M* = 33.51, *SD* = 10.63	*M* = 32.33, *SD* = 10.63
	Self-Reported Prosocial Behavior	*M* = 14.69, *SD* = 2.66	*M* = 14.39, *SD* = 2.6	*M* = 14.88, *SD* = 2.77
	Peer-Reported Prosocial Behavior	*M* = 11.83, *SD* = 8.92	*M* = 9.94, *SD* = 6.73	*M* = 11.0, *SD* = 6.29
	IRI: Empathic Concern	*M* = 10.43, *SD* = 3.44	*M* = 10.14, *SD* = 3.13	*M* = 10.62, *SD* = 2.96
	IRI: Perspective Taking	*M* = 9.48, *SD* = 2.95	*M* = 9.34, *SD* = 2.64	*M* = 9.84, *SD* = 2.87
	IRI: Personal Distress	*M* = 6.57, *SD* = 3.26	*M* = 7.27, *SD* = 3.33	*M* = 6.08, *SD* = 3.08

Table 5. Condition by school differences in empathic motives, beliefs about malleability of empathy, beliefs about social normativity of empathy, physical aggression, relational aggression, stress, loneliness, self-reported prosocial behavior, number of prosocial nominations received from peers, and IRI subscale scores.

**Please see footnote 3 for information about empathic motives at School 2*

3.4 Discussion

These findings suggest that large-scale, motivation-based interventions can change empathy-related motivation, beliefs and behavior among seventh graders. A three-session, computer-based intervention addressing the social normativity of empathy shifted seventh graders' perceptions of the normativity of empathy and increased their desire to be empathic, which in turn affected downstream outcomes including increasing prosocial behavior and decreasing in aggressive tendencies. This demonstrates of the feasibility of brief, scalable interventions for building empathy in early adolescence.

Our findings suggest that the content of the intervention and the context in which it is administered are of critical importance in determining the intervention's efficacy. In particular, the social normativity intervention elevated participants' desire to be empathic as measured by the empathic motives questionnaire, and changed participants' beliefs about the normative nature of empathy even weeks after the intervention. There was also a marginally significant indirect effect between the social normativity intervention and peer-reported prosociality: the social normativity intervention significantly increased empathic motives, which in turn increased peer-reported prosocial behavior. This finding suggests that addressing seventh graders' perceptions of the normativity and desirability of empathy may be an effective way to promote prosocial behavior in their school environments.

Conversely, although the malleable mindset intervention increased motivation to be empathic, this change was only marginally significant compared to the control group. What's more, it seems to be driven mainly by a change in empathic motives at a single

school, School 5. The difference in empathic motives between the malleable mindset and control conditions are not significant at Schools 1, 2, 3 and 4.

There are a number of reasons why the social normativity intervention may have been more effective than the malleable mindset intervention in this population. Given the social, emotional, physical and cognitive changes that characterize this time period, including the orientation and susceptibility to peer influence (Steinberg & Monahan, 2007), students this age may be particularly receptive to an interventions employing normative influence (Levy Paluck, Shepherd, & Aronow, 2016). Elevated *social sensitivity*—or attention paid to and emotion evoked by information pertaining to social evaluations and social status—is thought to be caused by a shift in motivation toward social connectedness that occurs at this age (Somerville, 2013). Indeed, one component of our social normativity intervention involved presenting students with their peers' empathy-positive responses to questions about school climate (i.e., why they valued empathy, how people in their grade felt about empathy).

Though group assignment did not directly affect outcome measures, we did find an indirect relationship between assignment to the social norms condition and peer-reported prosocial behavior. By increasing empathic motives, the social normativity intervention influenced the number of prosocial peer nominations a participant received. This suggests that an intervention that emphasizes the social normativity of empathy can shape students' prosocial behavior and group perception of peers' prosocial behavior.

Intervention context was also critically important in determining whether beliefs and behavior were changed. Intriguingly, the social norms intervention elevated empathic motives and beliefs about the normativity of empathy at Schools 3, 4, and 5, but not at

Schools 1 and 2. Notably, Schools 1 and 2 are the smallest class sizes (under 200 students), whereas schools 3, 4 and 5 all have over 200 students. However, the absence of directional shifts in beliefs about normativity in Schools 1 and 2 suggest that sample size cannot fully account for the null effect in these samples. We observed significant differences in measures pertaining to schools' social and emotional climates, which could affect the efficacy of our empathy interventions.

We also collected publically-available data including measures of achievement on state tests, percentage of students who were socioeconomically disadvantaged, and school suspension rates. Though we cannot test for moderation using school-level data (because there are only five observations), it is interesting to observe how these variables differ across the five schools, and to speculate about how these differences may affect receptivity to these interventions. For example, School 1 has the highest percentage of students who were socioeconomically disadvantaged and School 5 had the lowest percentage. Given that previous work finds that empathy and socioeconomic status are positively related (Jolliffe & Farrington, 2006), it is not surprising that students at Schools 1 and 5 reacted differently to our interventions. Future work should carefully evaluate how variables like these facilitate or inhibit empathy interventions in an effort to create effective programs that build empathy across different school climates.

Limitations and future directions. The present study has several limitations. First, in an effort to prevent anchoring in responses, we did not collect baseline measures from our sample. Baseline measures would enable more precision in assessing when and for whom the intervention is most effective. For instance, we observed some unexpected differences on some self-report measures, including greater levels self-reported prosocial

behavior among participants in our control group. This may be due to shifts in one's perception of their engagement in prosocial behavior and not actual changes in prosocial behavior per se, as there was no relationship between group assignment and peer reports of prosocial behavior. Nevertheless, it would be useful for future studies to establish baseline scores for constructs like empathy and prosociality to understand exactly how our intervention affects students' empathy-related beliefs and motives.

Second, although we tried to ensure consistency across schools in timing and administration of the intervention, sessions were scheduled based on school's preferences and availability. All of the intervention sessions were administered over a two-week period, but the spacing between the third intervention session and the follow up sessions differ across schools. The average amount of time between session 3 and follow up was 4.7 weeks, with the minimum separation of 18 days and a maximum separation of 52 days. Though latency between the intervention and follow up do not affect scores on manipulation checks at follow up, establishing consistent time intervals between the conclusion of the intervention and the follow up would have been ideal.

Finally, our intervention featured a control condition that may obscure comparison to the two intervention conditions. Though people often hold different theories of different psychological attributes (Dweck et al., 1995), it's possible that malleable mindset of intelligence intervention changed empathy mindsets (as mentioned in the previous chapter). Interventions addressing theories of personality are shown to increase prosocial behavior among adolescents (Yeager et al., 2013), suggesting that incremental theories of different psychological attributes can drive effects similar to those

observed in the present study. it would be interesting to address relatedness among theories of personality and theories of empathy in future work.

Conclusion. Empathy is an important part of social and emotional functioning during early adolescence. Here we developed and tested two novel empathy interventions—a malleable mindset of empathy intervention and a social normativity of empathy intervention—that shaped participants' motivation to empathize. We found that an intervention addressing perceptions of the social normativity of empathy increased participants' motivation to be empathic at three of five schools, which in turn elevated their prosocial behavior as reported by their peers. These findings suggest that seventh grade students are receptive to empathy interventions—especially to one that addressed the social normativity of empathy—and that elevating empathy through intervention can produce positive social outcomes during this challenging developmental period.

CHAPTER 4: GENERAL DISCUSSION

Empathy—the ability to share and understand others' thoughts and feelings—is a cornerstone of social life and emotional wellbeing. Given its many benefits, researchers have long wondered whether empathy can be increased through intervention. In these projects, we took a novel approach to building empathy; instead of developing empathy-related skills or abilities, we tried to increase empathy by addressing perceivers' motivation to empathize. Taken together, these findings suggest that motivation-based empathy interventions are effective in changing empathy-related motives, beliefs and behavior weeks later. In Chapter 2, an intervention that changed participants' empathy mindsets affected their beliefs about empathy, their performance on an empathic accuracy task, and the number of friends they had eight weeks after the intervention. In Chapter 3, a social normativity of empathy intervention increased seventh graders' motivation to be empathic and their perceptions of the normativity and desirability of empathy. This indirectly affected their prosocial behavior as indicated by peer report.

These studies demonstrate that motivation-based interventions are viable techniques for changing empathy and related behavior. However, these studies also underscore the importance of context in determining the intervention outcomes. First, it seems that college students and middle school students may be differentially receptive to these two interventions. Second, these data suggest that—at least among seventh-grade students—school climate matters in facilitating or inhibiting the effects of the intervention. Finally, the change strategies employed in these two interventions may contribute to their success.

4.1 Population differences and intervention efficacy.

Perhaps one of the most interesting components of these studies is that the two populations involved differentially responded to our motivation-based interventions. Among college students, a mindset intervention changed beliefs about empathy weeks later. It also improved performance on an empathic accuracy task, and increased the number of friends participants had eight weeks after the intervention. College participants who were given a social normativity intervention showed statistically significant changes in their empathic accuracy, but no changes in the number of friends they'd made since coming to college as compared to a control group.

Conversely, a social normativity-based empathy intervention administered to seventh-grade students elevated their empathic motives and their perceptions about the social normativity of empathy. This in turn predicted important downstream outcomes like peer-reported prosocial behavior. Seventh graders given the malleable mindset of empathy intervention showed only marginally higher changes in their motivation to be empathic, and this finding was driven by scores at a single school. Furthermore, the intervention did not change their beliefs about the malleability of empathy as compared to a control condition.

These two populations were selected to receive these interventions because they are both groups undergoing significant life transitions. According to previous research and psychological theory, transition periods are often effective times to administer psychological interventions, as they are temporal junctures at which recursive psychological processes can be interrupted (Yeager & Walton, 2011). However, the types of changes these two groups are experiencing—and the psychological processes

accompanying these changes—vary considerably. Given that a malleable mindset and social normativity intervention were differentially effective in college students and seventh graders, it seems that the nature of the changes an individual is experiencing may make one intervention more suitable than another.

College students experience unprecedented intellectual growth and development during their freshman year. They experience shifts in their interests and changes in their views of themselves and the world (Webster et al., 1962). Not surprisingly, they also experience shifts in their personality at this age, including a sharp rise in openness (Roberts et al., 2006). It therefore seems reasonable that a mindset intervention would be especially impactful for this population; the message of the intervention—namely, that empathy is malleable—complements their daily experiences during the transition to college.

Conversely, seventh graders are undergoing rapid developmental changes. In addition to experiencing the physical changes associated with puberty, they also face changes in their social and emotional lives. Their friendships evolve, becoming more intimate and intense than ever before (Berndt, 1982). They also experience shifts in their attention and emotional reactivity to social information (Somerville, 2013). It therefore seems intuitive that a social normativity intervention may be especially impactful with seventh graders. Early adolescents may be especially amenable to interventions involving social information like their peers' preferences and perspectives, which was a core component of our social normativity intervention.

