

1-18-2019

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Fairness, trust, and school climate as foundational to growth mindset: A study among Brazilian children and adolescents

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To cite this article: Kendra J. Thomas, Josafá Moreira de Cunha, Denise Americo de Souza & Jonathan Santo (2019) Fairness, trust, and school climate as foundational to growth mindset: A study among Brazilian children and adolescents, *Educational Psychology*, 39:4, 510-529, DOI: <https://doi.org/10.1080/01443410.2018.1549726>

ABSTRACT

Recent research has established the importance of children and adolescents developing a growth mindset for future success and motivation. This research tests believes about fairness, adult trust, and school climate that are theoretically foundational for establishing a cognitive connection between effort and outcome. Regressions and MANOVAS were conducted to understand the direct and indirect relationships between perceptions of justice, adult trust, school climate and growth mindsets.

The first study included 363 children from Brazilian public schools and the findings supported our hypothesis that adult trust partially mediates the relationship between justice perceptions and growth mindset. The second study included an adolescent sample ($n = 497$) from more diverse backgrounds and included a measure of institutional mindset. In this study, school fairness and solidarity mediated the relationship between perceptions of justice on institutional growth mindset. This

research can help inform educators and researchers of other constructs necessary to foster a growth mindset.

KEYWORDS

Justice; cognition; group climate; locus of control; trust

Introduction on growth mindset research

Over the last 30 years, a plethora of research has focused on the value of believing intelligence is not a fixed trait, but rooted in effort. Dweck (1986, 1999, 2006) has spearheaded this research and shown how personal intelligence beliefs are vital for motivation and responses to academic challenges. Believing intelligence is malleable helps students to have greater motivation to work hard and is associated with positive effort beliefs and greater achievement (Blackwell, Trzesniewski, & Dweck, 2007). Longitudinal research has shown that students who hold the belief that intelligence grows over time through hard work have greater math achievement compared to those who believe intelligence is fixed (Blackwell et al., 2007; Yeager & Dweck, 2012) and are more likely to use positive self-regulation strategies (Ommundsen, 2003). A fixed mindset tends to detract from intrinsic motivation because there is little power within a students' perceived control. Individuals who endorse a fixed mindset on intelligence tend to focus on performance-oriented goals such as obtaining positive judgments or avoiding negative judgments (Haimovitz, Wormington, & Corpus, 2011). Students who believe their intelligence is fixed are less likely to believe that working hard is important for success and more likely to make helpless attributions when faced with setbacks. However, those with a growth mindset are more likely to invest more effort and change strategies when faced with challenges (Blackwell et al., 2007). This could be because the mindset exhibited may help shape the kind of self-regulatory processes students use to reach their goals (Burnette, O'Boyle, Van Epps, Pollack, & Finkel, 2013). That is to say, the growth mindset itself may not be the mechanism of change, but it may spur important goal-monitoring and self-regulatory processes, that then shape a more successful outcome.

With all of this positive research stemming from mindsets, much effort has been put into how to improve students' mindsets. Short interventions teaching about growth mindset are becoming increasingly popular in educational practices today (Rattan, Savani, Chugh, & Dweck, 2015; Spitzer & Aronson, 2015). In some published studies, students have demonstrated improvement in both motivation (Blackwell et al., 2007) and achievement (Yeager et al., 2016). However, a recent meta-analysis concluded that these effects are weak, or more beneficial among students of lower socio-economic status or in a group of higher academic risk factors (Sisk, Burgoyne, Sun, Butler, & Macnamara, 2018). This could be because these programs are too generic and it can be hard to transfer mindset.

Although mindsets have been shown to be associated success, interventions may not be demonstrating the impact desired because of unaddressed assumptions supporting the mindsets. This study attempts to uncover some of the deeper constructs that need to be addressed. This article suggests that the trust in adults and the fairness of the environment may be important precursors to a growth mindset. Children may need to trust the adults providing the interventions and believe that the world is fair and predictable enough to make the proposed changes.

This study

The majority of the research on growth and fixed mindsets has focused on it as a predictor variable. Research that has analyzed its origins has found that mindsets are not directly transmitted, but rather shaped through a more complex web of interactions and feedback from parents and teachers (Haimovitz & Dweck, 2017). This study focuses on what might be some underlying predictors of growth mindset and adds an under-studied population to the scholarship of growth mindset. A recent review (Haimovitz & Dweck, 2017) has called for more research on the predictors of mindsets to be done in other cultures, as well as increased investigation into how theories of motivation influence mindsets. Justice has long been studied as a strong motivator of human behavior (Dalbert, 2001; Lerner, 1977). This research tests to see how students' assumptions of fairness, their trust in adults and their perceptions of school fairness predict their growth mindset. The

literature review below will outline prior studies in each of these areas and argue the theoretical relationship to growth mindset, which was tested in the two studies. This research adds to the literature of growth mindset by investigating the underlying constructs of trust and fairness necessary to foster growth mindset in children and adolescents.

