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Exploring the Relationship between Self-Efficacy and Career Commitment among Early Career Agriculture Teachers

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Abstract

The purpose of this study was to investigate the differences in career commitment and perceived efficacy among early career agriculture teachers as well as the relationships between early career agriculture teachers' perceived efficacy and career commitment. Five areas of self-efficacy were investigated among early career agriculture teachers in five western states: classroom management, instructional strategies, leadership of students, science teaching, and math teaching. Only small effects were found on four of the five self-efficacy variables based on years of teaching experience. Using multiple linear regression analysis, a predictive model for early career agriculture teachers' career commitment was developed. The final model explained a total of 20% of the variance in early career agriculture teachers' career commitment. Two areas of self-efficacy were identified as significantly related to early career teachers' career commitment, teachers' sense of efficacy in classroom management and science teaching. These findings implicate a need for increased emphasis on classroom management strategies and science teaching strategies throughout agriculture teacher development. Recommendations are made for potential self-efficacy building experiences based on Bandura's theory of self-efficacy.

Keywords: self-efficacy; career commitment; instructional strategies; classroom management; leadership of students; math teaching; science teaching

Kantrovich (2010) acknowledged the importance of agricultural education programs to secondary students as an "opportunity to apply the 'general' education curriculum of science and mathematics and leadership" (p. 6). Unfortunately, in the same study Kantrovich identified an agriculture teacher shortage which is limiting the effectiveness of agricultural education in meeting the needs of students. A variety of research studies in agricultural education have attempted to explain the reasoning behind agriculture teacher attrition, a critical component of the agriculture teacher shortage issue. A number of these studies have investigated the relationship between agriculture teachers' sense of efficacy and their career commitment (Blackburn & Robinson, 2008; Knobloch & Whittington, 2003; Swan, 2005; Wheeler & Knobloch, 2006; Whittington, McConnell, & Knobloch, 2006). The primary focus of these earlier studies was to determine the relationship between agriculture teachers' self-efficacy in instructional strategies, classroom management, and student engagement with career commitment. The purpose of our study was to explore the self-efficacy and career commitment relationship using three additional areas of agriculture teachers' self-efficacy: leadership of students, math teaching, and science teaching.

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Knobloch and Whittington (2003) launched the investigation into the relationship between career commitment and teachers' sense of efficacy among school-based agricultural teachers. Their research approached career commitment as an influence on first through third year agriculture teachers' sense of efficacy. The researchers measured teachers' sense of efficacy and career commitment at the beginning of the school-year and then split the teachers into two groups, high career commitment and low career commitment based on the median career commitment score. At the beginning of the year, researchers observed that the two groups exhibited similar levels of self-efficacy. Ten weeks into the school-year, researchers measured the two groups' sense of efficacy again and found a decrease in the perceived efficacy of those teachers in the low career commitment group. Meanwhile, the high commitment group maintained a stable level of self-efficacy. The research conducted by Knobloch and Whittington initiated the understanding of a positive relationship between self-efficacy and career commitment among agriculture teachers.

Continuing research into the relationship between agriculture teachers' sense of efficacy and career commitment used self-efficacy as the explanatory variable for career commitment. Each of these studies found a positive relationship between self-efficacy and career commitment (Blackburn & Robinson, 2008; Swan, 2005; Wheeler & Knobloch, 2006; Whittington et al., 2006). In one study, Swan (2005) explored teachers' sense of efficacy and the career intent of student teachers at The Ohio State University. Swan identified a total of 17% of the variance in career intent could be attributed to the self-efficacy of these student teachers. In a 2008 study, the research team of Blackburn and Robinson addressed the relationship between teachers' sense of efficacy and attrition by examining the job satisfaction of Kentucky agriculture teachers. The research completed by Blackburn and Robison found a significant relationship between agriculture teachers' sense of efficacy and job satisfaction.

The positive relationship between teachers' sense of efficacy and career commitment can be attributed to the principles of self-efficacy. Bandura (1986) defined self-efficacy as, "peoples judgments of their capabilities to organize and execute courses of action required to attain designated types of performances" (p. 391). Bandura postulated self-efficacy plays a significant role in whether or not individuals will attempt a given task. Bandura's theory states individuals first cognitively process a given task and the challenges associated with the task and then judge their capabilities to cope with the challenges. For instance, if an individual's self-efficacy is high they are more likely to perceive the challenges as surmountable given their perception of their abilities; therefore, these individuals will be more likely to attempt the given task. If an individual's self-efficacy is low, they will perceive the challenges as a deterrent based on their perceived abilities; therefore, these individuals will be less likely to attempt the given task (Bandura, 1977, 1986).

Bandura emphasized perceived challenges as an important component of the theorized relationship between self-efficacy and commitment; therefore, we should be aware of the perceived challenges faced by early career agriculture teachers. Previous research in agricultural education has investigated these potential issues. Talbert, Camp, and Heath-Camp (1994) logged the daily struggles of new agriculture teachers during the 1988-1989 school year. Researchers identified nine consistent challenges faced by early career agriculture teachers: student discipline, unique requirements, unique pitfalls, teacher isolation, students, FFA activities, time management, lesson planning, and classroom/laboratory management.

