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Examining the Relationships Among Motivational Factors and the Academic Achievement of Students Enrolled in a Comprehensive Agricultural Education Program

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Abstract

The purpose of the study was to examine the input factors and outcomes within the student motivational profile (SMP) that may affect the self-determination of students who elected to enroll in an agricultural education career academy was conducted. This study introduces the *organismic socio-behavioral perspective* (OSBP), which was developed to inform educational interventions on student motivation and engagement from a more holistic perspective. Among the 114 urban high school student respondents, those who reported having a choice in the decision to enroll in the comprehensive agriculture program were more likely to have self-determined types of academic motivation, academic satisfaction, and higher levels of perceived effort. Limitations within the SMP to measure moderate to strong associations with academic achievement were identified and recommendations on how to address these limitations were discussed. The study is intended to introduce a line of inquiry toward developing an inventory that identifies measurable factors that impact student engagement and achievement.

Keywords: student motivation, academic achievement, agriculture career academy, self-determination, autonomy support.

Introduction

Student motivation and the social factors that affect it are very significant psychological concepts in education (Gillet, Vallerand, & Lafrenière, 2012). Over the past 15 years, student engagement and motivation towards learning has been related to positive adaption in academic environments, including increased levels of student academic success in the short term and patterns of attendance and academic resilience in the long term (Fredricks, Blumenfield, Friedel, & Paris, 2004; Lee, 2014; Martin, 2008; Ungar, Russell, & Connelly, 2014). Student engagement in the classroom is multifaceted, reflecting a nexus of behavioral, emotional and cognitive participation that hinges upon the student-teacher relationship (Whitford, Liaupsin, Umbreit, & Ferro, 2013). Studies have shown that emotions have a strong influence on motivation and self-regulated learning, which in turn have predictive impact on behaviors that lead to the promotion and sustainability of academic achievement (Mega, Ronconi, & De Beni, 2014; Lee, 2014). However, maintaining students' interest in school and motivating them to succeed can be challenging for even the most experienced teachers.

A study on the factors that support and motivate high school students to learn and achieve in STEM-related subjects concluded that when students are satisfied with the academic environment, they will be more autonomously motivated to persist and exert effort in their studies, ultimately resulting in increased academic achievement (Leon, Nunez, & Liew, 2015). In this article, the lack of interest in and satisfaction with school is regarded synonymously with lack of motivation and engagement in the classroom.

Interests, which in this context are defined as students' focus on or attention to certain events and activities, are another variable that affects motivation. Further, students' interest relates to the cognitive and affective factors, as well as, method/processes employed that guide the student's attention, which develops through experience (Renninger & Hidi, 2011). It has been observed that student engagement in schoolwork, homework and school-related activities drops periodically as students get older, starting around middle school (Renninger & Hidi, 2011). Within this age group, conformity to peers also influences internalizing behaviors such as aggression and depression in negatively-valenced domains and academic achievement and motivation in positively-valenced domains (Masland & Lease, 2013, p. 662). Bullying is an example of negatively-valenced behaviors that serve to create strong in-group/out-group dynamics and ostracize certain individuals to the point that it can foster depression and have detrimental effects on academic achievement. Conversely, gestures such as a teacher's smile of acknowledgement and recognition of a student outside of the classroom reflect positively-valenced behaviors and can translate into a sense of acceptance and empowerment within the school setting, ultimately enhancing academic achievement (Leon, Nunez, & Liew, 2015).

Studies have demonstrated that the motivation level of peers towards academics and engagement is influential and persistent when viewed through the lens of selection and socialization effects (Masland & Lease, 2013). Furthermore, there are important individual differences among learners both in motivation to perform academic tasks and preferences about when, where, how, and with whom they prefer to perform (Hardre & Sullivan, 2008; Kiuru et al., 2014). Williams and Williams (2011) assert that classroom motivation is made manifest as "a function of five components: student, teacher, content, method/process, and environment", any of which can enable or hinder students' motivation (p. 18). Personal factors attributing to motivation include a student's aptitude, self-efficacy, autonomy through self-regulatory processes, and other abilities (Caprara et al., 2008; Zimmerman, 2008). One's views about his or her competence with different content are considerable predictors of potential academic achievement when accounting for intelligence and IQ (Ackerman, Chamorro-Premuzic, & Furnham, 2011). Nevertheless, the question remains, what can educators do to engage at-risk students or students who lack motivation to persist in educational endeavors?

A number of studies have shown that an individual's learning techniques and the conditions under which academic tasks are done increase compliance with these tasks and raise academic progress (Cerasoli, Nicklin, & Ford, 2014; Hardré & Sullivan, 2008). Additionally, motivation within the context of a student's environment is affected by the influence of teachers, parents, siblings, classmates, friends, and the existence of other activities that compete for the attention and time of the student (Reyes, Brackett, Rivers, White, & Salovey, 2012). Loera, Nakamoto, Oh, and Rueda (2013) denote that career academies and key factors of career and technical education (CTE) courses such as smaller classroom sizes, personalized content, and

increased academic autonomy has helped to strengthen the relationships between student academic engagement and school satisfaction.

CTE programming options have been associated with creating substantive school engagement because they, when implemented correctly, provide students with an authentic learning experience where: 1) learner-centered instructional strategies empower students to select relevant projects that are extensions of their world; 2) a community of learners who engage in discourse and social learning is established; 3) learners engage in activities that mimic real world situations and the work of professionals in the field; and 4) critical thinking, problem solving skills, and metacognition are addressed (Rule, 2006). These authentic learning components in turn increase the probability that the learners will persist and complete high school as well as the likelihood that they will matriculate at a post-secondary institution (Plank, DeLuca, & Estacion, 2008).

