

## Teacher Self-Efficacy and Student Outcomes: A Transactional Approach to Prevention

Mary J. Huber<sup>1</sup>, Jason D. Fruth<sup>2</sup>, Alan Avila-John<sup>3</sup> & Enrique López-Ramírez<sup>4</sup>

### Abstract

---

Teachers who are in their first couple of years of teaching are vulnerable to leaving the profession at considerably high rates. Teacher retention rates are related to teachers' feelings of self-efficacy. This study examined the effect of the universal preventive intervention, the PAX Good Behavior Game (PAX GBG), on teachers' self-efficacy when delivered as professional development to practicing teachers. PAX GBG has demonstrated an effect on numerous student proximal and distal outcomes when implemented as classroom-based prevention. However, the effects on teacher outcomes are less identified and researched as well as the reciprocal nature of teacher and student interactions during the implementation of a PAX GBG intervention. In this quasi-experimental design, practicing teachers reported significantly higher levels of self-efficacy after receiving training in PAX GBG suggesting the malleability of self-efficacy. The results were examined within the framework of the transactional model and demonstrate the need to further investigate teacher and student relationships and the related distal student outcomes as a result of increasing teacher self-efficacy.

---

**Keywords:** PAX GBG, classroom management, teacher self-efficacy, professional development

### 1. Introduction

Tschannen-Moran and Hoy (2007) show that predictably, novice teachers generally demonstrate a lower sense of efficacy in their teaching practices when compared to experienced career teachers. In addition, teachers who are in their first couple of years of teaching are vulnerable to leaving the profession if they have a low sense of self-efficacy. Phillips (2015) found that over a quarter of teachers do not stay in the profession past three years while Brill and McCartney (2008) reported that 33% of teachers leave their careers in the first three years and 46% after five years of teaching. Ronfelt, Lankford, Loeb, & Wyckoff (2011) point out the negative impact attrition has on student achievement. Thus, providing training programs and curriculum that increase pre-service and practicing teachers' sense of efficacy (TSE) is vital in teacher education (Caprara, Barbaranelli, Steca, & Malone, 2006; Klassen & Chiu, 2010; Ross & Bruce, 2007).

The relationship between TSE and teacher performance and retention has roots in Bandura's (2001) social cognitive theory, where a sense of efficacy refers to a person's beliefs about their capabilities to successfully carry out a particular course of action. Schwarzer & Hallum (2008) discussed the importance of self-efficacy and found that teachers who reported a low sense of self-efficacy reported more job stress and job burnout compared to teachers with a high sense of self-efficacy.

---

<sup>1</sup> 108U Allyn Hall, Wright State University, 3640 Colonel Glenn Hwy. Dayton, OH 45435, USA. 937.775.2022

<sup>2</sup> Wright State University, USA.

<sup>3</sup> Wright State University, USA.

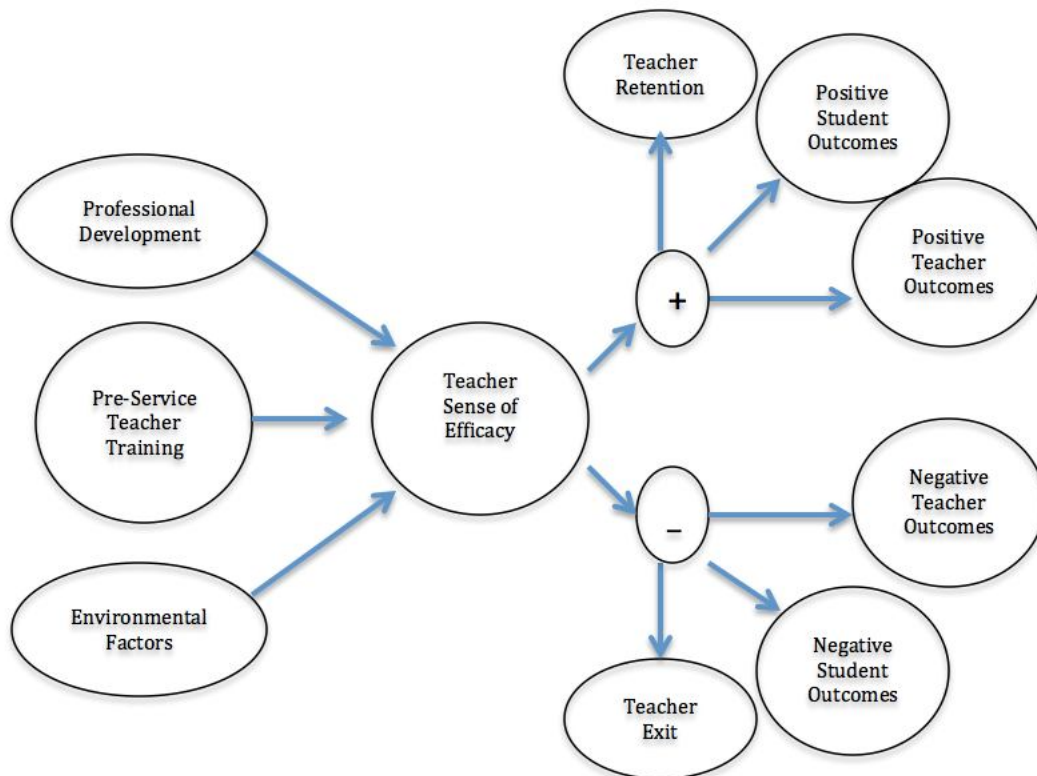
<sup>4</sup> University de Guadalajara, Mexico.