Assumptions of fairness

Growth and fixed mindset research has generated such results, at least partially because it taps into the deeper construct of locus of control and beliefs about the environment. The purpose of this study is to establish evidence of the assumptions supporting a growth mindset. We suggest that the underlying beliefs necessary for these coveted growth mindsets are embedded in fairness, trust, and the predictability of the system. Students must believe, to some extent, that their environment is fair and consistent enough to predict the outcomes of additional effort. If students believe their world is utterly unfair, they are unlikely to exert the effort because they do not assume they will be adequately rewarded. Likewise, if the world is unfair, they will be less inclined to develop an internal locus of control and feel as a sense of power over their fate (Furnham, 2003; Kristjansson, 2004; Zuckerman & Gerbasi, 1977). Believing the environment is fair helps reduce uncertainty (Hafer & Begue, 2005) and may help students attribute their good grades to hard work.

Childhood is typically a time to move away from gratifying immediate impulses, but for this to occur, children must believe that the world is predictable enough that their efforts will accrue them a more desirable outcome in the future (Lerner, 1977). The belief that the world is fair predicts a child's ability to delay gratification (Braband & Lerner, 1974) because it is only legitimate to delay gratification and work hard if the world is just (Maes & Kals, 2004). A recent study has hinted at this connection within American adolescents with evidence that students who perceive the world to be more fair are more likely to emphasize academic goals (Arsenio & Willems, 2017) and a longitudinal study among German adolescents found a relationship between justice perceptions and grades

(Dalbert & Steober, 2006). The current study will investigate how the underlying assumption of fairness and trust (both broadly and within the school) relate to growth mindsets.

Research on the belief in a just world (BJW) has revealed that it is a deeply ingrained worldview shaped by various interactions with society and it is a way to help individuals make sense of experiences (Dalbert, 1999). Believing to some extent that the surrounding system is fair helps individuals establish a personal contract to act according to the rules and work for a desired outcome (Lerner, 1980). More recent research has divided BJW into two constructs: general BJW and personal BJW. General BJW is the extent to which people believe the world is fair. Personal BJW is the extent to which people believe their world is personally fair and they are adequately compensated (Dalbert, 2009). A high personal BJW is seen as protective against the fear of arbitrary injustices. It enables a sense of safety within familiar circles and an internal locus of control (Dalbert, 2009). The higher people's personal BJW, the more they will believe that their hard work will be compensated, a precondition for establishing long-term goals (Dalbert, 2004; Sutton & Winnard, 2007). Similar findings from mindset research also support this connection; a growth mindset predicts lower levels of learned helplessness and stronger beliefs that increased effort will change the outcome (Blackwell et al., 2007). The current study bridges these findings and tests the hypothesis that BJW (both personal and general) are important assumptions to foster a growth mindset.

Assumptions of trust

Perceiving fairness is an important precondition to establishing a trusting relationship with authorities (Correia & Vala, 2004; Fagan & Tyler, 2005; Sallay, 2004). When people believe they will be treated fairly and their work will be adequately compensated, they are more likely to abide by the rules and trust their authorities. We suggest that fairness paves the way for trust and trust can support the development of a growth mindset. This study hypothesizes that trust partially mediates the relationship between perceived fairness (BJW) and mindset. The following section outlines some

studies to support the rationale for this hypothesis and the connection of these three constructs.

Research in educational settings has revealed that a school climate, which fosters solidarity is vital to establishing trust in authorities at a young age (Flanagan & Stout, 2010). Similarly, students who believed they lived in a just society were more likely to trust their authorities (Flanagan, Cumsille, Gill, & Gallay, 2007). When people believe they live in a democratic and fair place where they can trust each other and their outcomes are predictable, they may be more likely to buy-in to group rules and work hard. One study has investigated the relationship between trust and mindset and found that employees of companies that had a growth mindset (i.e. companies that emphasized that everyone could succeed through hard work) were more likely to trust their authorities (Emerson & Murphy, 2015). However, no research to our knowledge has investigated this relationship of trust and mindset among children and adolescents or in an educational setting. Without fairness and trust, an internal locus of control is difficult to sustain and may contribute to a fixed mindset.

The importance of adult trust and a fair environment aligns with recent research re-examining the popular marshmallow task research. The original study (Mischel, 1974) analyzed successful strategies children used to delay gratification. The widely publicized follow-up study (Shoda, Mischel, & Peake, 1990) revealed that long-delayers were more successful adults. However, a recent re-examination of the design has brought to light the importance of a reliable environment in the child's decision-making (Kidd, Palmeri, & Aslin, 2013). Children placed in a reliable condition waited significantly longer than those in an unreliable condition (Kidd et al., 2013). If children are in an unreliable environment, it may be more rational for them to eat the marshmallow right away, rather than trust that the adult will follow through with their promise to provide two marshmallows later. Similarly, when people are brought up in an unfair environment or do not trust the adults in their lives, they may shy away from growth mindset actions because they perceive their additional efforts to be fruitless. We expect this trust to be especially relevant in younger children's growth mindsets, who depend more on adults for

guidance and daily activities.

Contextual fairness

When understanding individuals' implicit theories of intelligence and fairness, broader beliefs and assumptions about reality must also be understood contextually. This section will briefly outline the research on school fairness and school solidarity and the rationale behind including them in the analysis to predict mindsets. This section will also explain how schools may project a mindset (institutional mindset) that may influence adolescents.