Myers, Dyer, and Washburn (2005) conducted a similar analysis of the issues faced by early career agriculture teachers. This team of researchers utilized a Delphi study in order to seek consensus on issues faced by early career agriculture teachers. The top five issues were: organizing an effective alumni chapter, organizing an effective advisory board, conducting FFA chapter events and activities, student discipline, and recruiting and maintaining alumni members. A 2009 study of the issues faced by agriculture teachers in West Virginia identified financial rewards, time management, paperwork, and balancing home and work responsibilities as strong

to moderate challenges faced by agriculture teachers (Boone & Boone, 2009). These studies suggest a variety of potential challenges which may be limiting factors to early career agriculture teachers' career commitment.

The relationship between an individual's perception of challenges in a given task and their commitment to the task plays an important role in this research (Figure 1). As this model illustrates, perceived challenges toward a given task may lower an individual's self-efficacy and subsequent commitment to the task.

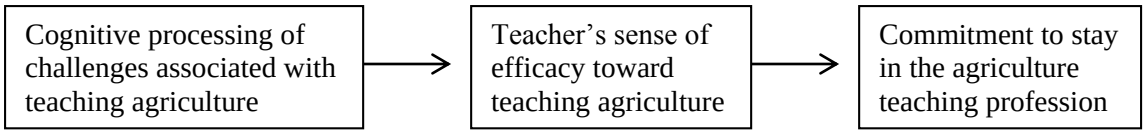

Figure 1. Conceptual model illustrating the relationship between perceived challenges, self-efficacy, and career commitment.

Our study investigated the relationship between career commitment and teachers' sense of efficacy in five western states. Teachers with up to five years of teaching experience served as the population for this study due to the career flexibility of these teachers. Tschannen-Moran, Woolfolk Hoy, and Hoy (1998) identified teachers early in their career are more likely to exit the profession and therefore should be the focus of self-efficacy research. Bandura (1977) supported the investigation of individual's self-efficacy early in a career. Bandura theorized that once self-efficacy is establish it is hard to change either positively or negatively. An abundance of positive self-efficacy building experiences early in a career can build a teacher's sense of efficacy to a heightened level which individual, negative experiences will not change. Alternatively, an abundance of negative experiences early in a teacher's career will yield a low level of self-efficacy relatively nonresponsive to individual positive experiences.

Although previous research in agricultural education has investigated select areas of teachers' self-efficacy, there are identifiable limitations in the literature. Exploring new areas of self-efficacy and their relationship to career commitment has the potential to broaden our understanding of teachers' commitment to teach agriculture. Therefore, this study analyzed two commonly researched self-efficacy variables: classroom management and instructional strategies as well as three additional areas of self-efficacy: leadership of students, math teaching, and science teaching. While these additional self-efficacy variables have been investigated in previous agricultural education research (Hamilton & Swortzel, 2007; Stripling & Roberts, 2012, 2013a, 2013b), their relationship with agriculture teachers' career commitment has not been explored. The new educational emphasis on the integration of math, science, and leadership in all high school classrooms, including agriculture (Doerfert, 2011; Kantrovich, 2010; Sanders, 2009) make investigation of teachers' self-efficacy in these areas both timely and relevant.

Purpose and Research Questions

The purpose of this research was to first analyze early career agriculture teachers' career commitment and perceived efficacy in the areas of classroom management, instructional strategies, leadership of students, science teaching, and math teaching by years of experience. This analysis allowed us to observe if any of the first five years of teaching should be considered differently when interpreting the results of this study.

Additionally, this study sought to describe the role of the five self-efficacy variables on early career agriculture teachers' career commitment. In order to accomplish the purpose of this study, the following research questions were developed.

1. How does career commitment differ among early career agriculture teachers?
2. How does perceived efficacy differ among early career agriculture teachers?
3. How does perceived efficacy relate to the career commitment of early career agriculture teachers?

By investigating the career commitment of early career agriculture teachers, this research addresses the National Research Agenda Priority Area Number Three. Priority area three calls for a focus on producing a highly qualified agriculture workforce and, recognizing the importance of agricultural educators in this process, stated, "This will require that adequate numbers of well-prepared, highly effective agricultural educators, communicators, and leaders be made available to meet current and future needs" (Doerfert, 2011, p. 20). In addition, the analysis of science and math teaching efficacy can aid the profession in understanding the effectiveness of agriculture teachers in integrating math and science. The integration of STEM concepts is a direct outcome of the National Research Agenda Priority Area Number Five, "Efficient and Effective Agricultural Education Programs" (Doerfert, 2011, p. 10).