Since self-efficacy is related to teacher retention and retention is highly associated with positive student outcomes, retaining teachers who have been trained and developed is a goal for administrators in all schools as well as providing professional development training that attempts to increase TSE (Boyd, Grossman, Lankford, Loeb, & Wyckoff, 2008; Caprara, Barbaranelli, Steca, & Malone, 2006; Ronfelt, Lankford, Loeb, & Wyckoff, 2011; Van Dinther, Dochy, Segers, & Braeken, 2013).

### Teacher Self-Efficacy

Different interventions and professional development trainings have shown unique methods of increasing a teacher's belief about his or her ability to be a successful teacher; increasing their odds of continuing to practice in their respected teaching field (Brill & McCartney, 2008; Mongeau, 2015; Ross & Bruce, 2007; Watson, 2006). Brill and McCartney (2008) cogently argued for trainings and experiences that directly increase teachers' skillsets and successes in the field. These successes lead to a sense of empowerment and increase in their TSE. Thus, finding a mediator or intervention to increase TSE could have a resounding impact on the profession by dramatically impacting the effectiveness of the professionals, the retention of those professionals, and in turn, student performance and outcomes (Patterson, Reid, & Dishion, 1992). Figure 1 represents a rudimentary mediation model of TSE, teacher retention, and outcomes.

