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Examining how parent and teacher enthusiasm influences motivation and achievement in STEM

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ABSTRACT

Parents and teachers play an important role in stimulating student motivation. The aim of this study was to examine if both parent and teacher enthusiasm could predict intrinsic motivation toward STEM activities, and if motivation would be associated with improved STEM achievement over one year in a one-year prospective examination of 288 Swedish students in their final year of a Science High School program (143 females and 145 males). Surveys of parent and teacher enthusiasm were collected at baseline, and student intrinsic motivation and GPA in STEM were assessed at baseline and at the end of the year. Baseline GPA and intrinsic motivation as well as follow-up intrinsic motivation were significantly associated with later GPA. Finally, intrinsic motivation mediated the relation between teacher and parent enthusiasm and change in GPA. Findings show the importance of parent and teacher enthusiasm for adolescent's intrinsic motivation and achievement in STEM.

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The role of parent and teacher involvement in students' studies in school has been a focus of current research in motivation (Roorda et al., 2011; Wilder, 2014). Parents can be involved in their children's studies in numerous ways, such as by being autonomy supportive (Vasquez et al., 2016), introducing learning activities at home Erion (2006), and being involved in their children's homework (Patall et al., 2008). Teachers may also be autonomy supportive (Jang et al., 2010) and use modeling techniques (Blank & De las Alas, 2009) when they are involved in their students' studies. However, to this date, no study has investigated the associations between parent and teacher enthusiasm and children's intrinsic motivation in STEM and its association with academic achievement in STEM subjects over time. The primary goal of the present study was to formulate a model that could explain how important parent and teacher enthusiasm in science and math is for adolescents' intrinsic motivation to study STEM, and academic achievement.

Self-determination theory

Self Determination Theory (SDT; Ryan & Deci, 2017) is a broad meta-theory of human motivation that highlights the fundamental role of personal autonomy in human functioning. The theory has often been applied to educational settings where it differentiates between types of motivation which vary in the extent to which they reflect autonomous processes. The most basic distinction is between intrinsic motivation (i.e., action taken because of intrinsic interest or pleasure) and extrinsic motivation (i.e., action taken because of anticipated separate consequences). SDT further postulates that intrinsic motivation represents the archetype of volitional action that is thought to fuel growth, learning, and development (Ryan & Deci, 2017). There are distinct types of extrinsic motivation that lie along a continuum of control to autonomy. External regulation refers to motivation based in rewards or threats of punishment; introjected regulation which involves the learner's self-esteem and the possible approval of others; and identified regulation involves a self-endorsement of goals and conscious valuing of the activity.

Educational researchers have generally assessed motivation in relation to the highly generalized goal of why are students pursuing their academic studies. The most commonly used scales are the Self-regulation Questionnaire (Ryan & Connell, 1989) and the Academic Motivation Scale (Vallerand et al., 1992). Both instruments assess the full range of controlled to autonomous motivations. Numerous studies have shown that intrinsic motivation leads to the expression of more creativity, stronger academic self-concepts, higher academic performance, and involvement in meaningful cognitive engagement (Clark et al., 2014; Guay & Vallerand, 1996; Ratelle et al., 2005). Importantly, there is evidence from longitudinal studies that intrinsic academic motivation may uniquely result in higher achievement over time (Lacaille et al., 2007; Taylor et al., 2014). Indeed, the authors of these studies argued that intrinsic motivation has a unique importance in predicting school achievement over

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time as it consistently was positively associated with achievement in school. A recent meta-analysis (Howard et al., 2020) examined the relation of academic motivation to diverse student outcomes in 344 samples. The results for school achievement showed that both intrinsic motivation and identified motivation were significantly associated with both self-reported and objective indicators of school achievement. External regulation and introjection were unrelated to school achievement outcomes. The meta-analysis did not distinguish between cross-sectional and prospective longitudinal studies.

Given this evidence, it is important to examine contextual factors that influence intrinsic motivation for learning. The present study considers students in STEM and the influence of teacher and parent enthusiasm for math and science.