Research within European educational settings has shown a strong relationship between BJW and perceived school fairness both for general BJW (Kamble & Dalbert, 2011; Peter & Dalbert, 2010) and personal BJW (Dalbert & Stoeber, 2006; Dalbert & Stoeber, 2005; Donat, Umlauft, Dalbert, & Kamble, 2012; Kamble & Dalbert, 2011; Peter & Dalbert, 2010). These justice perceptions help students give meaning to their experiences and perceive school experiences as fair or unfair. The study of the effects of the classroom social environment on students' adjustment through a classroom climate research approach has been increasingly studied in the Brazilian context and evidence suggests this partially explains the large inequalities in student' achievement in the country (Alves & Franco, 2008; Oliveira et al, 2013). Although most of it has been done through the use of instruments adapted from English versions (Bear et al, 2016; Reis, 2012). Although the literature still lacks a consensus regarding the definition of school climate (Thapa, Cohen, Guffey, & Higgins-D'Alessandro, 2013), contextual fairness has been highlighted among the core aspects of a positive school climate in Brazilian schools, as shown in the study by Vinha et al. (2016).

School solidarity is another aspect of school climate that may be an important foundation for fostering a growth mindset. School solidarity involves students' perception that they are a part of something larger than themselves and they belong there (Flanagan 2015; Flanagan & Stout, 2010). Along similar but parallel research lines, growth mindset research has recently highlighted the importance of belonging (Good, Rattan & Dweck,

2012; Rattan, Savani, Chugh, & Dweck, 2015). Environments that promote belonging help reduce achievement gaps and pave the way for motivation to achieve (Rattan et al., 2015). BJW literature also highlights the importance of belonging by demonstrating that perceived fairness of authority treatment is vital for the perception of social inclusion (Dalbert, 2004; Donat et al., 2012; Emler & Reicher, 2005; Lind & Tyler, 1988). These are all separate threads of research on belonging within schools (solidarity), mindset beliefs, and fairness perceptions. This study ties them together and suggests that perceiving solidarity in a school and expecting fair treatment at the school are important preconditions for a growth mindset as these foster a sense of safety and predictability.

The closest growth mindset research that has come in this area is studying it in the workplace. Research in professional settings has revealed how company climates can emphasize fixed or growth mindsets through incentives, hiring practices, and language surrounding success. When individual performance is highly regarded, the institution can foster a climate of genius and self-presentation (Murphy & Dweck, 2010). Hiring practices emphasizing IQ scores (often biased against minorities) or language such as 'having what it takes' can foster a competitive performance-oriented culture with little emphasis on growth (Emerson & Murphy, 2014; 2015; Murphy & Dweck, 2010). An organization that projects a fixed mindset tends to make people more anxious about failure, less motivated to overcome challenges, and more prone to defensive mechanisms (Murphy & Dweck, 2010). We refer to these ideas as *institutional mindsets*. Past research has shown that employees' perceptions of institutional mindsets can actually be more predictive of adults' actions within the company than their personal beliefs about intelligence and achievement. All participants in the aforementioned study preferred institutions with growth mindsets, but they were influenced by the company's perspective regardless of their professed personal mindsets (Murphy & Dweck, 2010). For example, employees may disclose a growth mindset personally, but if they believe they work in a company with fixed mindset traits, they are more likely to behave consistent with a fixed mindset. This indicates that a measurement of perceived institutional mindset beliefs may be more sensitive to how individuals operate in a specific context. Therefore, it is quite relevant to

study how the perceptions of institutional mindsets are shaped.

While perceptions of institutional mindsets have not yet been studied in schools, research on school climate and teacher transmission of mindset beliefs hint at its importance. Within schools, teachers and administrators can exalt the highest achieving students and use fixed mindset language such as 'he is an A student' or 'B student', lending achievement to identity, rather than effort. This can be done in a subtler approach as well or even with good intentions. Instructors with a fixed mindset who believe a student is not as capable of success may communicate their beliefs through trying to comfort students or assign less homework to struggling individuals (Rattan, Good, & Dweck, 2012). Likewise, complimenting students for their intelligence, rather than their effort helps promote a fixed mindset (Mueller & Dweck, 1998). Students may 'catch' these mindsets and subsequently diminish their own motivation, engagement, and future efforts (Rattan et al., 2012). Adolescents are particularly sensitive to the beliefs and views of others and are often more skilled than children at picking up on these beliefs that may be subtly transmitted from educators and school staff.

However, research on transmission of mindsets from teachers to students has revealed some inconsistencies and the best guess to-date is that mindsets are transmitted indirectly and are dependent on various other contextual variables and personal beliefs (Haimovitz & Dweck, 2017). This study furthers the study of the development of institutional beliefs within schools. While Study 1 focuses on a child sample, Study 2 encompasses an adolescent sample and includes measures of school fairness and school solidarity. Study 2 hypothesizes that perceptions of justice and school climate will significantly predict perceptions of institutional growth mindsets.