4.2 Intervention style and delivery

Key features of the two interventions could have driven the varied outcomes across our samples. The malleable mindset intervention designed for college students created lasting changes in beliefs and behaviors. This intervention employed a saying-is-believing framework that indirectly affected participants' beliefs by asking them to endorse a set of ideas in conversation with another person (Higgins & Rholes, 1978). Though the purpose of the intervention was ostensibly to improve social and emotional outcomes for a high school student, the true aim of the saying-is-believing intervention was to change college students' own beliefs about empathy, and in turn shape their social and emotional lives.

The malleable mindset intervention designed for seventh graders did not employ a saying-is-believing technique. Rather, it presented informational videos that taught students about the malleable nature of empathy. Though no direct evidence evaluates whether a saying-is-believing intervention is more effective than other types of interventions in building empathy, it is possible that a saying-is-believing mindset intervention could have changed empathic motives and beliefs about empathy among seventh graders.

Recent work supports this idea, suggesting that some intervention strategies are better suited than others among different populations or to combat particular problems (Walton & Wilson, in press). For instance, people often react negatively to direct attempts to change beliefs (Brehm, 1966; Sherman et al., 2009; Walton & Wilson, in press). Adolescents may be especially reactant to direct appeals to change their beliefs (Lapsley & Yeager, 2006; Yeager, Fong, Lee, & Espelage, 2015; Yeager, Dahl & Dweck,

2017), suggesting that employing indirect techniques in interventions may be more appropriate for this age group.

Importantly, the saying-is-believing technique did not unilaterally affect outcome measures across the three intervention conditions in our college sample. Specifically, participants in the social norms condition did not show an increase in the number of friends they'd made since coming to college as compared to the control group. Taken together, these findings suggest that there could be compatibility between the content of an empathy intervention (e.g., a mindset based intervention, a social normativity intervention) and the delivery of the intervention (e.g., using saying-is-believing approaches, using information approaches), or that one type of intervention is better suited for a particular population. Future research could examine complementarity between the content of a motivation-based empathy intervention (e.g., addressing beliefs about empathy's malleability or social normativity), the change strategy employed by the intervention (e.g., a saying-is-believing technique or an information delivery approach), and the population to which the intervention is administered (e.g., among college freshmen or middle school students) in an effort to develop best-practice guidelines for empathy interventions.

4.3 Intervention climate

One of the key findings from the middle school intervention is that school climate facilitated or inhibited the effects of the intervention. The social normativity intervention was successful in elevating empathic motives and beliefs about the normativity of empathy in three schools, but not in all five schools. In the previous chapter, we identified factors that may have contributed to the intervention's success or failure in

these schools. However, it is worth commenting more generally on the nature of the social and academic climates in which these interventions are administered.

For example, our college intervention was administered at Stanford University, a private-research university known for its access to ample academic and monetary resources. This climate may provide a nurturing environment for an intervention intended to bolster empathy. Several studies have suggested a negative relationship between stress and empathy (Buruck, Wendsche, Melzer, Strobel, & Dörfel, 2014; Martin et al., 2015), suggesting that motivation-based interventions may not be effective in contexts characterized by high levels of stress. In our data, a motivation-based intervention administered to college students at an affluent private research university produced small but significant group-level changes in beliefs about empathy and related behavior. Notably, participants in our control group endorsed relatively high beliefs about the malleability of empathy as compared to participants from previous studies (Schumann et al., 2014). It is possible that beliefs about empathy are already toward ceiling in environments like this, characterized by certainty and stability, in which individuals have access to important resources that facilitate academic achievement. Conversely, our middle school intervention was administered at five schools that differ considerably on important dimensions that affect the social and emotional experiences of participating students, such as levels of stress, loneliness, aggression, socioeconomic disadvantage, and performance on state-wide assessments of math and literacy.

Given that empathy is positively associated with socioeconomic status (Jolliffe & Farrington, 2006) and negatively associated with stress (Buruck et al., 2014), it seems possible that these factors influenced students' receptivity to our empathy intervention.

Supporting this idea, there was a main effect of school in students' perceptions of the normativity of empathy. Control group students at School 5 reported that empathy was more normative than did control group students at School 1. Given that our five schools differ in in levels of stress, loneliness, physical aggression rates, and relational aggression rates, its seems possible that some school climates were more conducive to these empathy than others. For example, when asked to describe their experiences of empathy, several students at School 1 pushed back. "not everyone has empathy", wrote one student. "I haven't really felt empathy at this school. That's because there are so many bullies that it makes me sad instead of happy or empathetic," said another. Said a third student, "Middle school is hell.. MOST kids are all for them self no one will care adout (sic) you there is no empathy for me". When empathy is not normative within a school, students may be less likely to engage in it in an effort to be consistent with those around them. Previous work demonstrates that people are often hostile to ingroup members that perform moral actions that violate normative behavior (Monin, Sawyer, & Marquez, 2008). In environments where empathy is not normative, students may be motivated to avoid empathy in an effort to be consistent with their peers (Asch, 1956). In these contexts, it may be useful to address factors contributing to the non-normativity of empathy before implementing an empathy intervention.

4.4 Limitations

Though these findings suggest that motivation-based empathy interventions can have a lasting and generalized impact, these studies are only initial steps on a long path of inquiry. Though study-specific limitations have been addressed in previous chapters,

here I will describe limitations of this program of research and higher-level conceptual limitations of motivation-based empathy interventions.

First, though this program of research employs two powerful motivations shown to affect empathy, these are not the *only* motivations that shape empathy. Other motivations may more suitable targets for interventions addressing specific perceiver-target relationships. For instance, highlighting how empathy can facilitate role-related goals might increase empathy in occupations where empathy is of critical importance, like in the doctor-patient relationship (Hojat et al., 2004).

Previous work has found that highlighting the motivational relevance of a certain behavior increases the likelihood that an individual will engage in it. For example, lifeguards volunteer to work more hours after reading stories about heroic water rescues than do lifeguards who read stories about how they could benefit personally from the job (Grant, 2008). Similarly, doctors who were reminded that hand hygiene promotes patient health washed their hands more frequently than doctors who were reminded that hand hygiene protects their own health (Grant & Hofmann, 2011). In both of these instances, people changed their behavior when empathy aligned with their role-based objects—namely, to promote others' welfare—underscoring the importance of sensitivity to context when constructing empathy interventions.

Beliefs about malleability and social normativity reflect approach motives, encouraging people toward empathy. But importantly, approach-motives are not always appropriate targets for psychological intervention. Indeed, there are some contexts in which efforts to strengthen approach motives can backfire. Considerable evidence suggests that perspective-taking interventions can do more harm than good in perceiver-

target relationships characterized by hostility (see Vorauer, 2013 for a review and theoretical exploration). Perspective-taking can amplify existing hostility between perceivers and targets (Paluck, 2007; Pierce et al., 2013). These findings caution against the undifferentiated application of approach-related empathy interventions.

In such contexts, it may be more expedient to reduce avoidance than to increase approach motives (Miller & Prentice, 2016). Previous work lends support to this idea. One study employed a novel technique called "paradoxical thinking" to reduce avoidance motives in hostile intergroup climates. This entailed presenting participants with an extreme and unfavorable perspective from a fellow ingroup member. In this instance, Israelis watched videos that featured fellow Israelis extoling the virtues of the conflict with Palestine. Following this intervention, participants reported holding more moderate views toward the conflict. Importantly, they were more enthusiastic about compromising with Palestinians (Hameiri, Porat, Bar-tal, & Halperin, 2016). The extreme views of fellow in-group members paradoxically reduced individual members resistance to compromise, likely reflecting attenuation in empathy-avoidance motives, and made them more open to compromise. In another study, Bruneau and Saxe (2012) compared perspective taking manipulations to *perspective giving* manipulations as strategies for improving relations between groups with asymmetrical power. They found that when low-power group members took the perspective of high-power group members, intergroup attitudes became more negative. Conversely, when low-power group members engaged in perspective-giving (or sharing their perspective with a high-power group member), attitudes improved. In this case, feeling understood by the outgroup mattered for low-power individuals, where understanding the outgroup mattered for high-powered

individuals (Bruneau & Saxe, 2012). Sensitivity to important features of the perceiver target relationship—including existing tensions, hostility, or imbalances in power—can inform the construction of interventions to make them as effective as possible.

4.4 Conclusion

Given the many benefits of empathy, researchers have endeavored to increase it through psychological interventions. The majority of existing interventions—which often focus on building empathic skills like emotion recognition, perspective taking, and communication—are often effective, but may be unnecessarily limited in their impact. These interventions address one's ability to empathize, but often inadvertently discount the importance of one's motivation to empathize. Here we designed and tested novel empathy interventions that specifically targeted empathic motives, encouraging people to empathize by teaching them that empathy was malleable, socially normative, or both.

Our findings illustrate the power of a motivation-based approach to empathy, demonstrating that interventions that affect empathic motives can produce long-lasting changes in empathy and related behavior. By shifting empathic motives through intervention, researchers can help improve social and emotional functioning during the most challenging times in people's lives.

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Appendices

Appendix 1A: Study 1 Prompts and Directions for Intervention Sessions

Study 1 Malleable Mindset Condition Prompts

Visit 1 Verbal Instructions

"As I mentioned, we're going to have you write a letter to an adolescent who is having some interpersonal issues at school. **We've found that a common solution is teaching these kids about malleable nature of empathy. A lot of people think that empathy is something that you either have or don't have, and that you can't change how much you have. But recent research including some from our lab suggests that in fact people can develop their empathy through practice. We find that adolescents who know this are often able to overcome some of their most crucial social difficulties.** We're giving you some of this research—from both psychology and neuroscience—in hopes that you can work it into your letter to the high school student. It's really important to us to use real data, since we want these high school students to be able to review what we present to them. Read these materials and pay attention to what you think the key messages are. Then, you can integrate the main points into the response you write back to the high school student. **The message we really want to get across is that empathy can be developed with effort, and we can learn to empathize even when it's challenging."**

Visit 1 Written Instructions

Please draft your response below, and please try to integrate the following message:

Because empathy is malleable, humans are capable of increasing their connections to others at any time in their lives by exerting the effort needed to do so. Countless studies have shown that taking the time to put one's self in somebody else's shoes can expand a person's empathic ability. This means that people can build their ability to connect with others, even those who come from very different backgrounds. Every time a person puts effort into empathizing even when it feels difficult, they ultimately shape their empathic tendencies in the long term, which can have important social outcomes. Imparting this message to young students is especially important when those students are struggling with their own empathy. If these students believe that their capacity for empathy is fixed, they may feel that they are incapable of connecting with others when they encounter difficulties. If students can instead be convinced that empathy is malleable, they may be more likely to put effort in to understanding others and succeed at this critical goal.