**Figure 1: Mediation model for TSE**

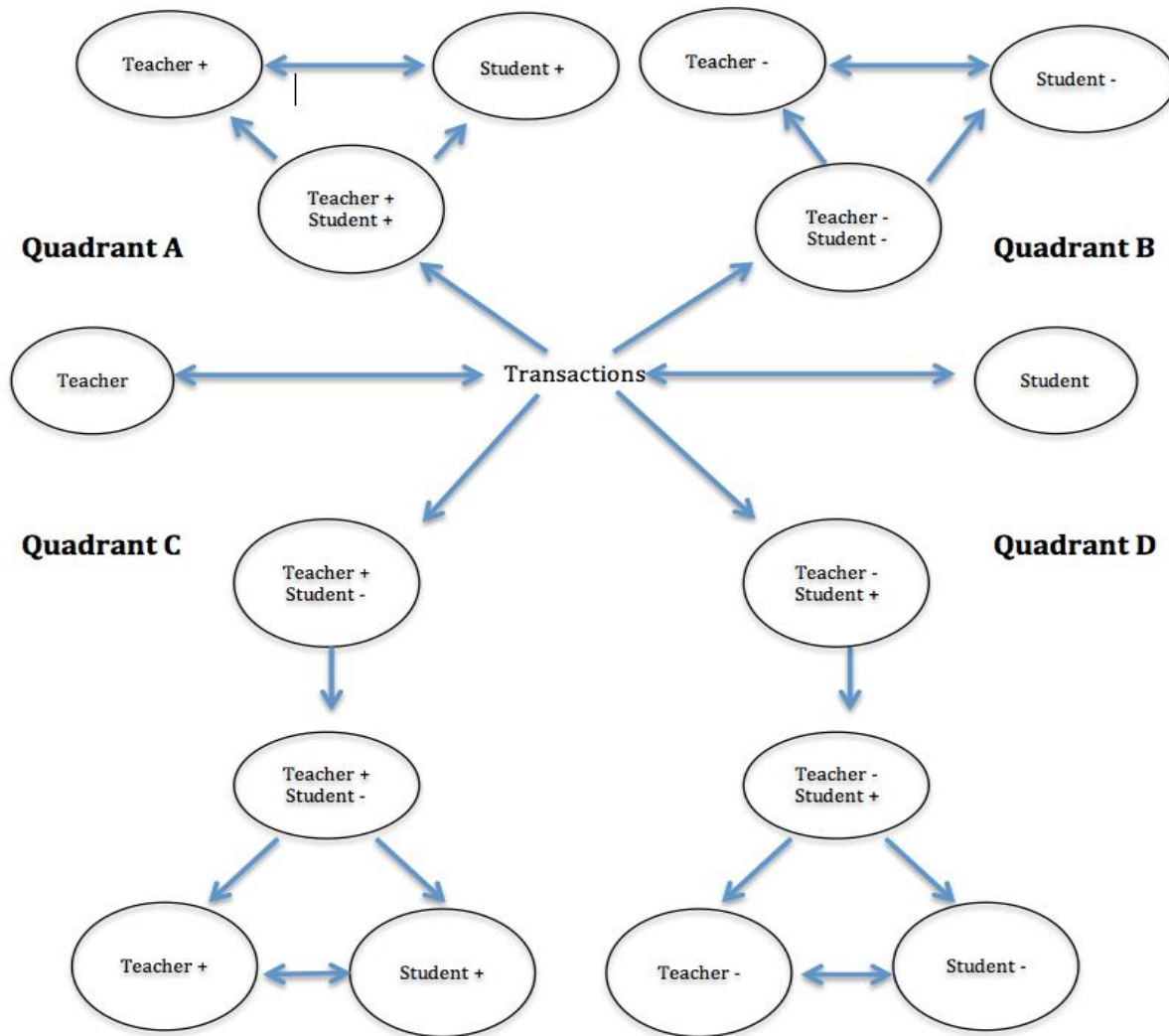


### Teacher and Student Transactions

Persuasive evidence has accumulated over the past three decades revealing the reciprocal relationship between a teacher's behavior and their student's academic outcomes (Boyd, et al., 2008; Caprara, et al., 2006; Ialongo et al., 1999; Ronfelt, et al., 2011; Van Dinther, et al., 2013). To understand this cyclical and dynamic relationship, Sutherland and Oswald (2005) propose a transactional framework for viewing teacher training and educational practice. Their research and that of others (Ialongo et al., 1999; Ronfelt, et al., 2011; Patterson, Reid, & Dishion, 1992) illustrates how the transactional model, originally proposed by Sameroff (1983, 1995, 2000), based on the early interactions of mother and child, can be applied to examine teacher and student interactions. The underlying theory is that the development of any process in an individual is influenced by the interplay of that process and the context in which it occurs.

As Sameroff suggested, the transactional process is an ongoing dynamic exchange between individuals and their environments (Sameroff, 1990). Thus, teachers' behavior and feelings about their teaching efficacy not only influences students' behavior, but students' behavior influences teachers' behavior and their feelings about their self-efficacy in a continuous dynamic manner (Patterson, et al., 1992; Sutherland & Oswald, 2005). This approach was supported by Ialongo et al. (1999). A decrease in a student's problematic behavior led to an increase in the number of identified friendships among other students and a decrease in bullying behavior – even without specific anti-bullying initiatives or curriculum demonstrating an example of the longitudinal nature of transactions. Figure 2 illustrates the dynamic process that occurs between teachers and students.

**Figure 2: Transactional model between teacher and student**



Although the interactions between a teacher and student are greatly simplified in this figure, it presents four possible scenarios that develop over time and lead to either a positive or negative transaction between a teacher and a student. In addition, the assumption in this model is that teachers who have a moderate or high sense of self-efficacy in their teaching practices respond to situations in a generally positive manner and those with a low sense of self-efficacy generally respond in negative manner. Quadrant A illustrates a transaction that includes a positive response from the teacher (e.g., a smile) and student (e.g., sitting quietly). This type of relationship is an example of what many researchers have found; students who are engaging receive more positive instruction and interactions (Patterson, et al., 1992; Skinner & Belmont, 1993).

Quadrant B demonstrates the opposite; a negative teacher response (e.g., scolding) and a negative student response leads to continuous negative transactions. For example, a student may disrupt class, thereby receiving less instruction, and the teacher may subsequently make fewer academic demands in order to escape or avoid the disruptive behavior and negative interactions. This can also create a cycle of coercion in which the teacher and students carry out “micro-retributions” such as watching specifically for the student to do something to get in trouble or the student carrying out specific behaviors known to “push the teacher’s buttons.” Consequently, the future transactions between the teacher and student are likely to continue to be negative. Simply put, teachers tend to promote further classroom engagement of students who are engaged, and interact less with disengaged students in a way that increases the likelihood of further disengagement or negative interaction (Patterson, et al., 1992; Skinner & Belmont, 1993).

Quadrant C and D represent scenarios that include opposing responses from a teacher and a student. In quadrant D, a cycle of continuous negative responses from a teacher influences what was a positive student response to eventually evolve into negative transactions. Quadrant C is the opposite of D. In Quadrant C, a continuous positive teacher response over time influences negative student responses (e.g., disruptive in class) leading to positive student behavior. Students in quadrant C eventually respond in a more favorable and engaging manner. These positive teacher-initiated interactions require a positive sense of efficacy on the teacher’s part in order to perpetuate in the face of initial negative student actions. Hence, the positive nature of the teacher’s continuous behavior fosters a nurturing environment (Biglan, Flay, Embry, & Sandler, 2012). In quadrants C and D the teacher’s response has a stronger influence on determining future transactions than those of the students. The ongoing, cyclical nature of transactions between teachers and students are directly impacted by the teacher’s level of confidence and self-efficacy.