Demographic differences

Some recent research has also suggested that growth mindset is more likely among those from higher socioeconomic statuses (SES). Students from a lower SES in Chile were less likely to have a growth mindset than those from higher SES (Claro, Paunesku, & Dweck, 2016). Similarly, research on justice beliefs has found that those in less privileged

groups also have lower perceptions of fairness (Thomas & Mucherah, 2016; Thomas & Napolitano, 2016). This could be because those in lower SES groups do, in fact, live in a less fair environment than those in higher SES groups and they may not get the same payout for the same work. It may be challenging to hold onto a growth mindset in an unequal society. Brazil is a society of great social inequality; it has many poor and vulnerable groups, yet it is not a poor country. Compared internationally, Brazil has a medium per capita income and plenty of natural resources, yet its distribution is starkly unequal (Honorato da Silva & Sampaio, 2010). For this reason, Brazil is a very relevant yet understudied place to assess perceptions of justice and mindset beliefs. Study 1 did not include a measure of SES, but it was added in Study 2 to be able to account for possible demographic differences.

Study 1

The purpose of the first study was to test if BJW and trust in adults helps predict children's growth mindset. This study assessed four measures (personal BJW, general BJW, trust in adults, growth mindset) that were added on to an ongoing longitudinal study assessing fifth graders in public schools in a capital city of Southern Brazil. We hypothesized that BJW (general and personal) and trust in adults would positively predict students' growth mindset and that trust would partially mediate the relationship between BJW and growth mindset.

Method

The questionnaire was translated into Portuguese by translators working in the fields of education and psychology and given to a separate team of Brazilian psychologists to ensure that the meaning of all four scales (described below) was retained in the translation. With permission from the School District, the public institutions selected classrooms at random to survey during convenient times. Active parental consent was obtained as well as the assent of the participants prior to the anonymous and voluntary survey. The research complied with Brazilian and American standards of ethics.

Participants

Three hundred and sixty-three fifth graders were surveyed across 10 randomly selected public schools in a city in Southern Brazil. The average age was 9.72 (S.D. = 0.77), with 49.90% male. Half of the participants identified as 'Pardo' (Brown), 37.50% as White, 5.20% as Black, and 5.50% as native Brazilian. These categories come from the Brazilian census and are the most common way to assess race and ethnicity within the country.

Measures

Belief in a just world (BJW) was measured through Dalbert's (1999) Personal BJW (e.g. 'Overall, events in my life are just') and General BJW questionnaire (e.g. 'I think basically the world is a just place'). Dalbert's scales are the most frequently used BJW questionnaires in education and have previously been used in a sample of Brazilian youth (Thomas & Napolitano, 2016). These items were assessed on a four-point Likert scale ranging from 1 = never to 4 = always. The internal consistency of these scales were assessed for Personal BJW ($\alpha = 0.62$) and General BJW ($\alpha = 0.60$).

Adult trust was measured through the following four items: *When I have a problem, I ask adults to help me; When I get in trouble, I ask trusted adults to help me; I can trust most adults in my life; Most adults have good intentions when they try to help me.* Likert scale ranging from 1 = never to 4 = always. This measure was created for this study. To validate and support its use, a factor analysis revealed that all items loaded on the same factor and they had a good internal reliability, $\alpha = 0.74$. While more work should be done to further validate this measure, all items are mentioned above to reveal its face-validity and be shared with other researchers to further develop or critique.

Growth mindset was assessed based on Dweck's work through the item "*I can increase my level of intelligence*". It was assessed on a four-point Likert scale of 1 = strongly disagree to 4 = strongly agree.

Results

We conducted 2 x 4 ANOVAs to see if there were differences in growth mindset and

adult trust on the independent variables of sex and ethnicity. There were no significant main effects nor interactions (all g^2 s < 0.01 , $ps > 0.05$). A two-way MANOVA also revealed that there were no between subject differences regarding sex and ethnicity with BJW personal and general. Correlations among the study variables and descriptive statistics are provided in Table 1. Both personal and general BJW were moderately positively associated with growth mindset ($r = 0.33$, $p < .05$ and $r = 0.34$, $p < .05$, respectively) and strongly correlated to each other ($r = 0.60$, $p < .05$). Meanwhile, adult trust was also positively correlated to the other study variables (rs 20.43, $ps < 0.05$).

The assumptions of a regression analysis were carefully assessed and there was no evidence of non-normality (observed through the histogram of regression residuals and a normal p–p plot of regression standardized residuals), no evidence of multicollinearity (observed by tolerance statistics) and no evidence of non-linearity (observed by a matrix scatterplot of the variables).

Table 1. Correlations and descriptive statistics of the study 1 variables.

	1.	2.	3.	4.	5.	Mean	S.D.
1. Age	–	–0.01	–0.03	–0.01	–0.03	9.72	0.77
2. General BJW	–0.01	–	0.60*	0.50*	0.34*	3.03	0.56
3. Personal BJW	–0.01	0.60*	–	0.48*	0.33*	3.03	0.53
4. Adult Trust	–0.01	0.50*	0.48*	–	0.43*	3.33	0.61
5. Growth Mindset	–0.03	0.34*	0.33*	0.43*	–	3.34	0.84

Note: * $p < .05$.

Table 2. Summary of multiple regression analysis for variables predicting adult trust ($n=363$).

	<i>B</i>	<i>SE B</i>	<i>b</i>
Personal BJW	0.349	0.062	0.304*
General BJW	0.355	0.059	0.327*
R^2		0.318	
F for change in R^2		83.769	

Note: * $p < .001$.