Visit 2 Verbal Instructions

"Same as last time, you'll be writing to an adolescent who is having some **interpersonal issues** at school. As mentioned, we've found that a common solution is teaching these kids about **malleable nature of empathy. Recent research suggests that people can develop their empathy through practice and with effort can empathize even when it's challenging, and adolescents who know this are often able to overcome some of their most crucial social difficulties.** Again we will be giving you some of this research in hopes that you can work it into your letter to the high school student. **However this time you will be asked to write specifically about an empathic challenge, and how you were able to overcome it with effort. The message we really want to get across through these letters is that empathy can be developed with effort, and we can learn to empathize even when it's challenging."**

Visit 2 Written Instructions

Please use the space below to share a specific empathic challenge you have faced, and how you were able to overcome it with effort. Before doing so, please read and try to consider the following passage:

Because empathy is malleable, humans are capable of increasing their connections to others at any time in their lives by exerting the effort needed to do so. Countless studies have shown that taking the time to put one's self in somebody else's shoes can expand a person's empathic ability. This means that people can build their ability to connect with others, even those who come from very different backgrounds. Every time a person puts effort into empathizing even when it feels difficult, they ultimately shape their empathic tendencies in the long term, which can have important social outcomes. Imparting this message to young students is especially important when those students are struggling with their own empathy. If these students believe that their capacity for empathy is fixed, they may feel that they are incapable of connecting with others when they encounter difficulties. If students can instead be convinced that empathy is malleable, they may be more likely to put effort in to understanding others and succeed at this critical goal.

Study 1 Social Norms Condition Prompts

Visit 1 Verbal Instructions

"As I mentioned, we're going to have you write a letter to an adolescent who is having some **interpersonal issues** at school. **We've found that a common solution is teaching these kids about the desirable nature of empathy. Recent research (some of which comes from our lab) suggests that empathy is valued in most communities, including ours here at Stanford, and that people want to be empathic. This isn't always what people think, and we find that adolescents who know this are often able to overcome some of their most crucial social difficulties.** We're giving you some of this research—from both psychology and neuroscience—in hopes that you can work it into your letter to the high school student. It's really important to us to use real data, since we want these high school students to be able to review what we present to them. Read these materials and pay attention to what you think the key messages are. Then, you can integrate the main points into the response you write back to the high school student. **The message we really want to get across is that empathy is valued in most communities, and that people want to be empathic.**"

Visit 1 Written Instructions

Please draft your response below, and please try to integrate the following message:

Because empathy is valued in most communities, people want to show it whenever possible. Countless studies demonstrate that people strongly value empathy and expect others in their community to be empathic. Imparting this message to young students is especially important when those students are struggling with their own empathy. If they believe that empathy is not a valued or part of their community's culture, they may feel that acting empathically, especially when it is difficult, is simply not worth it. If they instead understand that empathy is valued and practiced within most communities (like ours here at Stanford, and theirs in their high school), they are more likely to put effort in to understanding and caring for others.

Visit 2 Verbal Instructions

"Same as last time, you'll be writing to an adolescent who is having some **interpersonal issues** at school. As mentioned, we've found that a common solution is teaching these kids about **the desirable nature of empathy. Recent research (some of which comes from our lab) suggests that empathy is valued in most communities, including ours here at Stanford, and that people want to be empathic.** This isn't always what people think, and we find that adolescents who know this are often able to overcome some of their most crucial social difficulties. Again we will be giving you some of this research in hopes that you can work it into your letter to the high school student. **However this time you will be asked to write specifically about why you think empathy is valued here at Stanford and how the Stanford undergraduate community shows**

empathy. The message we really want to get across is that empathy is valued in most communities, like here at Stanford, and that people want to be empathic."

Visit 2 Written Instructions

Please use the space below to write about why Stanford students value empathy, and why empathy is important among undergraduates at Stanford. Before doing so, please read and consider the following message:

Because empathy is valued in most communities, people want to show it whenever possible. Countless studies demonstrate that people strongly value empathy and expect others in their community to be empathic. Imparting this message to young students is especially important when those students are struggling with their own empathy. If they believe that empathy is not a valued or part of their community's culture, they may feel that acting empathically, especially when it is difficult, is simply not worth it. If they instead understand that empathy is valued and practiced within most communities (like ours here at Stanford, and theirs in their high school), they are more likely to put effort in to understanding and caring for others.

Study 1 Combined Condition Prompts

Visit 1 Verbal Instructions

"As I mentioned, we're going to have you write a letter to an adolescent who is having some **interpersonal issues** at school. **We've found that a common solution is teaching these kids about the desirable and malleable nature of empathy. Recent research suggests that empathy is valued in most communities, including ours here at Stanford, and that people want to be empathic. And importantly, research including some from our lab suggests that people can develop their empathy through practice, which isn't what a lot of people think. We find that adolescents who know this are often able to overcome some of their most crucial social difficulties.** We're giving you some of this research—from both psychology and neuroscience—in hopes that you can work it into your letter to the high school student. It's really important to us to use real data, since we want these high school students to be able to review what we present to them. Read these materials and pay attention to what you think the key messages are. Then, you can integrate the main points into the response you write back to the high school student. **The message we really want to get across is that empathy is both socially desirable and malleable, meaning that empathy is valued in most communities, people want to be empathic, and that since empathy can be developed with effort we can learn to empathize even when it's challenging."**

Visit 1 Written Instructions

Please draft your response below, and please try to integrate the following message:

Because empathy is valued in most communities, people want to show it whenever possible. Countless studies demonstrate that people strongly value empathy and expect others in their community to be empathic. Recent research also shows that empathy is malleable, and that humans are capable of increasing their connections to other people in their lives by exerting the effort to do so. Every time a person puts effort into empathizing even when it is difficult, they ultimately shape their empathic tendencies in the long term, which can have important social outcomes. Imparting this message to young students is especially important when those students are struggling with their own empathy. If they believe that empathy isn't valued within their community, or if they believe that their capacity for empathy is fixed, they may feel that empathizing is simply not worth it or even that they're incapable of empathy. If instead they can be convinced that empathy is important and practiced within most communities (like ours here at Stanford, and theirs in their high school) and that empathy is malleable, they may be more likely to put effort into understanding and caring for others.

Visit 2 Verbal Instructions

"Same as last time, you'll be writing to an adolescent who is having some **interpersonal issues** at school. As mentioned, we've found that a common solution is teaching these kids about **the desirable and malleable nature of empathy. Recent research suggests that empathy is valued in most communities, including ours here at Stanford, and that people want to be empathic. And importantly, research including some from our lab suggests that people can develop their empathy through practice, which isn't what a lot of people think. We find that adolescents who know this are often able to overcome some of their most crucial social difficulties.**"

"Again we will be giving you some of this research in hopes that you can work it into your letter to the high school student. **However this time you will be asked to write about 1) an empathic challenge, and how you were able to overcome it with effort, and 2) why you think empathy is valued here at Stanford. The message we really want to get across through these letters is that empathy is both socially desirable and can be developed with effort."**

Visit 2 Written Instructions

Please use the space below to (a) share a specific empathic challenge you have faced, and how you were able to overcome it with effort. In addition, please (b) write about why Stanford students value empathy, and why empathy is important among undergraduates at Stanford. Before doing so, please read and consider the following message:

Empathy is highly valued in our society, which is why it is important for people to cultivate it. Countless studies have shown that people strongly value empathy, and that empathic individuals are more popular, successful, and respected by others. Research also finds that empathy is malleable. This suggests that we can cultivate our capacity to empathize, even with people from very different backgrounds, by exerting effort to put our self in somebody else's shoes. Imparting this message to young students is especially important when those students are struggling with empathy. If these students believe their capacity for empathy is fixed, and/or not valued by others, they may feel incapable of connecting with others when it is difficult to do so, or simply feel that it is not worth it. If students instead understand that empathy is both valuable and expandable, they are more likely to put effort into empathizing with others, and to succeed at this critical goal.

Study 1 Control Condition Prompts

Visit 1 Verbal Instructions

"As I mentioned, we're going to have you write a letter to an adolescent who is having some **academic issues** at school. **We've found that a common solution is teaching these kids about malleable nature of intelligence. A lot of people think that intelligence is something that you either have or don't have, and that you can't change how much you have. But recent research including some from our department suggests that in fact people can develop their intelligence through practice. We find that adolescents who know this are often able to overcome some of their most crucial academic difficulties**. We're giving you some of this research—from both psychology and neuroscience—in hopes that you can work it into your letter to the high school student. It's really important to us to use real data, since we want these high school students to be able to review what we present to them. Read these materials and pay attention to what you think the key messages are. Then, you can integrate the main points into the response you write back to the high school student. **The message we really want to get across is that intelligence can be developed with effort.**

Visit 1 Written Instructions

Please draft your response below, and please try to integrate the following message:

Intelligence is malleable, and humans are capable of increasing their intelligence at any time in their lives by exerting the effort needed to do so. Countless studies have shown that taking the time to understand concepts even when it's challenging can expand a person's intellectual ability. This means that people can build their intelligence, even those who come from very different academic backgrounds. Every time a person puts effort into understanding a difficult new concept, they ultimately shape their intellectual tendencies in the long term, which can have important outcomes on academic achievement over time. Imparting this message to young students is especially important when those students are struggling with performance in school. If these students believe that their capacity for intelligence is fixed, they may feel that they are incapable of learning when something feels too difficult. If students can instead be convinced that intelligence is malleable, they may be more likely to put effort in to understanding difficult concepts and persevere in the face of a challenge.

Visit 2 Verbal Instructions

"Same as last time, you'll be writing to an adolescent who is having some **academic difficulty** at school. As mentioned, we've found that a common solution is teaching these kids about **the nature of intelligence. Recent research suggests that in fact people can develop their intelligence through practice and adolescents who know this are often able to overcome some of their most crucial academic difficulties."**

"Again we will be giving you some of this research in hopes that you can work it into your letter to the high school student. **However this time you will be asked to write about an academic challenge and how you overcame it. The message we really want to get across through these letters that intelligence can be developed with effort."**

Visit 2 Written Instructions

Please use the space below to share a specific academic challenge you have faced, and how you were able to overcome it with effort. Before doing so, please read and try to consider the following passage:

Intelligence is malleable, and humans are capable of increasing their intelligence at any time in their lives by exerting the effort needed to do so. Countless studies have shown that taking the time to understand concepts even when it's challenging can expand a person's intellectual ability. This means that people can build their intelligence, even those who come from very different academic backgrounds. Every time a person puts effort into understanding a difficult new concept, they ultimately shape their intellectual tendencies in the long term, which can have important outcomes on academic achievement over time. Imparting this message to young students is especially important when those students are struggling with performance in school. If these students believe that their capacity for intelligence is fixed, they may feel that they are incapable of learning when something feels too difficult. If students can instead be convinced that intelligence is malleable, they may be more likely to put effort in to understanding difficult concepts and persevere in the face of a challenge.

Appendix 1B: Study 1 Reading Materials

Malleable Mindset Reading Materials

Empathy is changeable and can be developed

by Jennifer Schneider
Published: December 28, 2010

Recently, I bumped into someone I went to high school with over 10 years ago. As with all post-high school encounters, I couldn't help but compare the person in front of me to the person I remembered. Mary was one of those unsympathetic types who didn't really ever put herself in other people's shoes or understand how other people felt. Can you imagine my surprise to find that she is now a social worker with a family and an active role in community service? Meeting such a different person now, I wondered how Mary had changed so much.

"Empathy is not stable over one's lifetime. It can be developed and cultivated."

Does empathy change?

To find out what the experts say about whether empathy can change, I went to the Empathy Research Laboratory (ERL) at Harvard University. For more than 25 years, the ERL has been following over 800 individuals. The researchers have been collecting elaborate data on them since childhood, including school records, many observations at home and in the laboratory, and in-depth interviews with the individuals, their family members, and close friends.