Assuming that exerting high-effort on academic tasks related to an elective program such as CTE is an indicator of positive academic engagement, exploration into the motivational factors influencing students' academic effort and persistence in the program may provide salient information on the role of CTE in student motivation, resiliency, and academic achievement in urban settings. Toward this line of inquiry, a conceptual model, the *organismic socio-behavioral perspective* (OSBP), was developed based on an extensive review of motivation literature to explain the triadic reciprocal relationships between personal factors (*expressed identity*), behavioral factors (*observed behavior*), and environmental factors (*environmental feedback*), particularly when engagement is desired in an activity that is counter to the individual's typical behavior.

This study contributes to this line of inquiry by exploring the magnitude of association among input factors and outcomes that measure expressed identity (EI), observed behavior (OB), and environmental feedback (EF). Through this line of inquiry, we hope to begin to identify factors that adequately measure EI, OB, and EF by way of a *Student Motivational Profile* instrument. Once properly identified and validated, educators can use the instrument to assess students' motivational resiliency and target the root cause of maladaptive behaviors through affirming interventions. A career academy was the focus of this study because it provided an educational environment where students are (a) electing to study the curriculum, (b) dedicating more time to personalized, cross-curricular experiential learning, and (c) interacting with teachers and peers with like interests, thus increasing the potential for autonomy, relatedness, and competency. The following research objectives guided this study:

1. Describe participants by student motivational profile (i.e., gender, type of motivation, autonomy support, academic satisfaction, perceived effort on CTE academic tasks, and academic achievement);
2. Determine the relationships between the input factors (i.e., gender, perceived effort, and autonomy support) and outcomes (i.e., type of motivation, academic satisfaction, and academic achievement) of the student motivational profile; and
3. Determine the relationships among the outcomes of the student motivational profile (i.e., type of motivation, academic satisfaction, and academic achievement).

Background Literature and Conceptual Framework

Student Motivation

Dewey (1938) highlighted two strong and opposing viewpoints about what motivates a learner and how to structure education in accord with each viewpoint. First, there is the theory that motivation for learning comes from outside the learner. In other words, the learner must receive structures, rewards, and incentives in order to be successful in school. This viewpoint emphasizes the teacher providing extrinsic controls in order to motivate students. The second theory assumes that motivation is already present and can be catalyzed in the academic setting. From this point of view, the teachers and parents accomplish student motivation by providing encouragement and nurturing the students' educational interests. More specifically, teachers aid in the process of students accomplishing outcomes by communicating clear expectations and values (Williams & Williams, 2011) and parents reinforce the message at home. This motivational support can take the form of information and advice, modeled behavior, or specific experiences that facilitate learning.

Since its inception, motivation has been studied from several perspectives (Cerasoli et al., 2014; Evelein, Korthagen, & Brekelmans, 2008). The most widely used perspective on the regulatory processes suggests that behavior can be seen as intrinsically and extrinsically motivated (Cerasoli et al., 2014; Deci & Ryan, 2012). Intrinsic motivation refers to behaviors that an individual engages in for one's own pleasure (Deci & Ryan, 2012). The individual voluntarily performs an act in the absence of material rewards or constraints. The literature supports the assertion that positive feedback facilitates intrinsic satisfaction (Mouratidis, Vansteenkiste, Lens, & Sideridis, 2008). Additionally, students' intrinsic motivation for participation in afterschool activities supports subjective well-being, which is a critical element for a student's progressive school functioning (Beiswenger & Grolnick, 2010).

Conversely, extrinsically motivated behaviors are those that an individual engages in because the behaviors are a means to an end and are directed by the possibility of instrumental gain or loss (Cerasoli et al., 2014). Originally, it was believed that extrinsic motivation referred to behaviors an individual engaged in due to a lack of self-determination and therefore could only be prompted by external events (Vallerand, 2012). However, researchers have proposed that different types of extrinsic motivation exist (Ryan & Deci, 2009; Vallerand, 2012). In their self-determination theory (SDT), Deci and Ryan (1985) introduced a subtheory, the organismic integration theory (OIT), to expand on the regulatory styles that contribute to self-determined behaviors (see Figure 1).

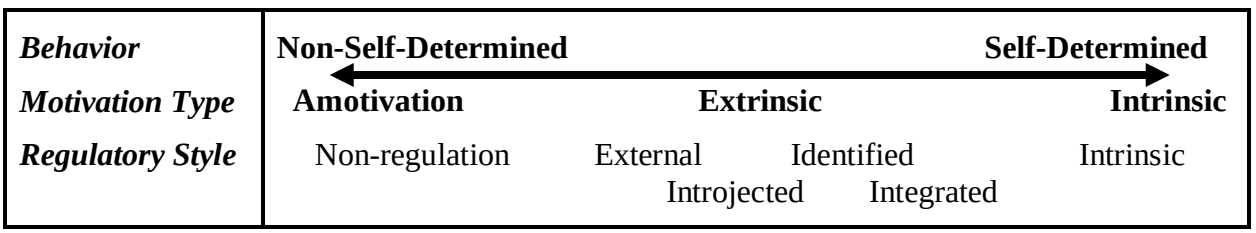

Figure 1. Self-determination Continuum Showing Types of Motivation with their Regulatory Style. Based on the continuum presented by Deci & Ryan (2000).