Table 3. Summary of hierarchical regression analysis for variables predicting growth mindset ($n = 363$).

	Model 1			Model 2		
	B	SE B	β	B	SE B	β
Personal BJW	0.300	0.096	0.190*	0.137	0.095	0.087
General BJW	0.339	0.090	0.228**	0.173	0.090	0.117
Adult trust				0.467	0.007	0.341**
R^2		0.140			0.219	
F for change in R^2		29.333			36.443	
Note: * $p < .01$, ** $p < .001$.						

A multiple regression analysis revealed that personal and general BJW significantly predicted adult trust, $R^2 = 31.8$, $F(2360) = 83.77$, $p < .001$. See Table 2. This was conducted to verify the expected relationship between fairness and trust. A hierarchical multiple regression predicting growth mindset was conducted with BJW entered first, then adult trust entered second. See Table 3. The final model explained 21.9% of the variance in growth mindset. The hierarchical model revealed that the effect of BJW on mindset was mediated through adult trust. Personal and general BJW significantly predicted growth mindset, until adult trust was entered, then only adult trust was significant.

A follow-up Sobel mediation test was conducted to verify that the observed results reflect a mediation effect. The test calculating the mediation of adult trust between personal BJW and growth mindset was significant and revealed that 57.06% of the total effect is mediated, $t = 5.845$, $p < .001$. The test calculating the mediation of adult trust between general BJW and growth mindset was also significant and revealed that 54.07% of the total effect is mediated, $t = 5.755$, $p < .001$.

Discussion of Study 1

These tests support our hypothesis that BJW and trust in adults have relevant associations to students' mindset beliefs and that trust partially mediates the relationship between BJW and growth mindset. This finding may be due to the importance of adults' feedback in middle childhood. Children who have trusting relationships with adults and a fair environment may also be more likely to believe that they have control over their intellectual development.

A fair environment, where consequences are predictable and appropriate, can serve as a mechanism to bond children to adults and establish a growth mindset where they believe their hard work will be compensated. It is important for parents and teachers to be mindful of children's perceptions and if children feel safe and fairly treated. Students who consistently feel unfairly treated are less likely to trust the adults in their lives and more likely to believe they cannot change their intelligence levels. This study acknowledges the world is not fair and there can be negative social outcomes to believing it is unequivocally fair (such as blaming the victim). Therefore, we do not propose that the implication is to teach children that the world is fair. Instead, adults should be mindful of how much children learn and create assumptions about their environment and strive to create spaces of optimal fairness so children can perceive the connection between their efforts and outcomes.

Study 2

In light of the relevance of institutional mindset (as seen in the literature review) to shape personal mindset and behaviors, a second study was designed to include items on institutional mindset and understand how the school context could influence students' perception of the school's mindset. For this study, an adolescent sample was most appropriate because of adolescents' ability to discern context more accurately and their susceptibility to others' opinions. The second study expands the findings of the first one to by including school climate of fairness and solidarity and students' perceptions of the institutional mindset. This study was designed to understand if BJW as well as school climate variables (fairness and solidarity) predicted students' mindsets and their evaluation of the institution's growth mindset. We hypothesized that school fairness and solidarity would partially mediate the relationship between BJW and mindset beliefs. In line with recent research on the influence of institutional mindsets, we expected that perceived institutional mindset would be predicted by BJW and school climate.

The second study was also designed to include a more diverse sample. Although the sample of the first study was representative of public schools, it did not include more

privileged students, who attend private schools. In Brazilian schools, students are largely segregated by social class with only those of lower-middle and lower SES attending public schools, while those of middle and upper SES largely attend private schools (Gamboa & Waltenberg, 2012; Honorato da Silva & Sampaio, 2010).

As such, the second study included more demographic variables including SES, race, and school type (private or public). Items on adult trust were included for consistency with the prior study, but we did not expect adult trust to be as relevant to adolescents as it was in the child sample because adolescents are more autonomous and less dependent on adults. The primary focus was on adding questions on school climate and institutional mindset due to adolescents' sensitivity to others' perspectives and their increased ability to interpret their environment and make contextual judgments.

Method

Four Brazilian high schools participated in the study, two private institutions and two public institutions. The public institutions selected classrooms at random to survey during convenient times while the private schools allowed access to all students during class time. Parents were informed of the study and the survey was anonymous and voluntary. The research complied with Brazilian and American standards of ethics.

Participants

Four hundred and ninety-seven adolescents between 13 and 19 years old (mean age= 15.53, S.D. = 1.94). This sample came from a different city in the same state of the country. Participants were 56.00% female and consisted of 72.80% White, 16.90% 'Pardo' ('Brown'), 3.00% Black, and less than 1.00% native Brazilian and Asian. These demographics are comparable to the city's racial composition. There were 334 students from private schools and 162 students from public schools.

Measures

Socioeconomic status was measured using the Brazilian Criteria (Kamakura &

Afonso, 2014). This tool is based on the Brazilian Institute of Geography and Statistics' Household Budget Survey and asks participants about the presence and frequency of household items such as cars, dishwashers, washer and drying, bathrooms, etc. The measure provides a scoring template to separate participants into a gradient of six socioeconomic status groups based on their purchasing power and household goods.