### **PAX GBG and Student Outcomes**

As suggested earlier, finding a mediator or intervention to increase TSE could have a resounding impact on the profession by dramatically impacting the effectiveness of the teachers, the retention of those teachers, and in turn, student performance and outcomes (Skiba & Losen, 2015; Wilson, Hayes, Biglan, & Embry, 2014). Further, classroom-based interventions that have shown to increase proximal and distal outcomes in students could be subscribing to the process in the transactional model. Thus, by increasing teachers’ sense of efficacy through skillset acquisition, positive interactions with students, especially difficult students, can be dramatically increased (Fruth, 2014). One such intervention is the PAX Good Behavior Game (PAX GBG). PAX GBG is a prevention intervention delivered universally to children by teachers in the classroom (Embry, 2002; Fruth & Huber, 2015).

PAX GBG is made up of a series of evidence-based, trauma-informed behavioral strategies that provide the classroom teacher with a foundation of sound, effective classroom management techniques that make the classroom a more nurturing environment for students and consequently teachers (Fruth & Huber, 2015). These techniques help teachers to reduce toxic influences, limit problematic behavior, reinforce pro-social behavior, and increase psychological flexibility in students (Biglan, et. al., 2012; Embry, et al., 2010; Fruth & Huber, 2015). In creating this nurturing environment, teachers not only create a safer, healthier classroom for learning, but also teach self-regulation skills in students that have shown to prevent many mental, emotional, and behavioral disorders as shown in the 2009 Institute of Medicine Report (IOM, 2009) and the Substance Abuse and Mental Health Services Administration (SAMSHA) National Registry of Evidence-based Programs and Practices (NREPP, 2014).

The numerous strategies within PAX GBG allow teachers to convey clear, concise expectations to avoid student confusion as well as setting boundaries (Abramowitz, Cote, & Berry, 1987, Embry, 2004). The intervention also utilizes soft team competition among students to both set and adhere to community standards of behavior. The students are divided into teams and carry out normal classroom processes while the teacher both teaches and assists in monitoring behavior in regards to the “rules” the students have helped establish. Throughout the activity and the predetermined length of time the game is played, the students pay specific attention to the vision and behavioral expectations that they created in partnership with the teacher before the game started. The teacher records violations and disruptions as well as the compliant or wanted behavior (Fruth & Huber, 2015). At the conclusion of the game, teams who have met the behavioral expectations take part in group reinforcement while groups who earned too many behavioral infractions sit out (Embry, et al., 2010). PAX GBG has demonstrated remarkable student outcomes that may in part be due to bolstering teacher skillsets and self-efficacy.

By adding to the teacher's repertoire, he or she can prevent and handle more classroom situations involving behavior and relationships that eventually promote increased positive interactions – even with “negative” students. For more detailed information about PAX GBG, see Fruth & Huber (2015), Embry (2002, 2004), Aos et al. (2011), Domitrovich (2015) and Abramowitz, Cote, and Berry (1987).

### **Hypothesis**

It is well documented that an increased number of teachers are leaving their careers early (Brill & McCartney, 2008; Phillips, 2015). Since TSE is related to teacher retention and student outcomes, it is critical to identify professional development strategies that directly increase self-efficacy (Goldstein, 2015; Yost, 2006). This study investigated the hypothesis that practicing teacher's TSE is malleable and can be increased by PAX GBG training.

### **Methods**

#### **Participants**

The 32 participants in this study were elementary teachers employed in two Midwestern school districts from the same region of the same state. Teachers attended PAX GBG training in the form of a free after school professional development opportunity provided in three sequential 2-hour sessions over the course of two weeks. Of the 32 original participants, 26 completed all six hours of the training in sequence, while six participants missed one or more of the three sessions and their results were not included in the final analysis (N=26).

#### **Design**

This study used a quasi-experimental one-group pretest-posttest design. This process involved selecting a group of teachers to receive PAX training, administering a pretest, providing the training, and administering a posttest. This design is valuable in instances where establishing a control or “business-as-usual” group is inappropriate such as in this instance of voluntary after school professional development. Stronger causal inferences can be derived from this model when effects other than those attributed to the intervention can be limited. This design sought to limit outside effects by conducting the entire treatment in the relatively short time period of two weeks.