SDT assumes that humans are dynamic organisms who are innately inclined toward a unified sense of self and integration of that self-image into large social structures (Anderson, 2013; Fukuda, Toshihisa, Sakata, & Takeuchi, 2011; Ryan & Deci, 2009). Simply stated, humans are motivated by a desire to satisfy the need for *autonomy*, *competence*, and *relatedness* (Anderson, 2013; Gasim, Stevens, & Zebidi, 2012).

Regulatory Style Relevance and Regulatory Process

Accordingly, OIT details the different forms of extrinsic motivation and the contextual factors that either promote or hinder internalization and integration (Deci & Ryan, 2012). The four types of extrinsic motivation are (a) external, (b) introjected, (c) identified, and (d) integrated regulation (Deci & Ryan, 2012). External regulation occurs when the behavior is regulated with outside inducements, typically with rewards or constraints such as receiving good grades or being barred from participating in a desired activity. Introjected regulation occurs when behavior is internally regulated and the individual is self-imposing rewards or constraints. For example, a student might volunteer to answer a question because she is uncomfortable with the silence of no one else answering. Identified regulation occurs when a behavior is valued by the individual and is perceived as self-chosen. A student acting on identified regulation may take honors classes in an effort to boost his grade point average. Finally, integrated regulation occurs when the behavior is performed because it fits within the individual's self-concept. For example, a student studies for every exam instead of participating in leisure activities because she values her education and has integrated the behaviors needed to be successful in school into other facets of her life. In application, integrated regulation is often indistinguishable from intrinsic motivation and is often not measured, which was the case in this study. In addition, a third construct, *amotivation*, was suggested by Deci and Ryan (1985) in order to fully understand all facets of human behavior. Amotivation occurs when an individual perceives a lack of contingency between their behavior and outcomes, eventually ceasing participation. Amotivation occurs because the individual cannot identify a sense of purpose and has no expectation for reward or control over changing the course of events. It is akin to learned helplessness since the individual experiences feelings of incompetence, uncontrollability and boredom (Sun & Chen, 2010; Tiwari, Tiwari, & Sharma, 2014).

Although some believe it is possible that a student's extrinsic and intrinsic motivations are totally separate and have no effect on each other (Emmett & McGee, 2013), others look at motivation as a complex system with intrinsic and extrinsic motives working simultaneously (Cerasoli et al., 2014; Lemos & Veríssimo, 2014) and amotivation playing the antagonist that is strongly associated with maladaptive functioning (Cheon & Reeve, 2015). To this end, there has been a substantial amount of research done in the last decade on the differences among the types of motivation (Reiss, 2012) in order to get a better understanding of how motivation impacts task compliance and academic achievement. It is believed that individuals become more self-determined, as demonstrated by increased internal regulation and persistent behaviors, when they perceive a course of action will satisfy the three psychological needs of autonomy, relatedness, and competence (Ryan & Deci, 2009). From this observation, one can deduce that the presence of the basic psychological needs will produce self-determined types of motivation like intrinsic motivation and identified regulation. These self-determined types of motivation will lead to positive outcomes due the internal nature of the types. Furthermore, one can also deduce that

non-self-determined types of motivation like amotivation, external and introjected regulations may be more inclined to lead to negative outcomes, especially when the external motive is no longer present or valued (Deci & Ryan, 2012).

The aforementioned understanding of student motivation implies that the current US educational structure, which is highly prescriptive, may not be conducive for learning and the academic achievement of all students. Most students are assigned to a specific school based on residence and taught a prescribed curriculum based on efficiencies and not individual needs and performance outcomes. This format may be perceived by students as controlling and therefore students may display less self-determined forms of regulation leading to disengagement from school and academic activities (Niemiec & Ryan, 2009). Also, based on the concept that autonomy support yields positively-valenced self-determined behaviors, the need for supportive teaching practices is projected to have a significant effect on student motivation, academic task compliance, and sustained engagement (Kiuru et al., 2014; Opdenakker & Maulana, 2012; Wentzel, Battle, Russell, & Looney, 2010).

Research shows that high achievement was observed amongst students with the greatest autonomous motivation related to prime performance (Corpus, McClintic-Gilbert & Hayenga, 2009). Therefore, it is proposed that allowing students to have more decision-making power in academic decisions will create a sense of autonomy leading to increased satisfaction, academic effort, substantive engagement, and higher levels of academic success.

Conceptual Framework

The conceptual framework borrows from Bandura's (1986) *social cognitive theory* (SCT). The *organismic socio-behavioral perspective* (OSBP) was developed to inform educational interventions on student motivation and engagement from a more holistic perspective, particularly in underrepresented populations or when engagement is desired in an activity that is uncharacteristic for the individual. This perspective is based on the family of holistic psychological theories that stress the unity and integration of identity into various social systems as an expression of one's inherent need for growth and development. OSBP is similar to SCT, which postulates that motivational processes influence both learning and performance of cognitive skills, prosocial skills, motor skills, strategies, and behaviors through a cyclical self-regulatory process (Anderson, 2013; Deci & Ryan, 2000; Pintrich & Schunk, 2002). Within this process, students analyze how the task relates to their *self-image*, decide on a path of action, and reflect on the internal and external factors that influence the outcome with each learning task (Zimmerman, 2013).

Bandura (1986) used *self-efficacy*, which is similarly to Deci and Ryan's construct of competence, as a key variable in the motivational process; however, some believe that self-efficacy does not consider the complexity of motivation (Deci & Ryan, 2000). Studies within the field of achievement motivation have delved deeper into and demonstrated the importance of autonomy and relatedness in motivation. In studying ethnically diverse high school students, Kim (2015) found that students who were given the autonomy to understand the value-base of their academic task were motivated to develop their competence through learning. Conversely, those who were not given such autonomy focused less on learning for competence sake, but

instead were driven by the need to appear competent and/or not appear incompetent. Similarly, relatedness, which is mediated by identity, was shown to impact emotionality and engagement. More specifically, Neville and Reicher (2011) noted a strong correlation between relatedness and both social and shared identity; however, they found a significantly stronger connection for shared identity. In other words, considering the dynamics of group relations, the idea of 'we belong' supersedes 'I belong' in validating the interactions between behaviors and the social environment.