Personal and general BJW measures were the same as study 1, with internal reliability scores of $\alpha = 0.80$ and $\alpha = 0.68$, respectively.

School fairness was measured by five items from the Delaware School Climate (Bear, Gaskins, Blank & Chen 2011) (e.g. 'The rules in this school are fair') and two items from the shortened version of the California School Climate and Safety Survey (Furlong et al., 2005) (e.g. 'It pays to follow the rules at my school'). Items have previously been translated into Portuguese and validated (Bear et al., 2016). Prior research supports the usage of these constructs and measures in Brazilian students (Alves & Franco, 2008; Bear et al., 2016; Reis 2012; Vinha et al., 2016). A factor analysis on the current sample revealed all items loaded on the same factor (loading > 0.3) and had a good internal reliability, $\alpha = 0.82$.

School solidarity was assessed through a four-item scale (Flanagan & Stout, 2010) (e.g. 'Students feel like they are an important part of the school'). All items loaded on the same factor (loading > 0.3) in a factor analysis and revealed a good internal reliability $\alpha = 0.77$.

Growth mindset was assessed by both a personal growth mindset item (same as Study 1), and an institutional growth mindset item ('Most people in this school believe that each student can learn new things and increase their intelligence').

Adult trust was measured with the following two items: *When I get in trouble, I ask trustworthy adults for help; When I do something wrong, I can ask adults for help.* Due to the time constraints, a shortened version from Study 1 was used. The items loaded on the same factor (loading > 0.30) in a factor analysis and showed good internal consistency, $\alpha = 0.78$.

The items on all scales were assessed on a six-point Likert scale (1 = strongly dis-

agree; 6 = strongly agree) and were averaged to compose one score for each dimension. This was assessed on a different scale from Study 1 because most of these measures were initially developed for a six-point scale. The first study was a four-point scale to make it easier for a younger sample to grasp and maximize reliability. The first study was also a part of larger longitudinal project where the other measures were on a four-point scale, so maintaining the consistency across the survey was judged as more important.

Results

Similar to study 1, we conducted a 2 x 2x2 ANOVA to see if there were differences in adult trust as a function of ethnicity minority group, gender, and now school type. There were no significant main effects nor interactions (all g^2 s < 0.01, p s > 0.05). Two-way MANOVAs also revealed that there were no differences between sex and ethnicity with personal and general BJW, school fairness and solidarity and lastly, personal and institutional growth mindset. Correlations among the study variables and descriptive statistics are provided in Table 4.

A hierarchical regression analysis was conducted predicting growth mindset by demographic variables, BJW, and adult trust and school climate variables. Demographic variables were entered in the first block to control for their effect, then BJW scales, then adult trust, and school climate variables. This structure was modeled after the first study and the theoretical framework that trust in adults and perception of the school can mediate the relationship between BJW and growth mindset.

The assumptions of a hierarchical regression analysis were carefully assessed. Normality was observed through a histogram of regression residuals and a normal p-p plot of regression standardized residuals. Absence of multicollinearity was verified by tolerance statistics and the matrix scatterplot showed no evidence of non-linearity. The model predicting a personal growth mindset was barely significant, $R^2 = 0.031$, $F(5, 492) = 1.231$, $p = .049$. See Table 5. Personal BJW and school type significantly predicted personal growth mindset. This indicates that personal BJW is a significant predictor of growth mindset and that students in the private schools are more likely to endorse a

growth mindset.

Table 4. Correlations and descriptive statistics of the study 2 variables.

	1.	2.	3	4.	5.	6.	7.	8.	9.	Mean	S.D.
1. Age	–	–0.40*	–0.37*	–0.21*	–0.09*	–0.32*	–0.26*	0.00	–0.16*	15.52	1.94
2. SES	–0.40*	–	0.28*	0.09*	–0.02	0.11*	0.13*	–0.01	0.10*	47.68	12.35
3. Personal BJW	–0.37*	0.28*	–	0.40*	0.26*	0.37*	0.31*	0.05	0.24*	3.97	0.84
4. General BJW	–0.21*	0.09*	0.40*	–	0.18	0.22*	0.29*	–0.03	0.20*	3.21	0.82
5. Adult trust	–0.09*	–0.02	0.26*	0.18*	–	0.26*	0.26*	0.08	0.20	3.54	1.05
6. Schl. fairness	–0.32*	0.11*	0.37*	0.22*	0.26*	–	0.44*	0.03	0.35*	4.25	1.08
7. Schl. solidarity	–0.26*	0.13*	0.31*	0.29*	0.26*	0.44*	–	0.01	0.41*	3.30	1.03
8. Pers. growth mindset	0.00	–0.01	0.05	–0.03	0.08	0.03	–0.01	–	0.23*	4.94	1.13
9. Inst. growth mindset	–0.16*	0.10*	0.24*	0.20*	0.20*	0.35*	0.41*	0.23*	–	4.37	1.33

Note. * $p < .05$.

Table 5. Summary of hierarchical regression analysis for variables predicting personal growth mindset ($n = 497$).