Parents and teachers involvement

Parents' involvement in children's education has been linked to children's academic outcomes in numerous studies (e.g., Bogenschneider, 1997; Brough & Irvin, 2001; Callahan et al., 1998; Gonzalez-DeHass et al., 2005; Rogers et al., 2009). Parents can make an impact on their children's academic achievements by actively participating in school-based involvement such as being present at school meetings and events, talking with teachers, and volunteering at school. However, parents' home-based involvement seems to be more common (Pomerantz et al., 2007). Home-based involvement usually focuses on the management of learning and characteristically involves actions such as engaging in cognitively stimulating tasks, like organizing and monitoring children's time (Finn, 1998) and helping with homework (e.g., Xu, 2012). It also often concerns children's intellectual activities such as reading books with children (e.g., Evans & Shaw, 2008), and taking them to museums as well as responding to children's school related efforts and talking with children about academic issues (Grolnick, 2009; Grolnick & Slowiaczek, 1994).

Parents' academic involvement is believed to improve their children's achievements as it gives them a selection of motivational resources, such as positive perceptions of academic ability and intrinsic reasons for studying. This in turn fosters children's engagement in school as the value of school is emphasized (Hill & Taylor, 2004). Such parental involvement can support children's educational endeavors and provide motivation to learn (Fan & Williams, 2010), which in the longer run may be internalized to make the engagement intrinsic (Grolnick, 2009; Grolnick & Slowiaczek, 1994). Moreover, parents' involvement in children's schooling models strategies of how children can deal with school and its various challenges by creating positive change.

The greater part of studies on parental involvement have examined parents' self-reported behaviors, while few studies have looked at it from the child's point of view. Furthermore, most studies have found associations between the impact of parents' school-based involvement and school achievement in children (e.g., Hill, 2001; Hill & Tyson, 2009), while less research has been carried out to examine the effects of parents' home-based involvement. However, some studies have found that parents' home-based involvement is associated with academic outcomes (e.g., Bogenschneider, 1997; Gonzalez-DeHass et al., 2005; Hill et al., 2004; Kaplan Toren, 2013; Rogers et al., 2009). Longitudinal research shows that parents' school-based involvement predicts children's future achievement (e.g., Duchesne & Ratelle, 2010; Hill et al., 2004; Park & Holloway, 2017).

Regarding studies in STEM, Gonzalez et al. (2002) found that parent academic involvement has been related to outcomes such as participation in advanced mathematics coursework and success in higher education, while Ing (2014) found that parents positively can influence their children's growth in mathematics achievement from 7th through 12th grade and persistence in STEM careers when involvement is mathematics-specific and intrinsically focused.

Swedish parents are expected to be highly involved and interested in their child's education and achievement (Forsberg, 2007). Moreover, students in Sweden have been given responsibility for planning and doing schoolwork. As the teaching practice focuses on students' individual responsibility for reaching academic goals, said responsibility is transmitted from teachers to students. A consequence is often that many parents take on this responsibility. This will probably have an effect on the parents' engagement in their children's studies in STEM, especially when parents assist their children with homework, which Swedish parents are expected to do Strandberg, 2013).

Research on how teachers may influence intrinsic motivation and academic achievement concerns teacher engagement (Fredricks et al., 2004) and also teacher enthusiasm. Teacher enthusiasm involves positive affective experiences and behaviors of expressiveness (Keller et al., 2016). Affective experiences concerns the enjoyment teachers feel while teaching and comprise intrinsic value (Coan & Gottman, 2007) and passion (Vallerand et al., 2003). Behavioral expressiveness includes features such as facial expressions, illustrative gestures, and eye contact with students (Babad, 2007).

Research has shown links between teacher enthusiasm and student outcomes. Numerous studies have shown that teacher enthusiasm is positively related to students' interest and intrinsic motivation (e.g., Brigham et al., 1992; Kim & Schallert, 2014; Patrick et al., 2000). Interestingly, when students perceive their teacher to be intrinsically motivated about their subject matter, they themselves experience more positive affect and are more intrinsically motivated in class (Wild et al., 1992; Wild et al., 1997). If students perceive that the teacher is extrinsically motivated they tend to feel less enjoyment even if they receive identical lessons (Wild et al., 1992).

The present study

The current study focuses on adolescents' perceptions of the enthusiasm that their parents and teachers have for science and math. Thus, students were asked the extent to which

parents "*took me to visit a science museum, aquarium, etc.*" and "*excitedly discussed new scientific discoveries.*" They were also asked the extent to which their teacher "*was enthusiastic about science and math*" and "*discussed new scientific discoveries in class.*" We hypothesized that both parent and teacher STEM enthusiasm would be associated with higher levels of student intrinsic motivation toward STEM activities, and that intrinsic motivation would be associated with improved math and science achievement over one year. To explore these questions we conducted a one-year prospective longitudinal investigation of 288 Swedish students in their final year of a Science High School program. Surveys of parent and teacher enthusiasm were collected at baseline. Student intrinsic motivation for STEM courses were assessed at baseline and follow-up. Grades in STEM courses were assessed at baseline and at the end of the year.