Therefore, OSBP uses *self-determination* as the self-regulatory process to support the assertion that students participate in academic tasks based on their desire to fulfill the three psychological needs of autonomy, competence, and relatedness. According to OSBP, students' interests, engagement, and volition to learn are induced by the internalization of personal factors, as a function of identity, with environmental factors. More specifically, expressed identity (EI) is cognitive functioning that include attitudes, beliefs, knowledge, preferences, and aptitude that one chooses to express. It is informed by many factors such as education, past experiences, ability, power, gender, socioeconomic status, religion, nationality, and culture. Observed behavior (OB) is an individual's action to fulfill a specified purpose. It is an intentional behavior that impacts the expressed identity and the perceptions of the environment; therefore, it must be seen and acknowledged. Finally, environmental feedback (EF) is the response(s) that the environment provides to an individual based on perceptions about expressed identity and observed behavior. Because it is a perception, the feedback may not be congruent with what the recipient of the feedback perceives about self and/or behavior(s).

Figure 2 demonstrates how regulation occurs through a triadic reciprocal process where the perceived value placed on one's expressed identity through *introspection* and *interpretation* impacts one's observed behavior, which elicits further environmental feedback, thus regulating the *interaction* with the environment. Within this perspective, introspection refers to the cognitive process of accessing how one's identity aligns with the actions taken to achieve desired goals; interpretation denotes the perceptions about the value of one's identity to society; and interaction represents the interface between the individual and the environment. Students' strategies, cognitions, affects, and behaviors for learning are changed as they go through this process of self-regulation.

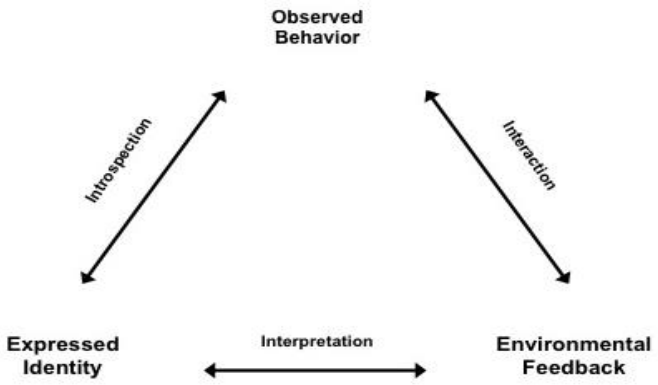

Figure 2. Conceptual Model for the Organismic Socio-Behavioral Perspective.

Related to the study, an instrument called the *student motivational profile* (SMP) was developed and used to gather data on input factors and outcomes of EI, OB, and EF (see Table 1). For the personal construct of EI, inputs are factors that construct identity and outcomes express identity. The input factor included in the SMP for EI was gender. Gender was included because previous studies have reported that females are more likely to express self-determined academic motives than males resulting in higher means for intrinsic and identified regulation (Martin, 2004; Vallerand & Bissonnette, 1992). The outcome measured in the SMP for EI was the types of motivation (i.e., intrinsic, extrinsic, amotivation).

For the behavioral construct of OB, inputs are factors that encourage or thwart participation and outcomes are the observed behaviors of engagement and identity expression. The input factor included in the SMP for OB was the level of satisfaction students reported with being enrolled in the career academy. The outcome measured in the SMP for OB was the level of perceived effort used to complete academic tasks related to agricultural sciences.

Finally, for the environmental construct of EF, inputs are factors that create a setting that supports autonomy, relatedness, and competence and outcomes are types of feedback the student receive that affirm expressed identity and observed behavior. The input factor included in the SMP was autonomy support as measured by the type and rate in which the student was influenced in making the decision to enroll in the career academy. The outcome for EF, in the SMP was academic achievement, as measured by the first semester grade point average (GPA). Al Khatib (2007) purported that students in academic environments where they feel supported and are satisfied are generally more successful in their academic studies and more likely to persist resulting in higher grades, supporting the use of GPA as a measure environmental feedback.

Table 1
Summary of Inputs and Outcomes Gathered to Operationally Define OSBP

Factors	Inputs	Outcomes
Expressed Identity (EI)	Gender	Type of Motivation
Observed Behavior (OB)	Academic Satisfaction	Perceived Effort
Environmental Feedback (EF)	Autonomy Support	Academic Achievement

Note. The inputs and outcomes listed above are not exhaustive of what can be used to operationally define OSBP.

In summary, the more an individual perceives observed behaviors are satisfying the three basic psychological needs, the more those behaviors become internalized or integrated into one's expressed identity through a process of introspection. Additionally, the more learning becomes a part of a student's identity, the more engaged the learner becomes. This engagement increases the positive interaction with the environment and subsequently yields positive feedback, which is interpreted as affirmation of one's identity as a learner. Connecting OSBP to the study, students who choose to enroll in a career academy (substantive exposure to curriculum of interest) and feel supported in that choice will be more engaged in academic tasks related to that choice, yielding higher academic success and increased identity and behavioral affirmation.