In a recent article published in the *Journal of Personality Research*, Dr. Daniel Lawrence, the Director of ERL, reported the findings of their research. Dr. Lawrence concluded that "Empathy is changeable and can be influenced over time. Empathy is not stable over one's lifetime. It can be developed and cultivated." Dr. Lawrence shows that of the 800 individuals followed over 25 years, very few people's overall empathy levels stayed the same as it was at the beginning of the study. Why? As Dr. Lawrence explains, "People learn and grow throughout life. Empathy is no different. It too can change. It is not always easy, but if they want to, people can shape how much empathy they feel for others. No one's empathy is hard like a rock."

How does empathy change?

To better understand how empathy changes, I spoke to eminent psychologists and neuroscientists all across the country. Surprisingly, I found good consensus that all through life, people can change their own levels of empathy.

How have these fields come to such agreement about the ability of empathy to be changed? Actually, this conclusion was reached long ago. The classic Child and Youth Engagement Study convinced the field of psychology that empathy can indeed be changed. In 1965, Henry Giroux established one of the most ambitious and exciting

intervention programs ever conceived. It was designed to serve the needs of low-empathy youngsters who had previously demonstrated bullying behavior or were judged by schools, police, or welfare agencies to be "at risk" of becoming bullies. Bullying was the focus of the study, because it is a common and serious problem that is strongly predicted by a lack of empathy for others. The youngsters were 250 boys from working-class families in a densely populated area of Massachusetts. They entered the program at ages ranging from 5 to 11 and then continued in it for an average of five years.

The main research question of the intervention program was whether these children could learn to become more empathic towards others, and, as a result, stop bullying other children. Among other things, during the five years of the program, each child was paired with a social worker who visited him twice a month. The social workers taught these children about putting themselves in other children's shoes, trying to see things from other children's points of view, and feeling what other children are feeling.

"If they want to, people can shape how much empathy they feel for others. No one's empathy is hard like a rock."

The results of the intervention were rewarding. Compared to the youngsters who were also bullies or "at risk" but were *not* in the program, those who had the intervention showed dramatic differences. Among the youngsters who were not in the program, over 60% were labeled as bullies in their high schools. In contrast, only 17% of the youngsters who were in the program were labeled as bullies in their high schools. In fact, many of the children in the program were identified by families and friends as now being highly empathic individuals.

What had changed their levels of empathy? Follow-up interviews with the participants when they were adults revealed that most attributed their empathic growth to believing that empathy *can* be changed. Said one participant: "Every time I struggled with feeling empathy for someone or seeing their perspective, I remembered what I learned during the program. That's OK, empathy can be changed. If I don't feel empathy naturally, it doesn't mean that I'm incapable of feeling it."

The conclusion is clear: the results from the Child and Youth Engagement Study indicate that empathy is changeable, and that understanding that it can sometimes be difficult to change is an important step to developing one's empathy.

Lessons Learned

So what about my old classmate, Mary? Well, I guess she worked at developing feelings of empathy over the years. Now, as a social worker, she can pass on the message to others: people can change how much empathy they feel for others.

Relevant Research

1. *Prosocial emotions and helping: the moderating role of group membership*. Sturmer, S., M. Snyder, and A.M. Omoto, J Pers Soc Psychol, 2005. 88(3): p. 532-46.

In this study, the authors examined a group-level perspective on the role of empathy and interpersonal attraction on helping behavior. The authors found that empathy was a stronger predictor of helping behavior when the person in need was an ingroup member, but not an outgroup member. This finding is important because it suggests that a helper's perception of a person in need influences whether the helper will empathize (and ultimately offer help). The authors suggest that by practicing perspective taking (or thinking from the perspective of someone else) might allow us to empathize with outgroup members, which in turn would encourage us to help outgroup members when they are in need. By practicing perspective taking, people can overcome the intergroup gap and empathize with outgroup members.

2. *Categorizing and individuating others: the neural substrates of person perception.* Mason, M.F. and C.N. Macrae. J Cogn Neurosci, 2004. 16(10): p. 1785-95.

The researchers in this study investigated the basic aspects of interpersonal categorization (or labeling of other people). Specifically, they were curious about the mechanisms that facilitate people's ability to categorize (i.e., assign persons to groups) and individuate (i.e., discriminate among group members) others. Categorization is often thought to inhibit empathy, while individuation is thought to enable empathy. The researchers found that categorization and individuation recruit similar neural substrates, suggesting that these processes are related. With this information, the authors claim that the way we identify people can be flexibly adjusted and suggest that perhaps we can tune elements of perception to encourage people to individuate (and ultimately empathize with) a given target person.

3. *Motivational influences on impression formation: outcome dependency, accuracy-driven attention, and individuating processes.* Neuberg, S.L. and S.T. Fiske, J Pers Soc Psychol, 1987. 53(3): p. 431-44.

The authors were interested in examining social and motivational factors that lead a perceiver (people empathizing with another person) to individuate of a social target (individuals with whom perceivers empathize). In three studies, the experimenters found that when a perceiver's outcome is contingent on a target's performance, perceivers are more likely to individuate the target. As mentioned previously, individuation is important in facilitating empathy. Broadly, this suggests that by shifting people's motivation we can shift the extent to which they empathize with a social target.

Our Views of Empathy

Current Stanford University undergraduates share their beliefs about empathy.

"Empathy is what allows us to become something more than ourselves. We can become something larger when we look to other people and attempt to gain an understanding of how their thoughts and emotions work. As Stanford undergrads, most of us want to somehow "change the world" and "make a difference," and whatever else they put in college brochures. While that shininess wears off pretty fast during freshman year, hopefully what's left is a better understanding of how small we really are, and how we can take our small part and add it to the world to make something better for tomorrow."

"Like many communities, Stanford is comprised of people from very different backgrounds. By trying to understand how others' experiences and background may shape who they are and their current opinions, we can broaden our own understanding of the world and others. Without empathy, it would be difficult to meaningfully connect with people who are different from us. Approaching issues from the perspectives of others helps us validate the positions and opinions of others. / Empathy also helps us broaden our world understanding. Putting myself in someone else's shoes will not only help me understand that person, but also people throughout the world with similar backgrounds. Acknowledging that the experiences and struggles of others may be different from your own is important for understanding the world as a whole."

"Stanford is a stressful place, and being high achieving students we struggle during the school year. However I think because of our empathy we really understand each others' pain and struggles so we try our best to support each other and understand each other. We all have difficult course loads and we all have our futures looming over our heads but I think Stanford is very community oriented rather than competitive. We all want each other to succeed and so I think that makes us a really empathetic community that supports each other."

"I think as Stanford students, we understand that although we are tied together through the craziness of rigorous academics and society's pressures to do "better and more," we come from all different places. And the main

way to connect and unite through those differences is to support each other, especially when you see your friend explicitly expressing passion or outcry. I think that constant support makes Stanford an empathetic community. I also think the University's mission to reach the world with our minds and hearts bleeds into the undergraduate life, and that you see students constantly trying to connect with the greater world to solve certain issues. Volunteering and giving back, I feel, is ingrained in our culture."

"Stanford students show empathy by celebrating each other's differences and realizing that just because we all come from different backgrounds, does not mean we do not have similar emotions or reactions and are also deserving of respect. Moreover, we show empathy by constantly trying to give back to our own Stanford community. On a more personal level, we show empathy by being good listeners, being respectful of others' feelings and trying to understand why they feel that way. When people raise concerns about the atmosphere we all live in - things that make them uncomfortable and upset - we can show empathy by listening to them and trying to change policies or our own reactions to accommodate their concerns. We are such an empathetic community because we try so hard to make this university a safe and brave space to live in for everyone. We listen to others, and we are respectful of their concerns and fears. We also make it a safe space for people to voice their concerns, which is another very important element of showing empathy."

Relevant Research

1. Addressing the empathy deficit. Schumann, K., Zaki, J., & Dweck, C. S. Journal of Personality and Social Psychology, 2014. 107(3): p. 475–93.
In this study, the authors examined whether people were motivated to feel empathy for others. If people believe that feeling empathy can be distressing, they may not be particularly motivated to be empathic. The researchers therefore examined whether people generally want to be empathic toward others. The results showed that people are strongly motivated to feel empathy; participants endorsed statements about their motivation to feel empathy (e.g., "I want to be an empathic person; I feel good about myself when I feel empathy for others.") significantly more than statements suggesting empathy avoidance (e.g. "Feeling empathy for others is not a good thing; Feeling empathy for others can be scary.") These findings suggest that, at a general level, people are motivated to be empathic.

2. *2800 personality trait descriptors: normative operating characteristics for a university population.* Norman, W. 1967. Technical Manuscript. p. 1 - 21.
This researcher indexed the social desirability of 2800 personality traits on a 9-point scale (9 was the highest desirability). Empathy had a high average rating on this scale (6.7), signifying that in general people believe that empathy is highly socially desirable and a valuable quality to have.

3. *The Neural Basis of Empathy.* Berhnardt, B.C., Singer, T. Annual Review of Neuroscience, 2012. 35(1): p. 1-23.
In this paper, the authors reviewed decades of work exploring the neural underpinnings of empathy. Specifically, they highlighted that perceiving others' pain often recruits similar brain regions as experiencing pain first-hand (such as the anterior cingulate cortex and the anterior insula), suggesting that humans literally "feel each others' pain". Given the robust body of research documenting the neural signatures of empathy, the human capacity for empathy appears to be present even at the cellular level.

4. *Development of an empathy scale.* Hogan, R. Journal of Consulting and Clinical Psychology, 1969. 33(3): p. 307-316.
The author developed a scale to measure people's empathy, and in doing so evaluated empathy items alongside measures of people's personality and social behavior. The empathy items were related to real-life measures of socially appropriate behavior. Specifically, empathy tracked with several varieties of desirable social behavior such as being enjoyable company at parties and having strong moral principles.

Empathy is changeable and can be developed

by Jennifer Schneider

Published: December 28, 2010

Does empathy change?

For more than 25 years, the Empathy Research Laboratory (ERL) at Harvard University has been following over 800 individuals. The researchers have been collecting elaborate data on them since childhood, including school records, many observations at home and in the laboratory, and in-depth interviews with the individuals, their family members, and close friends. In a recent article published in the Journal of Personality Research, Dr. Daniel Lawrence, the Director of ERL, reported that "Empathy is changeable and can be influenced over time. Empathy is not stable over one's lifetime. It can be developed and cultivated." Dr. Lawrence shows that of the 800 individuals followed over 25 years, very few people's overall empathy levels stayed the same as it was at the beginning of the study. Why? As Dr. Lawrence explains, "People learn and grow throughout life. Empathy is no different. It too can change. It is not always easy, but if they want to, people can shape how much empathy they feel for others."

How does empathy change?