Methodology

Participants

Participants consisted of a nonrandom selection of students enrolled in eight metropolitan high schools in Sweden. All students participated on a voluntary basis. They were all on an academic trajectory toward STEM studies in college by being enrolled in a science program in their final year of high school. An initial questionnaire was administered to 496 students during mathematics/science classes in the second week of the fall semester of the final year in high school. At follow-up, 288 high school students (143 females and 145 males) participated in the data collection. The mean age of the participants was 19 years at follow-up.

The students answered question on the SES of their parent; if the student had more than one parent, they were asked to fill out these items only for parent with the highest level of education and the highest income level. The sample's level of education was as follows: no high school diploma (4.5%), high school diploma or equivalent (16.5%), college or university diploma (62.8%), and at least a Master's diploma (16.2%). The income levels of the parent with the highest income were as follows: <120,000 Swedish Kronor/year (10.6%), 120,000–250,000 (31.4%), 250,000–400,000 (45.0%), and >400,000 (12.7%).

Participants were compensated by entry into a lottery were they could win movie tickets.

Instruments

Parent enthusiasm (Time 1)

An instrument assessing parents' enthusiasm for STEM was measured by a five item scale that was developed by adapting items from perceived parental involvement in learning items used by Ratelle et al. (2005) and a scale assessing attitudes toward science (Adams et al., 2006). The scale intends to capture parent actions that portray sciences as an exciting endeavor (e.g., My parents excitedly discussed new scientific discoveries) or that stimulate the child's interest (e.g., My parents and I had debates about science) and had a Cronbach alpha of .80. Responses were rated on a 4-point Likert scale ranging from *Strongly Disagree* to *Strongly Agree*.

Teacher enthusiasm (Time 1)

Students' perceptions of their teachers' enthusiasm for STEM studies was measured by a scale that was adapted and inspired by VASS (Halloun & Hestenes, 1998) and CLASS (Adams et al., 2006) in the formulation of six items of teacher involvement in STEM. The scale intends to capture teacher actions that portray sciences as an exciting endeavor (e.g., My science teacher excitedly discussed new scientific discoveries) or that stimulate the child's engagement (e.g., My science teacher was enthusiastic about his/her subject). Responses were rated on a 4-point Likert scale ranging from *Strongly Disagree* to *Strongly Agree*. The reliability for this scale in the current study was acceptable ($\alpha = .82$).

Intrinsic motivation

Motivation (Time 1 and 2) was measured with the Academic Motivation Scale (AMS) developed by Vallerand et al. (1992). The AMS consists of 20 items and is composed of five subscales (amotivation, extrinsic motivation, introjected motivation, identified motivation, and intrinsic motivation). Each subscale has four items. The present study focuses on intrinsic motivation because it has been linked with positive student achievement outcomes (Lepper et al., 2005; Taylor et al., 2014). The reliability for this scale in the current study was acceptable ($\alpha = .89$ at Time 1 and .88 at Time 2). A sample item of intrinsic motivation is "I am enrolled in the Science program because I enjoy learning new things in science".

Academic achievement

Student grades in physics, chemistry, and mathematics courses were obtained from the administrative offices of the Swedish high schools as observed indicators of achievement. Grades were collected for courses in mathematics, physics, and chemistry. Academic achievement at Time 1 was based on courses taken in their second year in high school and academic achievement at Time 2 was based on the grades taken in the final year of high school.

The scale used in the course grades in Sweden ranged from Fail = 1, Pass = 2, Pass with distinction = 3, and Pass with great distinction = 4. The final grade was determined by an overall performance grade based on a variety of assessments, such as the grades on the examinations in each relevant subject.

Using the same data set, two previous studies with other aims have been published (Jungert & Koestner, 2015; Taylor et al., 2014).

Results

Preliminary results

The means and standard deviations for the main variables in the study are presented in Table 1. It can be seen that

Table 1. Descriptive statistics and intercorrelations matrix for all constructs.