	Model 1			Model 2			Model 3		
	<i>B</i>	<i>SE B</i>	<i>b</i>	<i>B</i>	<i>SE B</i>	<i>b</i>	<i>B</i>	<i>SE B</i>	<i>b</i>
School type	–00.261	00.13	–00.110*	–00.362	00.13	–00.152**	–00.378	0.14	–0.159**
Ethnicity	–00.070	00.128	–00.026	–00.081	00.12	–00.030	–00.092	0.128	–0.034
SES	00.052	00.121	00.023	00.057	00.12	00.025	00.079	0.121	0.035
Personal BJW				00.177	00.069	00.134**	00.149	00.071	00.113*
General BJW				–00.095	00.006	–00.070	–00.104	00.067	–00.076
Adult trust							00.070	00.051	00.066
School Fairness							00.037	00.055	00.036
School Solidarity							–00.018	00.056	–00.016
R^2									
F for change in R^2									

Note: School type: private = 1; public = 0; ethnicity: dominant = 1; minority = 0; SES: 1 = high; 0 = middle-low;

* $p < .05$, ** $p < .01$, *** $p < .001$.

The regression analysis predicting the perceived institutional growth mindset was significant, $R^2 = .217$, $F(8, 487) = 16.846$, $p < .001$. See Table 6. Among the demographic variables in the first model, school type was the only significant variable indicating that those who attended private schools believed the institution had a stronger growth mindset than those in the public schools. The second model revealed that personal and general BJW were significant predictors of growth mindset. With these variables included, the effect of school type was slightly diminished, yet still significant. Once the school climate variables (fairness and solidarity) were introduced in the third model, BJW and

school type were no longer significant, indicating that these may first influence school climate, which in turn predicts attributions of institutional growth mindset. In line with our hypothesis, adult trust was no longer significant in the adolescent sample, as it was in the child sample (Study 1).

Table 6. Summary of hierarchical regression analysis for variables predicting institutional growth mindset ($n = 497$).

	Model 1			Model 2			Model 3		
	B	SE B	β	B	SE B	β	B	SE B	β
School type	0.547	0.153	0.193***	0.350	0.158	0.124*	-0.033	.153	-0.012
Ethnicity	-0.075	0.142	-0.023	-0.103	0.148	-0.032	-0.077	.137	-0.024
SES	0.010	0.151	0.004	0.022	0.1238	0.008	0.126	.129	.043
Personal BJW				0.287	0.077	0.182***	0.106	0.074	0.067
General BJW				0.200	0.076	0.124**	0.048	0.073	0.030
Adult trust							0.064	0.041	0.068
School fairness							0.234	0.059	0.189**
School Solidarity							0.349	0.061	0.273**
R ²	0.036			0.084			0.218		
F for change in R ²	60.172			120.844			270.749		

Note: School type: private = 1, public = 0; Ethnicity: dominant = 1, minority = 0; SES: 1 = high; 0 = middle-low; * $p < .05$, ** $p < .01$, *** $p < .001$.

Table 7. Summary of Sobel mediation tests between BJW and school climate variables.

	t	Mediation effect (%)
School fairness mediates personal BJW	5.291***	46.14
School fairness mediates general BJW	4.462***	35.83
School solidarity mediates personal BJW	5.507***	46.64
School solidarity mediates general BJW	5.512***	55.23

Note: *** $p < .001$.

To verify the mediation role of school climate variables, we conducted a Sobel mediation test. Four tests were conducted to observe the mediation effect between both BJW and both school climate variables. See Table 7. There was evidence of an effect indicating that school fairness and solidarity mediate the relationship between BJW and perceiving an institutional growth mindset.

Discussion of Study 2

This study revealed no significant difference between the higher and lower SES students, but there was a difference between public and private with private school students

reporting a significantly higher institutional and personal growth mindset. Private schools are an educational place of privilege for Brazilian adolescents and students attending these schools trust that those in the school believe that effort can increase intelligence and thus increasing their educational efforts will yield them with higher intellectual achievements.

Research has already established a strong relationship between BJW and school climate variables (Dalbert & Stöckel, 2005; Donat et al., 2012; Kamble & Dalbert, 2011; Peter & Dalbert, 2010). In this study, school fairness and solidarity partially mediated the effect of BJW on institutional growth mindset. These results indicate that adolescents who believe the world is fair (both generally and personally) are more likely to also believe the school is fair and feel a sense of belonging at school and may thus perceive the school to be a place with a predictable balance between effort and achievement.

As mentioned previously, adult trust was included in this analysis for consistency and comparison to the younger sample. However, as expected, it was not significant in predicting mindsets. This could be because the older sample is farther along in developing autonomy and is no longer as dependent upon adults.

There was a stark contrast between the strength of the model predicting institutional mindset in adolescents compared to the personal growth mindset. Although we hypothesized that the analysis would predict personal growth mindset, it did not. However, it did help explain how adolescents answered the institutional growth mindset. This could be because adolescents are keenly aware of the beliefs of those around them and are more apt to adopt these beliefs and read cues from the environment. The relevance of institutional growth mindset are in line with Murphy and Dweck's (2010) work that revealed the importance of institutional over personal mindsets. In their research, participants' perceptions of the institutional mindset were more predictive of their behaviors than their personal mindsets. Although the purpose of this study was not to measure compare the relevance of personal or institutional mindsets, it suggests that adolescents' institutional mindsets may become more influenced by these constructs than their personal mindsets. It could be that, in adolescence, growth and fixed mindset

beliefs become more nuanced and more context-specific. We suggest that adolescents' attribution of the school's mindset is upheld by their worldviews of fairness and perceptions of school climate. Future work should seek to understand if school growth mindsets are more predictive of achievement and motivation than personal growth mindsets.