#### **Materials and Procedures**

Each participant received an informational textbook and classroom application materials free of charge as well as the three days of after school training. The PAX training was delivered by one of seven national trainers accredited by the PAXIS Institute to train classroom teachers, administrators, counselors, and related community stakeholders. The training was conducted after school in three 2-hour blocks over the course of two weeks totaling the six full hours required in the model. The participants completed the Teachers' Sense of Efficacy Scale (TSES) as a pretest before training began and at the conclusion of the training.

#### **Measures**

The TSES is a 24-item Likert-style questionnaire that measures the sense of efficacy that the teacher has in the areas of student engagement, instructional strategies, classroom management, and overall efficacy as an educator (Tschannen-Moran & Hoy, 2001). The questionnaire directs participants to, “Please respond to each of the questions by considering the combination of your current ability, resources, and opportunity to do each of the following in your present position.” The 24 items include questions such as, “How much can you do to respond to defiant students?” The questionnaire then uses a 9-point scale for participants to select an answer ranging from 1-Nothing, 3-Very Little, 5-Some Influence, 7-Quite A Bit, and 9-A Great Deal. TSES has demonstrated reliability of .93 for total efficacy and .84-.88 for the subscales of student engagement, instructional strategies, and classroom management (Tschannen-Moran & Hoy, 2007). To address each of the subscales, participants are queried about their abilities to make expectations clear, foster student creativity, get children to follow rules and more.

#### **Results**

Paired *t*-tests were applied to the outcomes to determine a change in the participants' total sense of efficacy as well as efficacy in student engagement, instructional strategies, and classroom management according to the TSES. For analysis, participants' Likert scores on the TSES were added to achieve totals for the entire questionnaire and each subscale. Pretest and posttest scores were then compared to detect a change in sense of efficacy for the participants due to PAX GBG training.

The total mean scores, total subscale mean scores, and standard deviations are shown in Table 1. Paired *t*-tests indicated that participants reported statistically significantly higher total sense of efficacy (161.3 vs. 178.7) and higher sense of efficacy in student engagement (52.7 vs. 58.5) after PAX training. Participants reported higher sense of efficacy in instructional strategies (54.7 vs. 55.4) and classroom management (54.3 vs. 56.3), but these comparisons were not significant.

**Table 1: Means and standard deviations for TSE S**

| Variables                | Pretest Score (N=26) |      | Posttest Score (N=26) |      |
|--------------------------|----------------------|------|-----------------------|------|
|                          | Mean score           | SD   | Mean score            | SD   |
| Total score              | 161.3                | 20.6 | 178.7**               | 23.3 |
| Student engagement       | 52.7                 | 7.0  | 58.5**                | 8.3  |
| Instructional strategies | 54.7                 | 7.2  | 55.4                  | 17.4 |
| Classroom management     | 54.3                 | 7.9  | 56.3                  | 17.7 |

Note: The higher the score, the greater the sense of efficacy. \*\* $p < .001$ .

## Discussion

Retaining teachers who have been trained and developed is an important goal for administrators in all schools. The importance of this goal is highlighted by the recent rise in teachers leaving the profession in the first three years of their careers (Brill & McCartney, 2008; Goldstein, 2015; Phillips, 2015). Given the substantial evidence that self-efficacy is related to job stress, job burnout, teacher performance and teacher retention (Caprara, et al., 2006; Klassen & Chiu, 2010; Schwarzer & Hallum, 2008), it is imperative to identify strategies that can increase TSE. Professional development, particularly in the beginning years of a teacher's career, can be an avenue that addresses this issue. Indeed, this study found that practicing teacher's self-efficacy is malleable and can increase after receiving a professional development training in prevention (Van Dinther, et. al., 2013).

## Short-term and Long-term Student Outcomes

Training in PAX GBG has demonstrated an effect on numerous student proximal and distal outcomes when implemented as a classroom-based preventive intervention (Embry, et al., 2010; Ialongo, et al., 1999; Wilson, et al., 2014; Ialongo, Poduska, Werthamer, & Kellam, 2001; Kellam, Rebok, Mayer, Ialongo, & Kalodner, 1994; Kellam et. al., 2011). These proximal outcomes for students include an increase in students' academic scores, a decrease in teacher/student interactions involving problematic behavior, and a drop of 75-85% in disruptive behaviors (Embry, et al., 2010; Ialongo et al., 1999; Wilson, Hayes, Biglan, & Embry, 2014). Distal outcomes include decreased alcohol, tobacco, and illegal drug use, risky sexual behavior, as well as decreased suicide ideation (Ialongo, et al., 2001; Kellam, Rebok, Mayer, Ialongo, & Kalodner, 1994; Kellam et. al., 2011). Although this study is not longitudinal in nature, the belief is that student proximal and distal outcomes will improve if TSE is increased.