The classic Child and Youth Engagement Study convinced the field of psychology that empathy can indeed be changed. In 1965, Henry Giroux established one of the most ambitious and exciting intervention programs ever conceived. It was designed to serve the needs of low-empathy youngsters who had previously demonstrated bullying behavior or were judged to be "at risk" of becoming bullies. Bullying was the focus of the study, because it is a common and serious problem that is strongly predicted by a lack of empathy for others. 250 boys from working- class families in a densely populated area of Massachusetts were enrolled. They entered the program at ages ranging from 5 to 11 and then continued in it for an average of five years.

The main research question of the intervention program was whether these children could learn to become more empathic towards others, and, as a result, stop bullying other children. During the five years of the program, each child was paired with a social worker who visited him twice a month. The social workers taught these children about putting themselves in other children's shoes, trying to see things from other children's points of view, and feeling what other children are feeling.

Compared to the youngsters who were also bullies or "at risk" but not in the program, those who had the intervention showed dramatic differences. Among the children who were not in the program, over 60% were labeled as bullies in their high schools. In contrast, only 17% of the children who were in the program were labeled as bullies in their high schools. In fact, many of the children in the program were identified by families and friends as now being highly empathic individuals.

Follow-up interviews with the participants when they were adults revealed that most attributed their empathic growth to believing that empathy can be changed. Said one participant: "Every time I struggled with feeling empathy for someone or seeing their perspective, I remembered what I learned during the program. That's OK, empathy can be changed. If I don't

feel empathy naturally, it doesn't mean that I'm incapable of feeling it." The results from the Child and Youth Engagement Study indicate that empathy is changeable, and that understanding that it can sometimes be difficult to change is an important step to developing one's empathy.

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"I think as Stanford students, we understand that although we are tied together through the craziness of rigorous academics and society's pressures to do "better and more," we come from all different places. And the main way to connect and unite through those differences is to support each other, especially when you see your friend explicitly expressing passion or outcry. I think that constant support makes Stanford an empathetic community. I also think the University's mission to reach the world with our minds and hearts bleeds into the undergraduate life, and that you see students constantly trying to connect with the greater world to solve certain issues. Volunteering and giving back, I feel, is ingrained in our culture."

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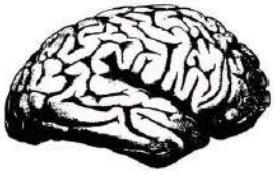
YOU CAN GROW YOUR BRAIN

New Research Shows the Brain Can Be Developed Like a Muscle

Many people think of the brain as a mystery. We don't often think about what intelligence is or how it works. And when you do think about what intelligence is, you might think that a person is born either smart, average, or dumb—either a "math person" or not—and stays that way for life.

But new research shows that the brain is more like a muscle—it changes and gets stronger when you use it. Scientists have been able to show just how the brain grows and gets stronger when you learn.



Everyone knows that when you lift weights, your muscles get bigger and you get stronger. A person who can't lift 20 pounds when they start exercising can get strong enough to lift 100 pounds after working out for a long time. That's because muscles become larger and stronger with exercise. And when you stop exercising, the muscles shrink and you get weaker. That's why people say "Use it or lose it!"

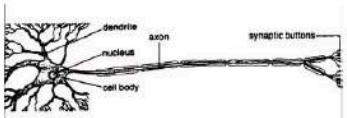
But most people don't know that when they practice and learn new things, parts of their brain change and get larger, a lot like the muscles do. This is true even for adults. So it's not true that some people are stuck being "not smart" or "not math people." You can improve your abilities a lot, as long as you practice and use good strategies.

A Section of the Cerebrum

Inside the outside layer of the brain—called the cortex—are billions of tiny nerve cells, called neurons. The nerve cells have branches connecting them to other cells in a complicated network. Communication between these brain cells is what allows us to think and solve problems.

When you learn new things, these tiny connections in the brain actually multiply and get stronger. The more you challenge your mind to learn, the more your brain cells grow.

Then, things that you once found very hard or even impossible to do—like speaking a foreign language or doing algebra—become easier. The result is a stronger, smarter brain.



A Typical Nerve cell

How Do We Know That The Brain Can Grow Stronger?

Scientists started thinking the human brain could develop and change when they studied adult animals' brains. They found that animals who lived in a challenging environment, with other animals and toys to play with, were different from animals who lived alone in bare cages.

While the animals who lived alone just ate and slept all the time, the ones who lived with different toys and other animals were always active. They spent a lot of time figuring out how to use the toys and how to get along with other animals.

Nerves in brain of animal living in bare cage.

Brain of animal living with other animals and toys.

These animals had more connections between the nerve cells in their brains. The connections were bigger and stronger, too. In fact, their whole brains were about 10% heavier than the brains of the animals who lived alone without toys.

The adult animals who were exercising their brains by playing with toys and each other were also "smarter" –they were better at solving problems and learning new things.

Can Adults Grow Their Brains?

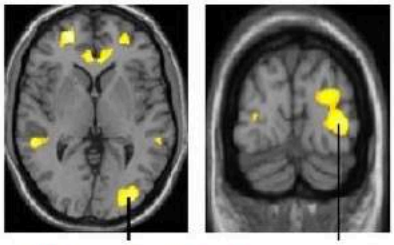
Scientists have recently shown that adults can grow the parts of their brains that control their abilities—like the ability to do math or even to juggle.

In one study, scientists found a group of adults who were not jugglers. They taught half how to practice juggling in the right way. These people practiced for a long time and got much better at juggling. The other half didn't practice, and didn't get better.

Next, the scientists used a brain scanner to compare the brains of the two groups of people. They found that the people who learned how to juggle actually grew the parts of their brains that control juggling skills—the visual and motor areas. Their brains had changed, so they actually had more ability.

This was surprising because these people said before the study that they couldn't juggle—just like some people say they're "not good at math." But when they learned good strategies for practicing and kept trying, they actually learned and grew their brains.

This can happen because learning causes permanent changes in the brain. The jugglers' brain cells get larger and grow new connections between them. These new, stronger connections make the juggler's brain stronger and smarter, just like a weightlifter's toned muscles.



In Yellow: Parts of the brain that grew when adults learned to juggle

doi:10.1371/journal.pone.0002669.g001

A Formula For Growing Your "Math Brain": Effort + Good Strategies + Help From Others

Scientists have also found that learning to juggle is a lot like getting better at math. When people learn and practice new ways of doing algebra or statistics, it can grow their brains—even if they haven't done well in math in the past.

Strengthening the "math" part of your brains usually happens when you try hard on challenging math problems. But it's not just about effort. You also need to learn skills that let you use your brain in a smarter way.

If you use a bad strategy, you may not learn—even if you try hard. A few people study for math by doing the same set of easy problems and skipping the hard ones, or just re---reading the textbook, because it feels easier. Yet when it comes time to do the test, they don't do well because they didn't work on problems that stretched their brains and taught them new things. When this happens, they may even say "I'm just not smart at math."

But the truth is that everyone can become smarter at math if they practice in the right way. If a weight lifter watched other people exercise all day long, he wouldn't get any stronger. And if someone tried to learn how to juggle by just reading a book about juggling, they wouldn't learn. You actually have to practice the right way—and usually that means the hard way—to get better at something. In fact, scientists have found that the brain grows more when you learn something new, and less when you practice things you already know.

This means that it's not just how much time and effort you put in to studying math, but whether, when you study, you learn something new and hard. To do that, you usually need to use the right strategies. People often learn those good strategies from others, like teachers or students who do well. Luckily, strategies are easy to learn if you get help.

The Truth About "Smart" and "Dumb"

People aren't "smart" or "dumb" at math. At first, no one can read or solve equations. But with practice, they can learn to do it. And the more a person learns, the easier it gets to learn new things—because their brain "muscles" have gotten stronger.

This is true even for adults who have struggled for a long time to learn something. Dr. Wittenberg, a scientist from Wake Forest University, said "We used to think adults can't form new brain connections, but now we know that isn't true... The adult brain is like a muscle, and we need to exercise it."

People who don't know this can miss out on the chance to grow a stronger brain. They may think they can't do it, or that it's too hard. It does take work to learn, just like becoming stronger physically or becoming a better juggler does. Sometimes it even hurts! But when you feel yourself get better and stronger, you realize that all the work is worth it!

Relevant Research

1. *Implicit theories of intelligence predict achievement across an adolescent transition.* Blackwell, L., Trzesniewski, C., Dweck, C. Child Development, 2007. 78(1): p. 246-263.

In this two-part study, researchers assessed adolescents' beliefs about the nature of intelligence. They found that students who believed that intelligence was malleable (or that it could be developed with effort) showed improvements in academic performance relative to their peers who believed that intelligence was fixed. The researchers found that it was possible to change adolescents' beliefs about the nature of intelligence (i.e., teaching adolescents that intelligence is malleable), and in doing so improve their academic performance.

2. *Goals: An Approach to Motivation and Achievement.* Elliot, E.S., Dweck, C. Child Development, 2007. 78(1): p. 246-263.

This study tested factors that facilitate the relationship between beliefs about intelligence and academic achievement. The researchers found that the believing intelligence is malleable engenders *learning goals*, or goals to increase one's competence. In contrast, believing that intelligence is fixed creates *performance goals*, or goals to perform well and appear intelligent. These goals differentially influence one's orientation to challenges. Learning goals drive people to try challenging things (such as difficult math problems) in order to develop their competence, which in turn lets them to increase their skills and ultimately helps improves their academic achievement. Performance goals, conversely, steer people away from challenges; since the goal is to perform well, they will often seek problems that they already know how to do. In avoiding challenges, people with fixed views of intelligence don't develop their capacities further. Malleable views of intelligence, and the learning goals that accompany them, let people develop their intelligence by orienting them toward challenging new problems.

Appendix 1C: Study 1 Adolescent Letters

Letter 1 (Malleable Mindset, Social Norms, Combined Conditions)

My name is Alex and I'm a freshman. I'm new at school, and so far it's been okay. It was harder in September but it's been somewhat better. I'm having a hard time making friends with the people at school because I feel like we have nothing in common. I come from another state and don't like any of the same teams they do or any of the same music they do. They've all known each other for like 10 years and I'm new and no one knows who I am and it feels like they dont care to know. I try to reach out to some of the kids in my classes. They are friendly mostly, but nothing has really come of it yet.

I feel like everyone already has there group of friends and doesn't need to meet anyone new. I don't know if they don't want to get to know me, but I try and connect to them and I just cant. We just don't have anything in common and I don't think we have anything to tie us together.

Letter 2 (Malleable Mindset, Social Norms, Combined Conditions)

Im Taylor. I just started high school. Ive been a freshman here for almost a month now, and it has been kinda tough for me. All of the middle schools in my town merge when its time to go to high school, so there are a ton of new people in my grade now and its weird. My two best friends have already started hanging out with some of the new kids outside of school and I havent yet. At first I was excited because I thought Id make a lot of new friends, but now I feel like Im the only one from my old group of middle school friends who isnt meeting new people and that they all have new friends that they already seem close with. I just dont feel like I get along with any of the new kids from the other schools. It feels like Im less close with my best friends now because they are making new friends and Im the only one not meeting new people from the other schools.