	1.	2.	3.	4.	5.	6.	N	M(SD)
1.Parent enthusiasm T1	–	–	–	–	–	–	444	2.19(0.73)
2.Teacher enthusiasm T1	.20**	–	–	–	–	–	442	2.78(0.72
3.Intrinsic motivation T1	.32**	.36**	–	–	–	–	438	2.78(0.86)
4. Intrinsic motivation T2	.34**	.28**	.74**	–	–	–	378	2.87(0.84)
5. GPA T1	.07	.18**	.05	.04	–	–	337	3.03(0.71)
6. GPA T2	.14*	.30**	.40**	.36**	.42**	–	291	2.98(0.83)
7. SES	.35**	.11	.14*	.11*	.08	.07	368	2.60(0.84)

Note. T1 = Time 1 (the fall semester of the final year in high school), T2 = Time 2 (follow-up in the spring semester of the final year), SES = Socioeconomic status as measured by parents' income ranging from 1 (low = 120,000 Swedish Kronor/year) to 4 (high = 400,000 Swedish Kronor/year), **indicates p <.01, *indicates p < .05.

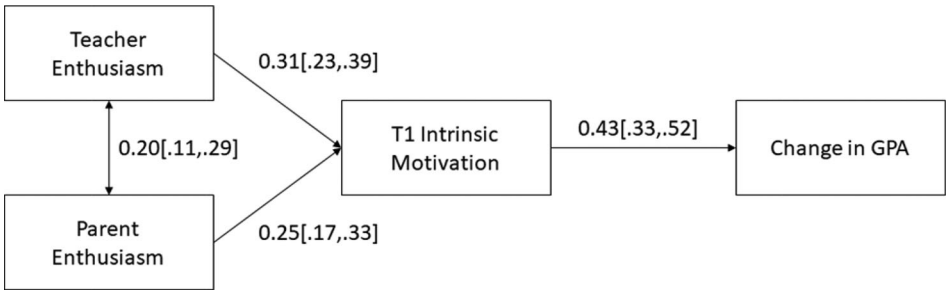

Figure 1. Structural equation model representing the relation between teacher and parent enthusiasm, intrinsic motivation and change in GPA. STDYX values are reported with 95% confidence intervals. Note. T1 = Time 1 (the fall semester of the final year in high school).

students perceived their parents as displaying significantly less enthusiasm for STEM than their teachers, $t(442) = -13.40$, p <.001. Intrinsic motivation for STEM was moderately high and remained stable from baseline to one year later, $t(287) = -0.85$, ns. Grade point average in STEM was moderately high but showed a significant decrease from baseline (M = 3.10) to follow-up (M = 2.99), $t(276) = 2.09$, $p = .05$).

Correlational analyses showed that gender was unrelated to all of the variables included in Table 1 except for parent enthusiasm for STEM. Boys perceived their parents to be much more enthusiastic about STEM (M = 2.31) than girls did (M = 2.05), $t(442) = 3.92$, p <.001. Table 1 also presents the correlations among the main variables. Parent and teacher enthusiasm were significantly correlated, but the two variables only share 4 percent variance suggesting that they would contribute independently to predicting intrinsic motivation and GPA. Intrinsic motivation was highly stable over time whereas GPA was moderately stable. The relations between adults enthusiasm for STEM, students' intrinsic motivation for STEM, and change in STEM grades over the year are examined in the next section.

Main results

Hierarchical multiple regression analyses were used to examine (1) the relation of parent and teacher enthusiasm to students' level intrinsic motivation for STEM and (2) the relation of intrinsic motivation to change in GPS over the school year.[1] Baseline intrinsic motivation was regressed on parent enthusiasm and teacher enthusiasm, while controlling for SES. A significant multiple R of .44 emerged, $F(3, 273) = 21.65$. Both parent enthusiasm for STEM – beta = .30, $t(273) = 5.13$, p <.001 – and teacher enthusiasm – beta = .25, $t(273) = 4.57$, p <.001 – were significantly associated with students level of intrinsic motivation. SES was unrelated to student intrinsic motivation – beta = −00, $t(273) = -0.22$, p =.982.

GPA after one year was regressed on baseline GPA, SES, baseline intrinsic motivation, and follow-up intrinsic motivation. A highly significant multiple R of .57 emerged, $F(4, 258) = 31.11$, p <.001. SES was unrelated to T2 GPA– beta = −00, $t(273) = -0.22$, p =.982. All the other predictor variables were significantly associated with later GPA: baseline GPA, beta = .41, $t = 7.93$, p <.001; baseline intrinsic motivation, beta = .25, $t = 3.36$, p =.001; follow-up intrinsic motivation, beta = .16, $t = 2.15$, p <.05. It is noteworthy that baseline intrinsic motivation was an equally strong predictor of end-of-the-year GPA as was baseline GPA! The change in intrinsic motivation from baseline to follow-up was also significantly associated with later GPA.