The multiple randomized control trials carried out by Johns Hopkins University have tracked multiple cohorts of students who received PAX GBG versus the control over the course of 14 years to detect differences in adult or longitudinal outcomes. The significant outcomes include 68% fewer men using tobacco products, 35% fewer students developing alcohol addictions, 32% fewer men involved in criminal behavior, 50% fewer men dependent on illicit drugs, 40% fewer men requiring public service use for the treatment of mental, emotional, or behavioral disorders, 50% fewer suicidal thoughts in women and significant increases in graduation rates and college entrance in both men and women (Ialongo, et. al., 2001; Kellam et al., 2011, Kellam et al., 2014).

A transactional approach goes a long way in explaining the tremendous longitudinal impacts seen in the original PAX GBG efficacy trials. With increased skillsets and self-efficacy, the teacher is more likely to become or remain a teacher in one of the "positive" teacher quadrants. This decreases the chances for negative student interactions or cycles of coercion. When exposed to these new teacher skillsets, students have a better chance of becoming "positive" students. This increases their chances for positive interactions as well. Further, as the lasting results of the intervention have shown, these positive interactions serve as protective factors far beyond the classroom and into the student's future and throughout adulthood.

These also include the tremendous return on investment to taxpayers as calculated by the Washington State Institute for Public Policy in 2011 in which numerous evidence-based programs and interventions were evaluated to determine effectiveness and efficiency.

Based on the longitudinal evidence from the original efficacy trials that tracked the students' futures from GBG classrooms, as compared to control classrooms, a teacher trained in PAX GBG could seriously impact society by merely replicating these early results. Merely replicating those efficacy results would mean that a pre-service teacher trained in PAX GBG who teaches a classroom of 25 students each year for 30 years should see 109 additional students graduate from high school, 102 additional students enter the university, 72 fewer students develop serious drug addictions and 7 fewer students convicted of violent crimes. Using the Washington State Institute for Public Policy report predicts that teacher will also save families, schools, and local, state, and the federal government a total of \$3,577,000 over his or her career compared to a teacher who did not have PAX GBG training. The logic behind the transactional approach explains the dramatic impact that PAX GBG has on teachers and students (Domitrovich et al., 2015; Embry, et al., 2010; Kellam, et al., 2014).

### Limitations

There are a few notable limitations in this study including the lack of a comparison group, a small sample, and lack of data on the years of teaching among the participants. Without a comparison group, it is difficult to generalize the results as well as control for confounding variables (Fruth & Huber, 2015). The sample was small because there was a limited number of teachers available to participate in the after school training. Despite a small sample, the differences are quite notable between student engagement and the overall self-efficacy. Finally, the premise in this study was that it is critical to provide professional development training to teachers early in their career to boost their self-efficacy. Unfortunately, this study did not have data on how many years the participating teachers taught. However, the study was able to demonstrate the malleability of self-efficacy regardless of years teaching. It is important for future studies in this area to collect data on the number of years teaching so that further investigation on teacher retention can be established.

### Future Research

Future research should include tracking the variables that TSE has historically predicted such as teacher performance, teacher retention, teacher satisfaction, and student performance with the pre-service teachers trained in PAX GBG. Additionally, the proximal and longitudinal outcomes for children impacted by these future teachers trained in PAX GBG should be compared to the projections from the original efficacy trials (Kellam et al., 2011) and the Washington State Institute for Public Policy report (Aos et al, 2011).

Understanding and implementing Sameroff's transactional framework can aid in the development of effective interventions and teacher training programs and provide a better understanding of the reciprocal nature between teacher and student interactions during the implementation of classroom-based interventions such as PAX GBG. This model has been demonstrated successfully in other arenas including childhood depression, pain management, stress and coping with critically ill patients, and sexual risk behavior in adolescence (Byers & Smyth, 1997; Cicchetti & Schneider-Rosen, 1984; Henrich, Brookmeyer, Shrier, & Shahar, 2005; Turk & Gatchel, 2002). As discussed, teachers' behavior not only influences, but is also influenced by student behavior in an ongoing dynamic exchange. Evidence suggests that behavior patterns associated with TSE may carry forward into future interactions with others and the students they teach. A better understanding of the transactional processes in classrooms for students transcends typical unidirectional models of teaching and learning and has important implications for research, training, and practice. However, if research continues to be restricted to individual student measures alone, at one point in time, the processes involved in this ongoing reciprocal interchange are missed.

A linear research approach limits the conclusions, which may be inaccurate or incomplete. Ineffective practices might be recommended because other factors that contribute to a significant effect have not been measured (Sutherland & Oswald, 2005).