Letter 1 (Control Conditions)

My name is Alex and I'm a freshman. I'm new at school, and so far it's been okay. It was harder in September but it's been somewhat better. I am having a hard time in school because my math class is really hard. There is a ton more homework and the teachers don't help you the same way they did in middle school. I also got put into a class for kids who are bad at math. In high school they assign your math class on how good you are at math. Even in my basic class I feel like I'm to stupid to understand what the teacher is talking about. I have a D in math and I might have to retake the class if I dont get a C- or higher.

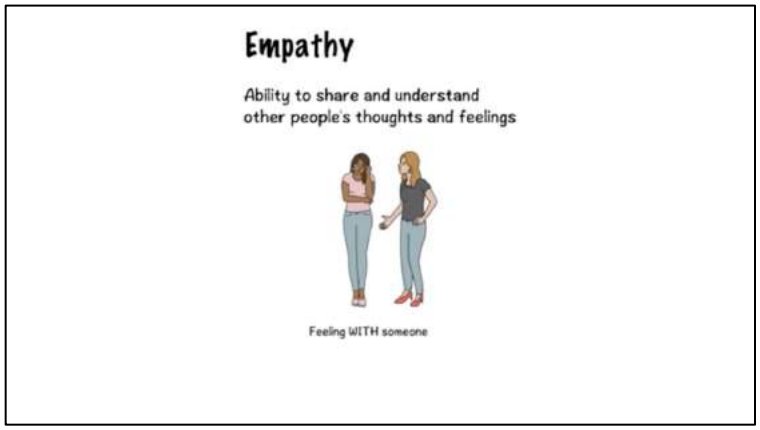
I'm not good at math and no matter what I try to do I still don't get it. It's hard because I just fail or get a D on all of my work and it feels like there's nothing I can do to get better. I'm just not a math person and I wish they didn't make me take math in the first place.

Letter 2 (Control Conditions)

I’m Taylor. I just started high school. Ive been a freshman here for almost a month now, and it has been kinda tough for me. I’m taking a physical science class and I barely understand the material. After the first test the teacher told us what the average score and the range of scores was and I got the lowest score of all the people in my class. It made me feel stupid. Ive never been great at science but this is way harder than its ever been and now im the dumbest kid in the whole class. I try to do practice homework problems but they are just so hard that I usually don't finish them and I cant understand how the other kids in my class do it.

Appendix 2A: Study 2 Video Transcripts and Stills

Session 1 Video 1 (Malleable Mindset and Social Norms Conditions)



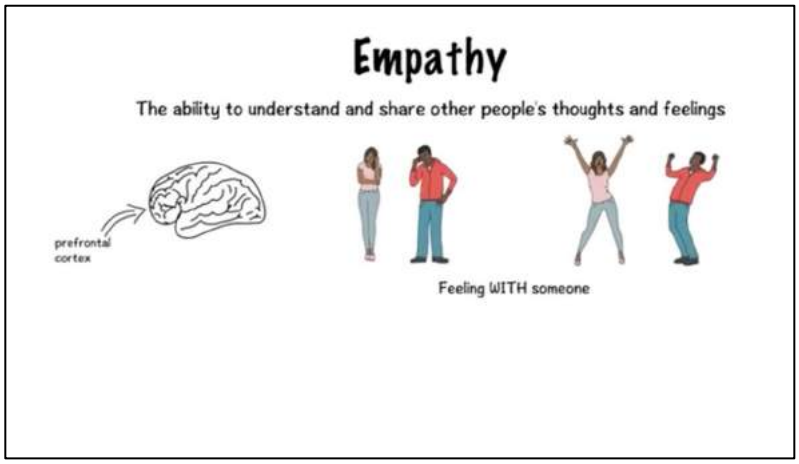
Empathy is the ability to share and understand other people's thoughts and feelings. And importantly, empathy is really different from sympathy. Sympathy is when you feel bad for somebody else, if you encounter someone who is upset about something you might feel or think something like "oh, I feel so bad for this person". Sympathy is feeling for somebody – maybe pitying them. Empathy is different, more like feeling with somebody. If someone is feeling sad about something, it's empathy that makes us feel sad too. So if something bad happened to somebody you care about and they were upset about it, you might not just feel sympathy for them. Instead you might feel empathy for them, meaning you would feel sad too.

Empathy often makes us want to help people. And when we help people, it makes them feel better especially during difficult times. When we share their thoughts and feelings, we're closer to them, and it makes us feel better too. That means that empathy helps us build strong relationships with friends and family.

So what does it mean to be empathic? Well, as we've already discussed, it means things like feeling upset when somebody that we are close with or somebody we encounter is upset. But it also means feeling good when somebody we interact with is feeling good. Or even feeling excited or joyful when something good happens to someone else. At your age, your brain is growing at a rapid rate and you're learning new things in school, facing new challenges, and lucky for you, your brain is growing really quickly to catch up. One part of the brain that grows a lot at your age is the prefrontal cortex. This is really important because the prefrontal cortex helps us empathize. We'll talk more about this in the next video. And given how much it is developing at your age it's no surprise that now more than ever, you are "empathy experts," able to empathize with friends really well.

So to recap, in this video we've talked about how empathy is the ability to share and understand other people's thoughts and feelings. And we've also talked about how your brain, now that you're in seventh grade, is growing faster than ever, particularly this one region right here, the prefrontal cortex, which is one of the regions of the brain that supports empathy. (video cuts out early).

Session 1 Video 2 (Malleable Mindset and Social Norms Conditions)



So to recap, in our last video we talked about empathy, specifically how empathy is the ability to understand and share other people's thoughts and feelings. Empathy is feeling with other people, like when you feel bad because somebody else does, or feel good because someone else is excited. We also talked about some of the changes that happen in your brain at your age. Specifically, in the prefrontal cortex, a region that supports empathy. In this video, we're going to think about where empathy came from, why humans developed empathy, and why it's a good thing. But first, how do feelings work? Whenever we feel an emotion, maybe we feel upset or happy or excited about something, our bodies and our brains communicate with each other and our brains send messages to places like our hearts. You've probably seen this in action, like when you are upset about something and your heart starts to beat faster.

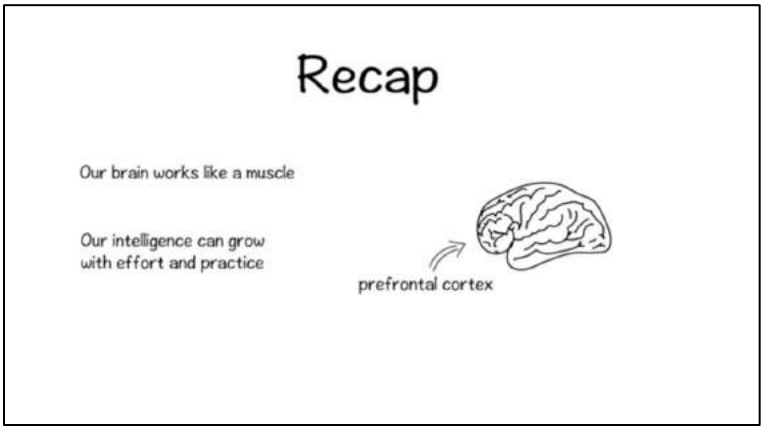
When we empathize with somebody, you can sort of think of the prefrontal cortex as a set of eyes, that lets us see how somebody else probably feels, and figure out what's going on inside of their brains and how their brains are talking to their bodies. After you figure out what someone else feels, you might experience a change in how your own brains talk to your own body, and that's why you'd have an emotional reaction.

Like we mentioned last time, empathy is a good thing because it lets us help people in need, which makes them feel good. Empathizing also makes us feel good. So it's beneficial to both people involved. Empathy also helps people work together and though humans show the most empathy of all species on the planet, other species like chimpanzees show it too. Chimpanzees have a bigger prefrontal cortex than other animals, and because of that can empathize with one another. Empathy lets them help each other and work together to do things that they couldn't do on their own. Empathy helps people work together, too, and lets us accomplish things that we couldn't do on our own, like playing an orchestra song or scoring a goal in football. But our prefrontal cortex is also much bigger than that of other animals. That means that we can empathize in richer, more sophisticated and interesting ways. We don't just share simple emotions like fear and joy, but also share other people's frustration, hope, and other emotions.

As we talked about in the last video, sharing and understanding other people's emotions make us feel more connected with them and make them feel more connected with us. But in addition to making the relationships we already have better, empathy also helps us form new relationships. When we meet someone new, sharing their feelings helps connect us and helps us, and to make friends with them. So to recap everything we've covered so far, we know that empathy is a way to see into other people to know what they're thinking and feeling. That it helps people and even other species work together and succeed. And finally, that empathy is really

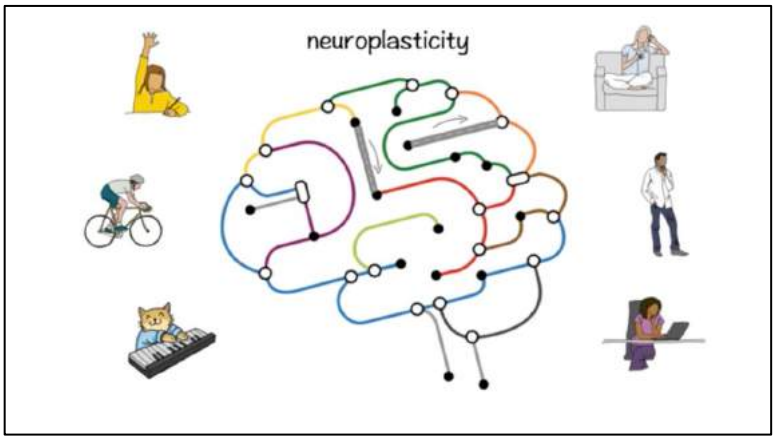
important for keeping our relationships strong and also for making new relationships, such as friendship.

Session 1 Video 1 (Control Condition)



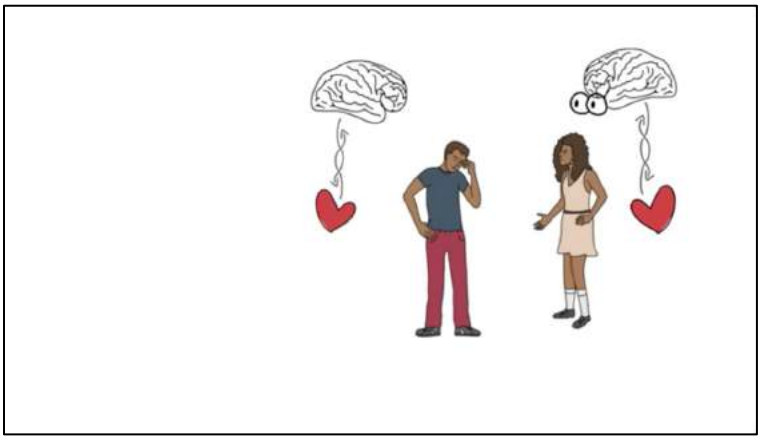
So what exactly is intelligence? For most of us, intelligence and how our brains work seems like a mystery. When people think about their own intelligence and the intelligence of people around them, many people believe that a person is born either smart, average, or dumb – and they stay that way for life. These people think about intelligence as a fixed trait, like eye color. Such people think 'you're either smart or you're not, and that's life'. But science tells us that intelligence works more like a muscle. It can be developed with practice – the same way a weightlifter can get bigger and stronger by practicing lifting more weights over time. In other words, science says that our intelligence can grow. At your age, your brain is growing at a rapid rate and you're learning new things in school, facing new challenges, and lucky for you, your brain is growing really quickly to catch up. One region in particular is growing especially quickly at your age, and this is the prefrontal cortex. This is really important because the prefrontal cortex is the region of the brain that supports our intelligence. And given how much it is developing at your age it's no surprise that now more than ever, you are able to learn new things at school. So to recap, in this video we have discussed how our brain is best thought of like a muscle. We've talked about how we can grow our intelligence with effort and practice. And we've also talked about how your brain, now that you're in seventh grade, is growing faster than ever, particularly this one region right here, the prefrontal cortex, which is one of the regions that helps your intelligence grow.