Structural equation modeling

To determine whether intrinsic motivation mediated the relationship between both teacher and parent modeling and change in GPA a structural equation model was created with MPlus software (Muthen & Muthen, 2015).[2] This model had good fit: BIC = 3607.02, $\chi^2(2) = 5.34$, $p = .07$, RMSEA = .061[.00, .13], CFI = .98, SRMR = .03. Change in grades was calculated through a residualized change score which is common in longitudinal research (Zumbo, 1999). Figure 1 below, shows a representation of this model with the standardized statistics reported. Both teacher and parent enthusiastic modeling predicted intrinsic motivation [(b = .31, p < .001, 95%CI = [.23, .39]); (b = .25, p < .001, 95%CI = [.17, .33]). When teachers and parents modeled interest in STEM, children reported greater intrinsic motivation to study STEM. In turn, intrinsic motivation was positively related to improved GPA in STEM subjects (b = .43, p

$< .001$, 95%CI = [.33, .52]). Being more intrinsically motivated to study STEM subjects was related to better grades over the year. Next, both mediation pathways were tested to determine whether intrinsic motivation mediated the relation between parent or teacher enthusiasm and grades. Intrinsic motivation mediated the relation between teacher enthusiasm and change in GPA (b = .13, SE = .02, $p < .001$, 95%CI = [.08, .18]). Intrinsic motivation mediated the relation between parent enthusiasm and change in GPA (b = .11, SE = .02, $p < .001$, 95%CI = [.06, .15]). Improved intrinsic motivation partially explained why those with enthusiastic parent and teacher models in STEM performed better in those classes.

Discussion

In this article, we conceptualized parent and teacher involvement in children's STEM education in terms of whether their actions depict sciences as an exciting endeavor and stimulate the child's interest in STEM. Our findings confirmed the hypothesis that these two sources of involvement are both positively associated with intrinsic motivation. This study also found that intrinsic motivation mediated the relation between both parent and teacher involvement and change in GPA in STEM.

To our knowledge, this is the first study that directly compares parents' with teachers' involvement in children's studies in STEM on the effect of intrinsic motivation and academic achievement. A strength of the present research is its prospective design, which allowed to investigate how enthusiasm at the beginning of a school year affects achievement at the end of the school year. Our findings also confirm previous research that have shown the importance of intrinsic motivation for achievement (Taylor et al., 2014).

The results clearly showed positive relationships between parent enthusiasm and intrinsic motivation at both time points. It seems that parents who enthusiastically involve their children in areas related to science and math, such as by taking them to visit science museums and excitedly discuss new scientific discoveries with them spur interests and trigger enjoyment in learning new things in science. When parents enthusiastically involve their children in such endeavors, it is likely to have a lasting impact on the child's intrinsic motivation to learn science in school too. Even if SES was associated with parent enthusiasm, SES was unrelated to student intrinsic motivation. We expect that for parents to be perceived as enthusiastic, they do not need any training or certain knowledge, they just need to be excited in science. Students are likely to benefit from this type of involvement. Surprisingly, the students in the current study were adolescents, which typically is a period when children desire to become independent from their parents (Gutman & Midgley, 2000). It is possible that parents who showed great enthusiasm in science and math when their children were very young have had good opportunities to involve them so that it had long-lasting positive effects on their motivation. Moreover, this result was not different between boys and girls, which is an important finding, because it means that parent enthusiasm may significantly contribute to reducing the gender gap in STEM (see Wang & Degol, 2017).

Intrinsic motivation mediated the relation between parent enthusiasm and change in achievement in STEM. This indicated that the positive impact of parent enthusiasm on their children's intrinsic motivation likewise has a positive association on achievement.

Teacher enthusiasm was significantly associated with intrinsic motivation at both time 1 and time 2, which was in line with our predictions. Previous research that has examined the effect of teacher enthusiasm on student outcomes have found effects on student motivation among other things. Just to name a few, Brigham et al. (1992), Frenzel et al. (2010), Keller et al., 2014, Kim and Schallert (2014), and Wheeless et al. (2011) all found positive relationships between teacher enthusiasm and student motivation. Reasons as to why teacher enthusiasm is positively related to student motivation is that enthusiastic teachers stimulate the students, increase their interest in the subject, and help make it more enjoyable. Rather than talking about aspects of STEM that may be perceived as too difficult and boring, enthusiastic teachers inspire students by inducing them with positive emotions (Keller et al., 2016).