Methodology

Design

A cross-sectional descriptive correlational design was selected to determine the power of association among the predetermined factors for expressed identity, observed behavior, and environmental feedback. Informed by literature on motivation, academic engagement and resiliency, a student motivational profile was developed to gather insights on the interrelationships between input factors such as gender, influences in academic decisions and satisfaction with academic decisions and outcomes such as academic motivation, perceived academic effort and academic achievement. Although, we acknowledge that a more robust multivariate regression analysis will be need to accomplish the ultimate goal of this line of inquiry, this study serves as a precursor to that in that the appropriate measures for the input factors and outcomes must first be identified.

Setting

The research population was high school students enrolled in a career academy in the Chicago Public School District with 109,982 students enrolled at the high school level (Chicago Public Schools Website, 2016), many of which are exposed to factors that contribute to them being categorized as "at-risk". According to the urban school district, 89% of the students enrolled identified as non-white and 86% were categorized as low-income. In addition, many schools within the district experienced high levels of violent crime (Burkick-Will, 2013). The CTE program selected was an agricultural sciences high school of 592 students of which 68% identified as non-white and 47% were categorized as low-income. The school was within two miles of three public high schools and two parochial high schools. As part of the comprehensive agricultural curriculum, each student takes two agricultural classes per year. Starting with introductory classes in agricultural sciences for the first two years and courses in an agricultural career pathway (e.g., animal sciences, horticulture, finance, technology, etc.) as selected by the student for the last two years. In addition, students participate in an agricultural enrichment experience during the summer after their first year and job shadowing and internships in subsequent years. Finally, students who complete the agricultural curriculum will receive an agricultural sciences endorsement upon graduation. Through extended coursework, some students are able to obtain professional certifications and/or college credit in agriculture.

Due to the high number of applications submitted for enrollment per year, approximately 1500 applicants from various public and private schools throughout the city, a computerized lottery is used by the school to select approximately 140 students annually to attend. This form of lottery is utilized both nationally and internationally when oversubscription exists (Stasz & van Stolk, 2007). The high school was selected because it served the entire metropolitan area, lending to more diversity in the sample and a better representation of students enrolled in a career academy in the selected location. The underlying assumption for this study is that with other options for schooling, including other career academies, the urban students who enroll in the agriculture program will have more self-determined motives for studying agriculture since the focus of the academy is beyond the typical interests of urban students.

Sample

For this study, all 145 newly enrolled freshmen students were recruited. One class of 28 students were used to pilot the SMP, and 114 additional students obtained consent and provided usable data. The freshman class was used because it was the largest group at the career academy that was randomly selected to attend the program and had the same classes and teachers. The remaining three classes were smaller due to attrition and placement in classes varied based on the academic needs of the student. It should be noted that a number of previous studies have used this sampling method of random assignment to estimate the effect on academic outcomes of attending a school other than the preassigned local school (Cullen, Jacob, & Levitt, 2006; Hastings, Kane, & Staiger, 2006; Krueger & Zhu, 2004). The school provided participants' 7th grade reading aptitude stanine as a measure of academic aptitude in order to confirm assumptions that the students were meeting literacy standards and could accomplish academic tasks at grade level. Accordingly, 5 students were below standards, 79 students met standards, and 30 exceeded standards. At the time of the study, the participants were enrolled in an introductory course for agricultural sciences and a personal development/agricultural career exploration course. The school reported that the primary methods of instruction in these classes were lecture; group projects; and experiential learning activities in the greenhouse, crop and garden plots, food laboratory, and livestock arena. Accordingly, the assumption is that all freshmen enrolled in the career academy are provided an opportunity to learn using authentic instructional strategies.

Instrumentation

The SMP was measured using an instrument comprised of 1) the Academic Motivation Scale (AMS) – High School Version that measured intrinsic motivation, three forms of extrinsic motivation, amotivation (Vallerand et al., 1992); 2) the type of motivation impressed upon students to attend school; 3) the rate at which individuals influenced the decision to attend the CTE program; 4) satisfaction with that decision to attend at the beginning of the school year and at the end of the first semester three months later; and 5) their perceived level of effort on academic tasks related to agriculture. The aforementioned factors were measured using a 7-point Likert Scale (1 = Does not correspond at all to 7 = Corresponds exactly). In addition to the students' state reading assessment scores, the school provided participants' gender, ethnicity, and first semester GPA. Although, reading aptitude and ethnicity are personal factors that were collected, the literature does not indicate a direct correlation between them and motivation and therefore they were only used to provide a context for the study.

A panel of experts consisting of an educational psychologist, a methodologist, and three content experts reviewed the SMP for face and content validity. Further, test/retest was conducted on a pilot group (n = 28) to confirm reliability with a percent agreement of 82% or better. It should also be noted that Vallerand et al. (1992) established the validity of the AMS using confirmatory factor analysis to correlate each subscale among themselves and the tenets of Deci & Ryan's (1985) motivational theory. Using a sample of students (n = 745), standardized Cronbach's alpha coefficients for the subscales were .85 for the 4-item amotivation subscale, .83 for the 8-item external regulation subscale, .84 for the 6-item introjected regulation subscale, .69 for the 6-item identified regulation subscale, and .85 for the 6-item intrinsic motivation subscale. Test-retest reliability displayed temporal stability with a mean correlation value of .79 over a

one-month period. In addition, intrinsic motivation and amotivation were negatively correlated (r = -.38), which is predicted by self-determination theory (Vallerand & Bissonnette, 1992).

Data Collection

Each student was asked to provide their student identification number on the SMP and the self-reported data was matched to the school reported data by the student identification number. Data were analyzed in SPSS using descriptive statistics for research objective one, point-biserial correlations for gender, and Pearson Product Moment for the remaining correlations. The alpha level was set at a .05 *a priori*. In addition, Davis' convention (1971) was used to describe the magnitude of the correlations. Finally, an interview was conducted with one of the school's administrators to glean insights on the environmental context in which the school exists and the school climate in order to inform the setting, sample and discussion sections.