### References

- Aos, S., Lee, S., Drake, E., Pennucci, A., Klima, T., Miller, M., & Burley, M. (2011).  
Return on investment: Evidence-based options to improve statewide outcomes. *Olympia: Washington State Institute for Public Policy.*

- Bandura, A. (2001). Social Cognitive Theory: An Agentic Perspective. *Annual Review of Psychology*, 52, 1-26.
- Biglan, A., Flay, B. R., Embry, D. D., & Sandler, I. N. (2012). The critical role of nurturing environments for promoting human well-being. *American Psychologist*, 67(4), 257.
- Boyd, D., Grossman, P., Lankford, H., Loeb, S., & Wyckoff (2008). Who leaves? Teacher attrition and student achievement. *NBER Working Paper Series, No. 14022* <http://www.nber.org/papers/w14022>
- Brill, S., & McCartney, A. (2008). Stopping the revolving door: Increasing teacher retention. *Politics and Policy*, 36(5), 750-774.
- Byers, J. F., & Smyth, K. A. (1997). Application of a transactional model of stress and coping with critically ill patients. *Dimensions of Critical Care Nursing*, 16(6), 292-300.
- Caprara, G. V., Barbaranelli, C., Steca, P., & Malone, P. S. (2006). Teachers' self-efficacy beliefs as determinants of job satisfaction and students' academic achievement: A study at the school level. *Journal of School Psychology*, 44(6), 473-490.
- Cicchetti, D., Schneider-Rosen, K. (1984). Toward a transactional model of childhood depression. *New Directions for Child and Adolescent Development*, 1984(26), 5-27.
- Dolan, L. J., Kellam, S. G., Brown, C. H., Werthamer-Larsson, L., Rebok, G. W., Mayer, L. S., & Wheeler, L. (1993). The short-term impact of two classroom-based preventive interventions on aggressive and shy behaviors and poor achievement. *Journal of Applied Developmental Psychology*, 14(3), 317-345.
- Domitrovich, C. E., Pas, E. T., Bradshaw, C. P., Becker, K. D., Keperling, J. P., Embry, D. D., & Ialongo, N. (2015). Individual and school organizational factors that influence implementation of the PAX Good Behavior Game intervention. *Prevention Science*. DOI: 10.1007/s11121-015-0557-8.
- Embry, D.D. (2002). The Good Behavior Game: A best practice candidate as a universal behavioral vaccine. *Clinical Child and Family Psychology Review*, 5, 273-297.
- Embry, D. D. (2004). Community-based prevention using simple, low-cost, evidence-based kernels and behavior vaccines. *Journal of Community Psychology*, 32(5), 575-591.
- Embry, D. D., Richardson, C., Schaffer, K., Rosen, A., Darney, D., Kelly, B., et al. (2010). *PAX Good Behavior Game* (3rd ed.). Tucson, AZ: PAXIS Institute.
- Fruth, J. (2014). Impact of a universal prevention strategy on reading and behavioral outcomes. *Reading Improvement*, 51(3), 281-290.
- Fruth, J., & Huber, M. J. (2015). Teaching prevention: The impact of a universal preventive intervention on teacher candidates. *Journal of Education and Human Development*, 4(1), 245-254.
- Fruth, J.D., Mayer, G.H., & Finnegan, E.M. (2015). Creating nurturing environments and engaging populations with evidence-based kernels, *Journal of Instructional Psychology*.
- Goldstein, D. G. (2015). The teacher wars. *Anchor; Reprint Edition*, 220.
- Henrich, C. C., Brookmeyer, K. A., Shrier, L. A., & Shahar, G. (2005). Supportive relationships and sexual risk behavior in adolescence: An ecological-transactional approach. *Journal of Pediatric Psychology*, 31(3), 286-297.
- Ialongo, N. S., Werthamer, L., Kellam, S. G., Brown, C. H., Wang, S., & Lin, Y. (1999). Proximal impact of two first-grade preventive interventions on the early risk behaviors for later substance abuse, depression, and antisocial behavior. *American Journal of Community Psychology*, 27(5), 599-641.
- Ialongo, N., Poduska, J., Werthamer, L., & Kellam, S. (2001). The distal impact of two first-grade preventive interventions on conduct problems and disorder in early adolescence. *Journal of Emotional & Behavioral Disorders*, 9(3), 146.
- Institute of Medicine. (2009). *Preventing mental, emotional, and behavioral disorders among young people: Progress and possibilities*. National Academy of Sciences; Board on Children, Youth and Families, Washington, DC.
- Kellam, S.G., Mackenzie, A.C., Brown, C.H., Poduska, J.M., Wang, W., Petras, H., & Wilcox, H.C. (2011). The good behavior game and the future of prevention and treatment. *Addiction Science & Clinical Practice*, 6(1), 73.
- Kellam, S. G., Rebok, G. W., Mayer, L. S., Ialongo, N., & Kalodner, C. R. (1994). Depressive symptoms over first grade and their response to a developmental epidemiologically based preventive trial aimed at improving achievement. *Development and Psychopathology*, 6(3), 463-481.