This second study highlights the differences between children and adolescents. Study 1 helps build the case for the importance of adult trust and how children may be incorporating these concepts into their growth mindsets. The second study hints at adolescents' increased autonomy from adults and the importance of contextual variables both for school fairness predictors and for how adolescents perceive mindsets from their educational institution. The contextual take of this study and the understudied sample of Brazilian adolescents from various economic levels opens new doors to study growth mindset assumptions in highly unequal societies. We must expand the scholarship of growth mindset to understand their developmental and contextual dependents.

Limitations and future research

The reliability scores of BJW scales in the first study are lower than ideal ($\alpha = 0.60$ and $\alpha = 0.62$). The low internal consistency is limitation of this study and one of the reasons a second study with older participants was conducted as a part of this research. It is relevant to study mindset beliefs in children because from a young age, their beliefs shape their motivation (Haimovitz, Wormington, & Corpus, 2011). Most research on BJW has focused on adolescents and more work must be conducted in the future to establish a stronger measurement for children's BJW.

Only one item was used to measure growth mindset. While it was a simple straight forward statement that gets to the core of the definition of mindset, more work must be done to adequately translate and validate a growth mindset measure to a Brazilian child and adolescent population. The adult trust scale was also developed for this study, and, while it held up to standard validity and reliability tests, more work should be done to expand and validate this measure.

We live in a time of increasing inequalities, with many repercussions in the school context. SES was not measured in the first study but the second study strengthens these findings and is able to demonstrate similar findings in an older and more economically diverse sample. A more detailed assessment of how socioeconomic inequalities within school settings might affect BJW, as mediated by the school climate, would be a potential avenue for understanding how macro-systemic aspects of society influence BJW. Future research should also seek to replicate these findings in other cultures.

This study is the first of its kind to bring institutional mindset research to a school sample. Future research should seek to understand if institutional mindsets are more predictive of adolescent motivation and achievement compared to personal mindsets. This was beyond the scope of the study but additional findings would benefit how interventions are shaped and administrated.

It is important to highlight that this study is correlational in nature. This study represents an important step to establishing a relationship with perceptions of justice and trust within schools. This work should be seen as an important validator for more resources to be spent studying these underlying assumptions in future mindset research and interventions. However, we are far from establishing a causal relationship. A recent review (Haimovitz & Dweck, 2017) called more and more research to understand the indirect shaping (versus direct transmission) of mindsets in children and adolescents. While that review was mainly pointing to adults' feedback and personal theories of motivation, this study demonstrates that there could be personal underlying worldviews and relationships necessary to adequately nurture a growth mindset. This is a preliminary study that hopes to stimulate further inquiry and discussion about these basic assumptions of fairness and trust.

Conclusion

This article is an important, though obviously incomplete, attempt to get at some of the underlying assumptions of a growth mindset. Justice beliefs were relevant constructs to predict adult trust in children and to school climate evaluations in adolescents. These

beliefs may lay the groundwork for trust and the predictability of the surrounding environment. Adult trust and BJW seem to be especially important for children, who depend more on adults. For adolescents, their BJW and school climate variables were particularly relevant predictors of their judgments of institutional mindset beliefs. This study suggests that children and adolescents must believe, to some extent, that their environment is fair and consistent enough to predict the outcomes of additional effort.

These findings can be useful to design more effective interventions. While a lot of interesting research has demonstrated the importance of growth mindsets, effects of interventions are often weak (Sisk et al., 2018). Therefore, more attention should be spent investigating and critically analyzing the assumptions necessary for a growth mindset. We do not advocate for teaching students that the world is fair when there are injustices at every level. However, schools can focus on establishing a highly just school climate and take careful consideration of not only of the fairness of the environment, but of students' *perception* of fairness. This study only measured the perception of justice and its purpose was not to establish object fairness. If the administration is compensating and reprimanding students fairly, but that is not clearly communicated to students, the school may be undermining the students' implicit beliefs about internal control and ability. Clearly communicating the justice of the system and the trustworthiness of the adults may help create conditions where growth mindset can be enhanced. When schools emphasize fairness and justice, they are promoting two of the sustainable development goals: quality education and peace and justice (United Nations, 2015). It is important to continue exploring how contexts of justice and peace are associated with other academic outcomes and individual mindsets. Future work can advance this scholarship, particularly in unequal and developing societies.

This study is the first to explicitly evidence the assumptions of fairness, trust, and school context necessary for growth mindsets. It is meant to inspire and spur further critical dialogue about the assumptions of mindset development. Additional research should continue investigating how students are making meaning of growth mindset messages and how assumptions about the environment shape their interpretation of

interventions. This can help inform educators and researchers of other constructs necessary to foster a growth mindset. This knowledge can strengthen interventions and lead to deeper understanding of the importance of fostering a fair and trusting educational environment.

Disclosure statement

No potential conflict of interest was reported by the authors.

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