Results

Describing Subjects by Student Motivational Profile (SMP)

Research objective one sought to describe participants by student motivational profile, which included inputs and outcomes for expressed identity (EI), observed behavior (OB), and environmental feedback (EF). The EI construct was operationalized by gender for input and type of motivation for outcome. Of the 114 students who participated, the majority were females (n = 64, 56%). Of the 68% who identified as non-white, 58% were African American, 7% were Hispanic, and 3% were Other. The participants' type of motivation to attend the CTE program mean scores ranged from 4.6 to 6.2 for the intrinsic and extrinsic subscales and 2.5 for amotivation (see Table 2).

Table 2
Outcome of the SMP for Expressed Identity (EI) (n = 114)

Type of Motivation	Mean	*SD*
Intrinsic Motivation	4.6	0.9
Identified Regulation	5.8	1.0
Introjected Regulation	5.7	1.2
External Regulation	6.2	0.8
Amotivation	2.5	1.5

Note. The ratings are as follows: 1 = Does not correspond at all, 2-3 = Corresponds a little, 4 = Corresponds moderately, 5-6 = Corresponds a lot, and 7 = Corresponds exactly.

The OB construct was operationalized by academic satisfaction for the input factor and perceived effort toward academic tasks for the outcome (see Table 3). Participants reported putting a high amount of effort (M = 5.4, SD = 1.3) into academic tasks related to agricultural sciences. Additionally, participants reported being moderately satisfied with the decision to

attend the career academy prior to the first day of class (*M* = 4.8, *SD* = 2.1) as well as at the end of the first semester (*M* = 3.3, *SD* = 2.3).

Table 3
Input Factors and Outcomes of the SMP for Observed Behavior (*n* = 114)

Satisfaction and Effort	Mean	*SD*
Satisfaction Before School Began	4.8	2.1
Satisfaction After the First Semester	3.3	2.3
Perceived Effort	5.4	1.3

Note. The ratings are as follows: 1 = Does not correspond at all, 2-3 = Corresponds a little, 4 = Corresponds moderately, 5-6 = Corresponds a lot, and 7 = Corresponds exactly.

The EF construct was operationalized by autonomy support or the rate in which they perceived self or others having an influence on the decision to attend the career academy for the input factor and academic achievement as measured by grade point average for the outcome (see Table 4). Related to the decision to attend the career academy, participants reported self (*M* = 4.9, *SD* = 1.9) as the strongest influence in their decision followed by a family decision (*M* = 4.2, *SD* = 2.1). The participants also reported that mothers only had a slight influence (*M* = 3.6, *SD* = 2.2) and fathers only had little influence (*M* = 3.0, *SD* = 2.2) on the decision to attend. Finally, the GPAs ranged from 0.27 to 4.0 on a 4-point scale with the mean for the sample being 2.2 (*SD* = 1.0) for the semester and 2.4 (*SD* = 1.26) for agricultural science courses.

Table 4
Input Factors and Outcome of the SMP for Environmental Feedback (*n* = 114)

Influence and Academic Achievement	Mean	*SD*
Self-Selected to Attend	4.9	1.8
Family Decision to Attend	4.2	2.1
Mother's Decision to Attend	3.6	2.2
Father's Decision to Attend	3.0	2.2
Academic Achievement	2.2	1.0

Note. The ratings are as follows: 1 = Does not correspond at all, 2-3 = Corresponds a little, 4 = Corresponds moderately, 5-6 = Corresponds a lot, and 7 = Corresponds exactly.

Relationships between the Input Factors and Outcomes of the SMP

Research objective two sought to determine the relationships between the input factors and the outcomes of the student motivational profile. There were significant relationships between type of motivation and gender, satisfaction and influences in the decision to attend as well as influences in the decision to attend and effort (see Table 5). More specifically, there were low statistically significant relationships with introjected regulation (r_{pb} = .24, p < .05) as well as external regulation (r_{pb} = .22, p < .05) among females, and a low statistically significant relationship with amotivation among males (r_{pb} = -.28, p < .05).

Furthermore, intrinsic motivation had a moderate and positive relationship with self-selecting to attend the career academy ($r = .39$, $p < .05$) and family decision ($r = .31$, $p < .05$). Self-selection and introjected regulation ($r = .26$, $p < .05$) had a low and positive relationship as well as family decision and external regulation ($r = .21$, $p < .05$). Intrinsic motivation had a low and positive relationship with satisfaction with the decision to attend the CTE program at the beginning of the semester (SB) ($r = .20$, $p < .05$) and at the end of the semester (SE) ($r = .23$, $p < .05$). The decision made by the mother ($r = .35$, $p < .05$) or by the father ($r = .42$, $p < .05$) both had moderate and positive relationships with amotivation. Finally, the decision made by the father had a low and negative relationship with effort on academic tasks related to agricultural sciences ($r = -.22$, $p < .05$).