On the other hand, the picture of the association between teacher enthusiasm and achievement is not that clear. Many studies found positive effects, such as Brigham et al. (1992), Frenzel et al. (2010), and Kunter et al. (2011), while some studies using an experimental design in which teachers had been trained to be enthusiastic, failed to find positive effects on achievement (see Keller et al., 2016 for a review). There are a couple of possible explanations as to why those experiments failed to find positive effects, such as the short duration of the treatments and that manipulating a single dimension of teaching such as engagement is not sufficient to improve student academic achievement. Another interesting explanation is provided by McKinney et al. (1983), who suggested that excessively enthusiastic behaviors will overstimulate young children and create problems in classroom management. In one of their experiments (McKinney & Larkins, 1982), students assigned to a medium enthusiastic-teacher condition displayed more interest and emotion than the low level, but remained attentive and had the highest achievement scores whereas the group taught with high teacher enthusiasm was extremely active and noisy.

In the current study on high school students, we did find that intrinsic motivation mediated the relation between teacher enthusiasm and change in achievement in STEM. Thus, the positive influence of teacher enthusiasm on intrinsic motivation also has a positive association on achievement.

Implication and limitations

The current findings have implications for both parents and teachers. Parents might struggle with how to make their children more interested in taking important subjects in school more seriously and motivated to perform well. We

found that parent enthusiasm in science and math functioned as an important predictor of students' intrinsic motivation. An implication of this result is that parents could show that they are enthusiastic about science in general by initiating discussions about scientific discoveries with their children. They could also suggest documentaries on the radio or the television or recommend articles on interesting subjects. Parents will not have to show enthusiasm about all aspects of science and math, but it is possible that a certain amount of enthusiasm can stimulate and spur their children's interest and motivation in one way or the other.

There are also implications in the class room for teachers. If teachers are to be perceived as enthusiastic about their subject, we suggest that they might want to initiate learning activities by enthusiastically talking about the subject and thereby encouraging the students' interest and enthusiasm. Teachers may try to find fascinating aspects of their subject and make enthusiastic points about these aspects to capture everybody's attention. That said, we recognize that it can be a challenge to find the right level of difficulty in the subject. It cannot be something too simple but not something too advanced either. In addition, the enthusiasm should not be perceived as inauthentic. Teacher enthusiasm should not only focus on its affective component (Frenzel, 2014), but also on the behavioral component. Thus, it should preferably involve things such as taking the students to a museum or watching an interesting documentary together in class.

Finally, merely focusing on parent and teacher enthusiasm is probably not sufficient. For instance, focusing on how to be autonomy supportive, to give positive and relevant feedback, and using strategies to build self-efficacy, will probably have an even greater impact on the students' intrinsic motivation and achievement in STEM, if this is done in an enthusiastic way.

This study only included Swedish participants. While meta-analyses indicate that even if parent involvement will have a positive impact on achievement regardless of the ethnicity of students, it is likely that certain ethnic groups will benefit more (Jeynes, 2003). Although the primary focus of the current study was not to investigate this, future research may be needed in order to elucidate possible differences in the effects of parent enthusiasm on motivation and achievement across various ethnic groups.

The primary limitation of our investigation is that we relied on self-report measures of parent and teacher enthusiasm and student motivation. It would have been valuable to collect enthusiasm data directly from the parents and teachers themselves. We also focused merely on students in a science stream. It is likely that parent and teacher enthusiasm for other subject areas such as the arts would also positively impact students' motivation and achievement.

Conclusion

The goal of the current study was to use a prospective design to examine if parent and teacher enthusiasm could predict intrinsic motivation toward STEM activities, and if intrinsic motivation would be associated with improved math and science achievement over one year. We showed that both parent and teacher enthusiasm was associated with increased intrinsic motivation in STEM and confirmed previous studies (e.g. Howard et al., 2020; Taylor et al., 2014) that intrinsic motivation is a highly beneficial form of motivation for students' achievement. Our findings have implications for parents, schools, and teachers. For example, parents and teachers should try to be enthusiastic in their children's science subjects in high school.

Notes

1. Note, an ICC was calculated to determine the variance that occurred for students nested within classes. The amount of variance nested between classes was small (1%), so the current analyses are more appropriate for the research question as most of the variance (99%) occurred across students.

2. Previous analyses held when controlling for SES, so the current model did not include SES to reduce degrees of freedom.

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