Session 1 Video 2 (Control Condition)



So to recap, in our last video we talked about intelligence, specifically how our intelligence, as well as our brain, works like a muscle. We talked about how we can grow our intelligence with effort, practice, and by taking on new challenges, the same way a weightlifter can build muscles by practicing lifting heavier weights. Finally we talked about some of the changes that happen in your brain at your age. Specifically, in the prefrontal cortex, a region that supports intelligence. In this video, we're gonna dive in further to thinking about how the brain works, how it develops, and how it allows our intelligence to grow. Scientists used to believe that the brain did not change much after childhood. They believed that by the time we become adults, the brain is "hardwired" and "fixed". But scientists have recently learned that this is not true. We now know that the brain can change and be "re-wired" throughout our lives. In other words, our brains are like plastic. Scientists who study the brain call this process of change "neuroplasticity". How does neuroplasticity work? Try to think of the brain like a traffic grid. Some of the roads in this grid we use everyday. These roads reflect our habits, the things we think about, and the things we know how to do. Every time we think a certain way, or practice a certain task, we strengthen this road, making it easier for our brain to travel along this road. When we challenge ourselves to learn a new skill, our brain creates a new road. And as we continue practicing this new skill, it becomes easier for our brain to travel this new road too. This process of forming new roads, or connections in our brain, is called neuroplasticity. Lucky for us, we all have the ability to learn and change because of this quality of our brains. When you've learned a new skill, such as how to ride a bike or play a musical instrument, you've experienced neuroplasticity in action. So by focusing our effort and attention on learning other new skills, over time, we can 're-wire' our brains. So to recap everything we've covered so far, we know that our brains change not just in childhood, but throughout life. This process of change that occurs whenever we take on new skills, and engage in new ways of thinking, is called neuroplasticity. And this means that our brains will continue to change, and grow as we take on new challenges and learn new skills in the future, both inside and outside of school.

Session 2 Video 1 (Malleable Mindset Condition)



So last time we talked about empathy, our ability to understand and share what other people think and feel. We talked about how empathizing with people, for example if they feel bad, might make them feel better, make us feel better too, and bring us closer together. Because of this, empathy helps us keep our friendships strong and also to make new friends, and work together to do things we couldn't do on our own like playing sports or making music.

We also spent some time talking about your brain and how it develops a lot in seventh grade. Particularly this one area of your brain right here, the prefrontal cortex, which is an area of the brain that helps us empathize. And at the very end of our last meeting we talked about how empathy can change over time, meaning that people can actually grow the levels of empathy they have. Today were going to talk more about that last point.

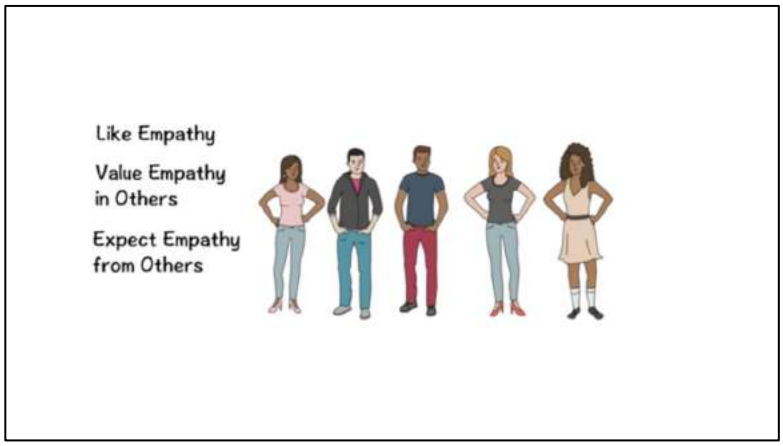
Every time we empathize with someone, we're practicing our empathy. And like other things you practice, say a musical instrument or a sport, you can get better at it. If you try to empathize with a friend when they're upset – to share and understand their feelings, you're activating that region of your brain, that area called the prefrontal cortex, right here. The key to growing this region of your brain and to growing empathy is to practice and try to empathize in new situations, with new people, even when it feels hard. It might be easy to empathize with your friend because you've known each other for so long. But the big changes happen when you try to empathize with new people. When you try to empathize with new people, maybe someone you haven't talked to before, maybe someone who seems different from you, your brain works harder to try to empathize with them. When you do this your prefrontal cortex changes. Inside of the cortex of the brain there are billions of tiny nerve cells called neurons, and there's lots of them. Neurons have branches that connect them to other cells, and when these brain cells connect, they allow us to do everything we do, like riding a bike, or talking to other people, or solving problems, and even empathizing. When you empathize even when it's not easy, for example, with new people or people who are different from you, these tiny connections in the prefrontal cortex multiply and get stronger. The more you challenge your mind to empathize, the more your prefrontal cortex cells grow, kind of like your muscles do when you exercise. After you practice empathy enough, people you used to

have a hard time empathizing with before become easier to empathize and connect with. It becomes easier to understand and share their feelings. And the result is a stronger, more empathic prefrontal cortex.

Remember when we empathize with people our prefrontal cortex is like a pair of eyes. They help us read others and let us see what they're doing, thinking, and feeling. When we empathize with them, we get an understanding of what's going on inside of them. Sometimes it's hard to understand new people at first, especially when we don't know them well, But the more we practice empathy, the easier it becomes.

So what does this mean for our ability to empathize? It means that, if they want to – people can shape how much empathy they feel for others by developing their prefrontal cortex. And when it's hard for you to empathize with someone, say because they're different from you, remember that empathy can be changed. If you think harder about why they feel what they do, that will help you understand and share their feelings. This is because parts of your brain that help you empathize are getting stronger. Empathy isn't hard like a rock that never changes, it's more like a muscle that can grow. If you don't feel empathy at first, it doesn't mean you can't feel empathy at all.

Session 2 Video 1 (Social Norms Condition)



So last time we talked about empathy, our ability to understand and share what other people feel. We talked about how empathizing with people, for example if they feel bad, might make them feel better, make us feel better too, and bring us closer together. Because of this, empathy helps us keep our friendships strong and also to make new friends, and work together to do things we couldn't do on our own like playing sports or making music.

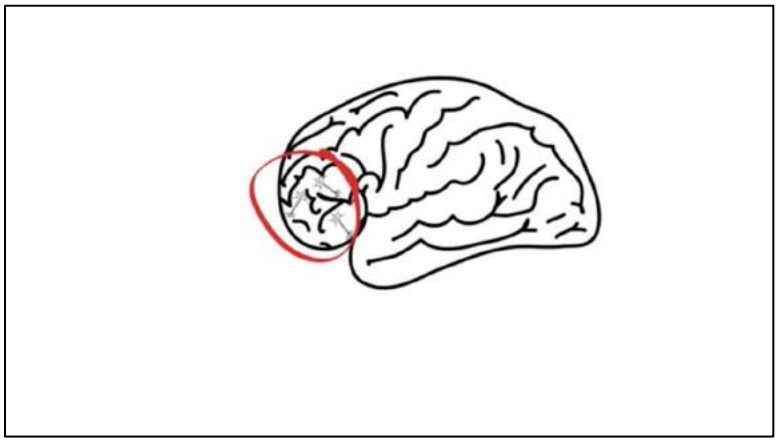
We also spent some time talking about your brain and how it develops a lot in seventh grade. Particularly this one area of your brain right here, the prefrontal cortex, which is an area of the brain that helps us empathize. And at the very end of our session we mentioned how empathy, like some other qualities, becomes more common in seventh grade. Today were gonna tell you more about that idea.

If you try to empathize with a friend when they're upset – to share and understand their feelings, you're activating that region of your brain, that area called the prefrontal cortex. As we've discussed, your brain grows a lot during 7th grade, and one of the areas that has the biggest growth spurt is the prefrontal cortex. . Inside of the cortex of the brain there are billions of tiny nerve cells called neurons, and there's lots of them. Neurons have branches that connect them to other cells, and when these brain cells connect, they allow us to do everything we do, like riding a bike, or talking to other people, or solving problems, and even empathizing.

These brain changes explain a lot of the social changes that you may have noticed happening with you and your classmates. Since you've been in middle school, you've probably continued to meet new people, to make new friends, and to interact with other students you haven't talked to before. Just like you, all of your peers in seventh grade are also experiencing changes in their brains. And because of this, they, just like you, are better able to understand and share other people's feelings better and do so more easily than ever before. This means that people's attitudes towards empathy also change in seventh grade changing. Specifically seventh graders tend to like empathy more, meaning that they want to be empathic. They also value empathy in others, meaning that they like it when other people are empathic and want to be friends with empathic people. Finally, they expect empathy from others, meaning that in seventh grade, most people are empathic.

And now more than ever you and your seventh grade peers are better able to share and understand each other's emotions. You may notice that empathy is more common in your social interactions now that you're better able to empathize and your peers are too. When we empathize with people it feels good for them and it feels good for us. People like to interact with others who they believe are empathic, who try to understand and share their emotions, and seventh graders usually know that when interacting with friends at school, with teachers, with peers, with family, it's important to be empathic. (edit long pause) So to summarize, in seventh grade people usually like empathy more, meaning that they want to show empathy to others, and that they like to be empathic. They also value empathy in others more, meaning that they like to be treated with empathy, they like others to try to empathize with them, and they like to be friends with empathic people, and that they expect empathy from others, meaning that in seventh grade most people are empathic, and that your classmates will expect you to be empathic too.

Session 2 Video 1 (Control Condition)



So last time we talked about intelligence. We talked about your brain and how it develops a lot in seventh grade. Particularly this one area of your brain right here, the prefrontal cortex, which is an area of the brain that supports our intelligence. We talked about neuroplasticity - the process of forming new connections in the brain. We also mentioned how intelligence, like some other qualities, can be developed over time as a result of neuroplasticity. In short, we showed that people can actually change their intelligence. Today were gonna tell you about how intelligence grows, how you can help your brain develop its intelligence regions through practice and by challenging yourself in school.