Table 5
Correlations among Input Factors and Outcomes of the Student Motivational Profile (*n* = 114)

Outcomes	Input Factors						
	Gender	SB	SE	Self	Family	Mother	Father
Intrinsic Mot.	-.11	.20*	.23*	.39*	.31*	-.13	.03
Identified Reg.	.17	-.10	.01	.11	.14	-.03	-.08
Introjected Reg.	.24*	-.01	.13	.26*	.17	.02	.00
External Reg.	.22*	-.07	-.05	.05	.21*	.07	.00
Amotivation	-.28*	.003	-.14	.00	.01	.35*	.42*
Effort	.10	.05	.03	.05	.10	-.08	-.22*
Achievement	.03	-.05	.14	.00	.00	.00	.06

*$p < .05$

Relationships among the Outcomes of the SMP

Research objective three sought to determine the relationships among the outcomes of the student motivational profile. There were several significant relationships among the outcomes of EI, OB, and EF (see Table 6).

Table 6
Correlations between Outcomes of Expressed Identity and Observed Behavior with Academic Achievement (n = 114)

Outcomes	**IM**	**IdR**	**InR**	**ER**	**AM**	**PE**	**AA**
Intrinsic Motivation	1.00	.37*	.55*	.21*	-.07	.36*	.20*
Identified Regulation		1.00	.54*	.68*	-.39*	.38*	.31*
Introjected Regulation			1.00	.46*	-.23*	.43*	.09
External Regulation				1.00	-.37*	.21*	.26*
Amotivation					1.00	-.46*	-.26*
Perceived Effort						1.00	.22*
Academic Achievement							1.00

*$p < .05$

There were moderate and positive relationships between perceived effort and intrinsic motivation (IM) ($r = .33$, $p < .05$), identified regulation ($r = .38$, $p < .05$), and introjected regulation ($r = .42$, $p < .05$). There were low and positive relationships between perceived effort and external regulation ($r = .20$, $p < .05$) as well as academic achievement ($r = .22$, $p < .05$). Conversely, there was a moderate and negative relationship ($r = -.46$, $p < .05$) between amotivation and perceived effort. There were low and positive relationships between academic achievement and intrinsic motivation ($r = .20$, $p < .05$) and external regulation ($r = .26$, $p < .05$), and a moderated and positive relationship between academic achievement and introjected regulation ($r = .31$, $p < .05$). In addition, there was a low and negative relationship between amotivation and academic achievement ($r = -.26$, $p < .05$). Finally, there were significant relationships among the types of motivation that were consistent with the self-determination theory.

Discussion

The purpose of this study was to explore the relationships among predetermined input factors and outcomes of EI, OB, and EF. Aspects of expressed identity as influenced by the introspection of observed behavior and the interpretation of environmental feedback were expected to increase effort during authentic learning and thus positively affect academic achievement. Although these relationships were present, the magnitude of association for the factors identified the limitations of the SMP measures used. The following discussion outlines implications and limitations of the SMP, and recommendations for addressing those limitations. Additionally, recommendations for further inquiry to validate the OSBP conceptual model for use in practice were provided.

Expressed Identity

Expressed identity is the "I am" aspect of an individual, which demonstrates one's positionality in a given circumstance. Gender was used as the input factor for expressed identity and type of motivation was used as the outcome in the SMP. Although the low correlation between gender and type of motivation was an unexpected outcome, the gender differences were consistent with previous studies. Ratelle, Guay, Vallerand, Larose, and Senécal (2007) found that high school females reported higher levels of introjected regulation, and lower levels of amotivation. Additionally, Boiché and Stephan (2014) reported differences between female and male students' regulations and a non-emergence of amotivation. Although the sample was moderately low in amotivation, males in the sample were more likely to be amotivated and females in the sample were more likely enrolled due because of external factors imposed on them either by self, as measured by introjected regulation, or by an outside influence, as measured by external regulation.

Additionally, there was no difference in levels of intrinsic motivation between males and females, which is contrary to previous findings that high school aged females tend to be more intrinsically motivated to learn than their male counterparts. This conflicting finding points to a common observation in STEM-oriented CTE programs like agriculture that gender bias exists (Hamilton, Malin, & Hackman, 2015; Scherer, 2016). Although the association between gender

and motivation was present, there was no statistically significant association found between gender and effort or gender and academic achievement, making gender not a good measure alone for an SMP input factor.

In light of the findings, the literature on self-determination was revisited to see what other factor may have a stronger relationship with effort and academic motivation. Pitzer and Skinner (2017) found that direct measures of autonomy, relatedness, and competence were better predictors of motivational resiliency and environmental feedback through teacher warmth, structure, and autonomy support directly impact the three psychological needs. Therefore, in keeping with SDT (Deci & Ryan, 1985), it is recommended that students' perception of autonomy, relatedness, and competence in the academic setting be used as the input factor for expressed identity, providing a measure to address the biggest limitation of the current SMP; no measure of the learning process itself.

Environmental Feedback

Environmental feedback is the "how I am perceived by others" aspect of an individual. Autonomy support as measured by influences in the decision to attend the career academy was used as the input factor for environmental feedback and academic achievement as the outcome in the SMP. When asked about influences in the decision to enroll in the program, the sample reported it was a personal decision followed by a family decision. This finding is promising because it indicates a level of perceived autonomy when choosing which high school to attend. Students who perceive autonomy support in educational decisions tend to be more engaged and persistent with difficult tasks related to those educational decisions (Reeve & Jang, 2006). That is, students who perceive they have agency in their education and that academic decisions are supported by influential people tend to display more self-determined behaviors.

In a study by Esters and Bowen (2004), students in Philadelphia reported that recruitment activities, interest in animals, agricultural sciences career aspirations, and parental influence accounted for more than half of the reason for enrollment in the agriculture program. Similarly, one of the school's administrators reported that the most common reasons mentioned by students for enrolling in the career academy was because they had a family member who had graduated from or was currently attending the program, they heard about the success rate with obtaining high-dollar college scholarships upon graduation, they felt it was a safer alternative to their neighbor school, or it was the best free alternative to attending one of the neighborhood parochial high schools. All of these reasons point to extrinsic motives for attending, which is counter to our assumption that intrinsic motives would be the major drive behind why urban students applied for and enrolled in a comprehensive agriculture program.