- Kellam, S. G., Wang, W., Mackenzie, A. C., Brown, C. H., Ompad, D. C., Or, F., et al. (2014). The impact of the Good Behavior Game, a universal classroom-based preventive intervention in first and second grades, on high-risk sexual behaviors and drug abuse and dependence disorders into young adulthood. *Prevention Science, 15*(1), 6-18.
- Klassen, R. M., & Chiu, M. M. (2010). Effects on teachers' self-efficacy and job satisfaction: Teacher gender, years of experience, and job stress. *Journal of Educational Psychology, 102*(3), 741-756.
- Mongeau, L. (2015). Teachers wanted: Passion a must, patience required, pay negligible. *The Atlantic*. Retrieved from: <http://www.theatlantic.com/education/archive/2015/09/teachers-wanted-passion-a-must-patience-required-pay->
- Murphy, K.A., Theodore, L. A., Aloiso, D., Alric-Edwards, J.M. & Hughes, T. L. (2007). Interdependent group contingency and mystery motivators to reduce preschool disruptive behavior. *Psychology in the Schools, 44*(1), 53-63.
- Rogers, J.M. (1997). Class participation: Random calling and anonymous grading. *Journal of Legal Education, 47*, 73-82.
- Ronfelt, M., Lankford, H., Loeb, S., & Wyckoff, J. (2011). How teacher turnover harms student achievement. *NBER Working Paper Series, No. 17176*
- Ross, J., & Bruce, C. (2007). Professional development effects on teacher efficacy: Results of randomized field trial. *Journal of Educational Research, 101*(1), 50-60.
- Patterson, G. R., Reid, J. B., & Dishion, T. J. (1992). *Antisocial boys: Vol. 4. A social interactional approach*. Eugene, OR: Castalia.
- Phillips, O. (2015). Revolving door of teachers costs schools billions every year. <http://www.npr.org/sections/ed/2015/03/30/395322012/the-hidden-costs-of-teacher-turnover>
- Sameroff, A. J. (1983). Developmental systems: Contexts and evolution. In P. H. Mussen (Gen. Ed.) & W. Kessen (Vol. Ed.), *Handbook of Child Psychology: Vol 1. History, Theory, and Methods* (4th ed., pp. 237-294). New York: Wiley.
- Sameroff, A. J. (1995). General systems theory and developmental psychopathology. In D. Cicchetti & D. J. Cohen (Eds.), *Developmental psychopathology: Vol. 1. Theory and Methods* (pp. 659-695). New York: Wiley and Sons.
- Sameroff, A. J. (2000). Developmental systems and psychopathology. *Development and Psychopathology, 12*, 297-312.
- SAMHSA'S National Registry of Evidence-based Programs and Practices. (2015).
- Schwarzer, R., & Hallum, S. (2008). Perceived teacher self-efficacy as a predictor of job stress and burnout: Mediation analyses. *Applied Psychology, 57*(S1), 152-171.
- Skiba, R. J., & Losen, D. J. (2015). From reaction to prevention: Turning the page on school discipline. *American Educator, 39*(4), 4-12.
- Skinner, E. A., & Belmont, M. J. (1993). Motivation in the classroom: Reciprocal effects of teacher behavior and student engagement across the school year. *Journal of Educational Psychology, 85*(4), 571-581.
- Sutherland, K. S., & Oswald, D. P. (2005). The relationship between teacher and student behavior in classrooms for students with emotional and behavioral disorders: Transactional processes. *Journal of Child and Family Studies, 14*(1), 1-14.
- Tschannen-Moran, M., & Hoy, A. W. (2001). Teacher efficacy: Capturing an elusive construct. *Teaching and Teacher Education, 17*(7), 783-805.
- Tschannen-Moran, M., & Hoy, A. W. (2007). The differential antecedents of self-efficacy beliefs of novice and experienced teachers. *Teaching and Teacher Education, 23*(6), 944-956.
- Turk, D. C. & Gatchel, R. J. (2002). Psychological approaches to pain management. A practitioner's handbook. *The Guilford Press, New York*, 256-276. Chapter 12: Treating families of chronic pain patients: Application of a cognitive-behavioral transactional model.
- Van Dinther, M., Dochy, F., Segers, M., & Braeken, J. (2013). The construct validity and predictive validity of a self-efficacy measure for student teachers in competence-based education. *Studies in Educational Evaluation, 39*(3), 169-179.
- Watson, G. (2006). Technology professional development: Long-term effects on teacher self-efficacy. *Journal of Technology and Teacher Education, 14*(1), 151-166.
- Wilson, D., Hayes, S., Biglan, A., & Embry, D. (2014). Evolving the future: toward a science of intentional change. *Brain and Behavioral Sciences, 37*(4), 395-416.
- Wurtele, S.K., & Drabman, R.S. (1984). "Beat the buzzer" for classroom dawdling: A one-year trial. *Behavior Therapy, 15*(4), 403-409.