So every time we attempt to learn a new skill or take on a new problem, we're growing our intelligence. When you try to learn more difficult subjects at school, be it math, science, or English, you're activating that region of your brain, that area called the prefrontal cortex, right here. The key to growing this region of your brain and to growing intelligence is to try to learn new skills, approach new material, adopt new ways of thinking, frequently, and even when it feels hard. It might be easy to do math problems we have mastered in the past. But the big changes happen when you try new, more challenging ones. When you approach new challenges in school, maybe ones you've never tried before, or maybe ones you have struggled with in the past; your brain works harder too during these challenges. Inside of the cortex of the brain there are billions of tiny nerve cells called neurons, and there's lots of them. Neurons have branches that connect them to other cells in complicated networks, communication between these brain cells is what allows us to do everything, like riding a bike, or talking to other people, or doing math. When you challenge yourself at school, these tiny connections in the prefrontal cortex actually multiply and get stronger. The more you challenge your mind, the more your prefrontal cortex cells grow. Then, problems you had a hard time with before become easier to conquer. It becomes easier and more natural to understand difficult concepts. And the result is a stronger, smarter prefrontal cortex. Though it might be hard for us to understand ideas that challenge us, the more we practice thinking about them, the easier it becomes. An important part of this process can be finding a strategy that best fits the problem at hand. When we encounter new problems, we can think about strategies that we've used in the past to learn new skills and overcome challenges, and

apply them here. It takes practice to develop our ability to adjust our strategy for solving problems, but it is important to do so when the strategy we are using is not working as well as we would like it to. By taking on new challenges and thinking how to best approach these challenges, it will become easier for us to challenge our mind in the future. By doing so, we can learn new skills more quickly and with less effort. And why does it become faster and easier? Its because we've developed more connections in our prefrontal cortex. So what does this mean for our intelligence? It means that, if they want to – people can shape their intelligence by developing their prefrontal cortex. No ones intelligence hard like a rock, and every time you struggle in school, remember that intelligence can be changed. You can increase your connections in the prefrontal cortex by working hard to understand things that feel challenging, and knowing this is a crucial step for the development and growth of your young mind.

Appendix 2B: Study 2 Writing Prompts

Session 1 Prompts (Malleable Mindset and Social Norms Conditions)

To recap some of the key points from the two videos you just watched:

1. Empathy is the ability to share and understand other people's thoughts and feelings

2. Empathy happens in the prefrontal cortex, a region of the human brain that develops rapidly during 7th grade

3. Empathy helps us build our connections to other people, strengthen our relationships and make new friends

Now we want to know about some of your experiences with empathy at your school. We're going to ask you to tell us about what empathy means to you and why you value it.

To give you a better sense of what we want you to write about, we'll show you some examples. We asked Stanford students what empathy means to them and why they value it. On the next few screens, you can read some of their responses.

(Stanford students' responses presented)

(Prompt 1) Now that you've seen these examples, it's your turn. In the box below, please describe why you value empathy.

(Prompt 2) We are also curious about your experience of empathy in 7th grade. In the paragraph box below, please describe a time when you've used empathy this year.

Session 1 Prompts (Control Conditions)

To recap some of the key points from the two videos you just watched:

1. Our brain is like a muscle; we can grow our intelligence with effort and practice

2. Intelligence happens in the prefrontal cortex, a region of the human brain that develops rapidly during 7th grade

3. Our brain grows through neuroplasticity, the ability for the brain to form new connections and strengthen old ones.

Now we want to know about some of your experiences with growing your brain. We're going to ask you to tell us about a time you built connections in your brain by practicing something that was hard for you.

Think about something you know how to do really well. Maybe it's riding a bike, maybe it's playing an instrument, or anything that you're good at doing. Now think back in your life to the time when you first tried to do this thing.

Try to reflect on how difficult it was for you to do it then, and how easy it is for you to do it now.

Now think about what you learned in the videos you just watched, namely about how the brain can grow new connections that let us learn how to do new things.

(Prompt 1) In the box below, please tell us about something you're really good at doing now but didn't always know how to do. Tell us how you became good at it, how you practiced and how you improved.

(Prompt 2) Now recall what you learned in the video about neuroplasticity, your brain's ability to form new connections and strengthen old ones. How did neuroplasticity help you learn how to do the thing you're now good at doing?

Session 2 Prompt (Malleable Mindset Condition)
As you may have noticed, some of these students wrote about "empathic challenges" when asked to describe their experience with empathy. An "empathic challenge" is a time in which empathizing feels challenging or difficult. As we mentioned in the video, it can sometimes be harder to empathize with people you've never met before or with people who are different from you.

However, these empathic challenges are opportunities for us to grow our empathy because, when we try really hard to empathize, we increase the amount of neural connections in the brain that allow us to empathize.

Even when empathy feels hard, you can still do it. And if you empathize when it's challenging, you get better at empathizing across all challenging times, like when you're meeting someone new, when you don't understand a person, or even when you're in a conflict with someone.

Now we're going to ask you about a recent empathic challenge you were able to overcome with effort. We want you to take a few moments and reflect on 7th grade so far. Since you've come back to school, you've met new people, you have changed, and your peers have changed. You've likely already encountered an empathic challenge, or a time when it was difficult to empathize with a peer. We want you to tell us about a time since the school year started where you were able to overcome an empathic challenge.

In the box below, describe an "empathic challenge" you were able to overcome with effort. Think about a time when you had difficulty empathizing, but were able to overcome the challenge by trying extra hard to empathize.

Session 2 Prompts (Social Norms Condition)

Because we're going to ask you to write about empathy in your grade, we will now show you some of the things your peers wrote about empathy in the last session. On the next three screens, we'll show you three of your peers' responses to our questions from last week. These responses will not have the writer's name and will be randomly selected. Pay attention to their beliefs about empathy, as we'll ask you to report back on their views in just a few minutes.

(Peers' responses presented)

Now we're going to ask you to summarize and reflect on your peers' views on empathy. Take a moment to think about what your peers said that lets you know they value empathy.

Based on the responses you just read from your peers, describe how people in your grade feel about empathy.

Session 2 Prompts (Control Condition)

As you may have noticed, some of these students wrote about "academic challenges" when asked to describe their experience with intelligence. These challenges are when something in school feels difficult to understand. As we mentioned in the video, it can sometimes be harder to understand new ideas or difficult concepts in school.

However, these challenges are opportunities for us to grow our intelligence because, when we try really hard to understand hard ideas, we increase the amount of neural connections in the brain that allow us to think and solve problems.

Even when something feels hard, you can still do it. And if you try to understand the problems that feel really hard, you get better at understanding challenges across different areas, like in different subjects like math or science.

Now we're going to ask you about a recent school challenge you were able to overcome with effort. We want you to take a few moments and reflect on 7th grade so far. Since you've come back to school, you've taken new classes, you learned new ideas, and you've encountered new challenges in school. We want you to tell us about a time since the school year started where you were able to grow your brain by working hard to overcome a challenge from one of your classes.

In the box below, describe a school challenge you were able to overcome with effort. Think about a time when you had difficulty understanding something, but were able to overcome the challenge by trying extra hard.

Session 3 Prompt (Malleable Mindset Condition)
At the end of the last session, we asked you to try increasing your empathy.

We're now going to ask you about how it felt to try to grow your empathy.

(Prompt 1) Think back on your week and describe a time when you tried to empathize when it felt challenging. What tricks did you use to try to understand their thoughts and feelings? How were you able to "up" your empathy for this person?

(Prompt 2) How did you feel after empathizing with this person? What did you learn about your ability to empathize?

Now we want you to think about some empathic challenges that you might expect to arise during 7th grade. These could include empathizing with new people, people who are different from you, and things like that.

Take a moment to think about some empathic challenges you can imagine facing (or are already facing) in 7th grade. When you've thought of at least three, press the button below to continue.

> What is an empathic challenge you can imagine facing this year (or are currently facing)? Tell us about it in detail in the box below.
>
> How will you overcome this empathic challenge? Describe the strategies you'll use to grow your empathy during this challenge. Be specific!

Session 3 Prompt (Social Norms Condition)

Last time, we had you write about your school in particular; we asked you to tell us why people at your school value empathy.

We told you to pay attention to your experience being empathic and observing empathy around you. Now we want to hear about what you observed.

First, we want to hear what you noticed about your classmates' empathy.

(Prompt 1) In the box below, tell us what you noticed since our last session. Describe some recent times when YOUR CLASSMATES showed empathy to people from school.

Now we want to hear about your own experience with empathy at school.

(Prompt 2) In the box below, tell us what you noticed since our last session. Describe some recent times when YOU showed empathy to people from school.

Last time, we showed you some of your classmates' opinions on empathy. We asked you to read your classmates' answers and then tell us what people in your grade think about empathy.

We're now going to show you some of your classmates' answers from last session, about what people in your grade think about empathy. Pay attention to their responses, because we're going to ask you to write about them in a few minutes.

(Peers' responses presented)

Now we want you to imagine that you're talking to a 7th grader from a different school or a student from a different grade who's a little younger than you. Reflect back on your classmates' views on empathy and on what you know about how the brain changes in 7th grade.

(Prompt 3) Now imagine this person wants to know about empathy in your grade. What would you tell this person? How do you and the people in your grade feel about empathy?

Session 3 Prompt (Control Condition)

At the end of the last session, we asked you to try increasing your intelligence.

We're now going to ask you about how it felt to try to grow your intelligence. Think back on your week and remember a time when you tried to do a problem or understand a concept that felt challenging.

(Prompt 1) In the box below, tell us what you tried since our last session. Describe a recent time when you were able to overcome a challenge at school. What tricks did you use? How were you able to "up" your intelligence in this situation?

(Prompt 2) How did you feel after you were able to understand something that used to feel challenging? What did you learn about your ability to grow your intelligence?

Now we want you to think about some other school challenges that you could expect to arise during 7th grade. These could include things like trying harder problems in class, learning a new language, and things like that.

We also want you to think about how you can overcome these challenges by trying harder to understand, which will help you grow your intelligence.

On the next few screens, we're going to have you list three school-related challenges that you could face in 7th grade, and then think about ways that you could overcome them.

Take a moment to think about some new challenges you can imagine facing (or are already facing) in 7th grade. When you've thought of at least three, press the button below to continue.

> What is a challenge you can imagine facing (or are currently facing) in class this year? Tell us about it in detail in the box below.

How will you overcome this challenge? Describe what you will do if you experience this challenge, and the strategies you'll use to grow your intelligence. Be specific!

Appendix 2C: Malleability and Normativity of Empathy Questionnaire

1 – 7 scale, Strongly Disagree to Strongly Agree

Malleability of Empathy

1. A person's level of empathy is something very basic about them, and it can't be changed much. *(reverse coded)*

2. People can always change how much empathy they generally feel for others.

3. People can't really change how much empathy they tend to feel for others. Some people are very empathic and some aren't and they can't change that much. *(reverse coded)*

4. No matter who somebody is, they can always change how empathic a person they are.

5. Whether a person is empathic or not is deeply ingrained in their personality. It cannot be changed very much. *(reverse coded)*

6. Anybody can change how empathic a person they are.

Social Normativity of Empathy

1. People generally don't want to be empathic and usually try to avoid empathy. *(reverse coded)*

2. On the whole, people value empathy.

3. Empathy isn't really socially desirable. *(reverse coded)*

4. For the most part, people want to be empathic and experience empathy for others.

5. People don't generally value empathy. *(reverse coded)*

6. Empathy is socially desirable, and people like when others show empathy.