These students may have made an autonomous decision, but their decision was not driven by an inherent desire to study agriculture, resulting in reports of higher levels of autonomy and support from parents, higher levels of effort, moderate academic satisfaction, but lower levels of intrinsic motivation. The implications of these motives to attend the career academy can be seen in their academic performance. The "C" GPA for the sample confirmed that the sample, on average, had not internalized the educational context and therefore was not fully exhibiting self-determined behaviors, which was consistent with the drop in academic satisfaction once engaged

in the learning process. However, those participants with more extrinsic forms of motivation, specifically identified and external regulation, were more likely to have a higher GPA as long as they perceived value in the academic tasks. Conversely, students who parents made them attend, were more likely amotivated and more likely failing. This finding highlights the importance of autonomy and support and the need to identify students who are amotivated early in their academic career in order to address the root cause before they completely withdraw.

The administrator also discussed the presence of a small number of students who expressed a strong desire to enroll because of their interests in horticulture, animals, or food. One of the strongest associations between an input factor and an output was between students who reported making the decision to attend for themselves and intrinsic motivation. The administrator reported that these students were highly engaged both inside and outside of the classroom, held freshmen leadership positions, and were often chosen to participate in special projects or conduct tours when dignitaries visited the school. These students have identified with the school, are engaging and putting effort into their academics, and receiving positive environmental feedback that supports this expression of identity.

Although the current measure for autonomy support did have moderate associations with motivation and academic effort, it had no association with academic achievement, making it, by itself, not a good input factor measure for the SMP. However, several studies have found that positive exposure to agriculture while in high school, support from parents, friends, and teachers to pursue opportunities in agriculture, and a connection to a professional network in agriculture were the types of environmental feedback that increased student motivation, persistence, academic achievement, and career attainment (Friedel & Anderson, 2017; Scherer, 2016; Vincent, Henry, & Anderson, 2012). The biggest limitation of the SMP is that it doesn't include a measure of the learning process and therefore doesn't provide insights into teacher, parental, and peer support, which directly impact students' perceived fulfilment of autonomy, relatedness, and competence (Pitzer & Skinner, 2017). Therefore, it is recommended that the measure for autonomy support be modified to include influences on all academic decisions during the learning process as well as perceptions of teacher warmth and academic structure (Pitzer & Skinner, 2017; Wilder, 2014).

Observed Behavior

Observed behavior is the "I want to" aspect of an individual that is seen and acknowledged. Satisfaction with being enrolled in the career academy was used as the input factor for observed behavior and perceived effort on academic tasks was used as the outcome in the SMP. Further analysis showed that there was no statistically significant relationship between satisfaction and perceived effort on academic tasks, but there were moderate associations with effort and other outcomes. Informed by a meta-analysis of Vroom's expectancy theory (Van Eerde & Thierry, 1996), it was hypothesized that satisfaction with the decision to attend the career academy would lead to interest in CTE tasks, course satisfaction, and academic achievement (Kim & Lee, 2015). Although it may still be the case, it was not evident with this sample. The students could be satisfied with attending the academy and not satisfied with certain courses and thus lack interest in tasks associated with that undesirable setting. These findings indicate that the measure for effort is appropriate, but the measure for satisfaction should be

expanded to include sub-factors of satisfaction related to specific academic components (Kim & Lee, 2015). Further, the drop in satisfaction after being at the school for three months requires further investigation. Was there a lack of interest in the curriculum? A disconnect between the core academic courses and the agriculture courses? An absence of bonding with teachers and peers? Did other environmental factors play a role in the decrease in satisfaction? Including sub-factors of satisfaction in the SMP may help answer these questions by giving better insights into the learning process through self-appraisals (Pitzer & Skinner, 2017).

Conclusions

Although relationships were present, the magnitude of associations were too low and sporadic leading us to conclude that the SMP cannot be used to collect data for predictive analysis. However, modifying the measures for all three input factors to include a perceived fulfillment of psychological needs measure, an expanded academic satisfaction measure, and a revised autonomy support measure that includes perceptions of teachers and peers would move this line of inquiry closer to that possibility. As it relates to the significance of this study for career and technical education, the OSBP conceptual model was introduced. Once validated, it may be useful in assessing the needs of students based on personal and environmental factors in order to decrease maladaptive behaviors and increase engagement and academic achievement. Accordingly, we recommend future studies explore the impact environmental feedback from peers, teachers, and parents have on expressed identity and observed behavior. Namely, how interpretation, interaction, and introspection within the model is demonstrated in the educational setting when the student has an *autonomous*, *controlled*, or *combined* motive for engagement (Ratelle et al., 2007).

Through this study, we were able to confirm that autonomy and support in the decision to enroll in a career academy has some association with self-determined forms of motivation, which lead to satisfaction, persistence in academic task, and academic achievement. Although the findings are not generalizable, we assert through our findings that students' academic performance can be improved by providing more autonomy for making academic decisions, increasing the environmental support through affirming feedback, and making the learning process more relevant to authentic learning strategies that focus on both current and future utility (Anderson & Kim, 2009; Fredricks et al., 2004; Boiché & Stephan, 2014; Wentzel et al., 2010). Therefore, our final recommendation is that CTE teachers continue to explore context-specific ways of fulfilling students three psychological needs; particularly focusing on interventions that affirm students' expressed identity and target the root cause of maladaptive behaviors.

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