Methods

The population for this study included all school-based agriculture teachers in their first five years of teaching in five western states: California, Idaho, Oregon, Utah, and Washington (N = 295). A larger population frame, e.g. a nationwide study, was not attempted due to the exploratory nature of this research; specifically, the unexplored relationships between math self-efficacy, science self-efficacy, leadership self-efficacy, and career commitment. However, the findings of this research should be used to determine the appropriateness of similar research using larger population frames. To construct our population frame, teachers' names and contact information were collected by contacting leaders in the field of agricultural education from each state. The data collected for this study are part of a larger research project.

A census of all early career agriculture teachers in five western states was attempted. Data were collected using Dillman's (2000) tailored design method. Data were collected using a secure online survey provider, Qualtrics ® with an option for individuals to respond via a mailed questionnaire if preferred. All data were collected during a three week timeframe in the middle of the 2012-2013 academic year. A total of 150 useable questionnaires were completed, yielding a response rate of 51%. Non-response error was checked by comparing on-time to late respondents using an independent samples t-test (Lindner, Murphy, & Briers, 2001; Miller & Smith, 1983). No significant differences were found between on-time and late respondents' sense of efficacy or career commitment. Therefore, we treated respondents as a representative sample of the population of first through fifth year agriculture teachers in California, Idaho, Oregon, Utah, and Washington.

The scales used to measure teachers' sense of efficacy were developed using four established self-efficacy instruments. Early career agriculture teachers' self-efficacy toward their instructional strategies and classroom management were collected from the Teacher's Sense of Efficacy Scale (TSES) long form (Tschannen-Moran & Woolfolk Hoy, 2001). The Science Teaching Efficacy Belief Instrument (STEBI; Riggs & Enochs, 1990) captured respondents' sense of efficacy in teaching science. Respondents' perceived efficacy in teaching math was measured using the Ohio State University Teaching Confidence Scale for Math (Woolfolk Hoy, 2000). Finally, teachers' sense of efficacy related to the leadership of students was developed using the Individual Leadership Factors Inventory (ILFI; Simonsen, Velez, Birkenholz, &

McKim, 2013). All self-efficacy variables were measured on six-point scales which ranged from 1 "Strongly Disagree" to 6 "Strongly Agree." Career commitment scores were developed by averaging the responses of two questions: How confident are you that you will be teaching school-based agriculture in five (5) years? and How confident are you that you will be teaching school-based agriculture in ten (10) years? Career commitment scores were measured on six-point scales ranging from 1 "No Confidence" to 6 "Extreme Confidence."

The entire instrument was pilot tested with a group of 31 early career agriculture teachers in a Midwestern state. Construct reliability scores of this pilot test ranged from.75 to .95, exceeding the acceptable level of .70; therefore, the combined instruments were determined to be acceptable for data collection.

Data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 20. The significance level used in this study was set *a priori* at $\alpha < .05$. Research questions one and two: "How does (1) career commitment and (2) perceived efficacy differ among early career agriculture teachers?" were analyzed using an ANOVA to test for statistical differences among groups. The independent variable in each of these analyses was years of teaching experience, the dependent variable for research question one was teachers' career commitment and for research question two the dependent variables were the five self-efficacy variables which were compared using separate ANOVAs. Effect sizes were calculated for the differences among groups, the effect levels used in this study were established by Cohen (1988) at small effect, $\eta = .100$; medium effect, $\eta = .243$; and large effect, $\eta = .371$.

Research question three: "How does perceived efficacy relate to the career commitment of early career agriculture teachers?" was analyzed using multiple linear regression with the independent variables being the five teacher efficacy areas and the dependent variable being teachers' career commitment. Multiple regression was used to allow for analysis of the relationship between individual efficacy areas on teachers' career commitment. The four assumptions of multiple linear regression (normal distribution of variables, linearity, equality of variances, and independence) were checked before data analysis. The normal distribution among variables assumption was checked by visually inspecting histograms of career commitment, classroom management efficacy, instructional strategies efficacy, leadership of students efficacy, science teaching efficacy, and math teaching efficacy. None of the six histograms revealed any violation of the normality assumption. The assumption of linearity was checked by developing a normal probability plot of residuals, this plot indicated no violation of the linearity assumption. The assumption of equal variances was checked by developing a scatter plot of the residuals, this plot showed no pattern, indicating the assumption of equal variances had not been violated. Independence between variables was checked using the Lewis-Beck (1980) method. Each independent variable was regressed against all other independent variables. The resulting r^2 values from each regression were not close to 1.0, (r^2 values ranged from .15 to .55); therefore, independence between variables was not considered an issue. These conclusions are supported by Cohen and Cohen (1983) who advocate keeping independent variables separate if the research objective and/or questions require separate analyses of each independent variable and its relationship with the dependent variable.

Findings

Selected demographic characteristics of respondents to this study are identified in Table 1. Females (67.3%) were the majority of respondents in this study. The most common age group was 26-29 years old (40.7%). First year teachers were the largest group, comprising a total of 26% of the population. The most common response to the highest level of education was "some graduate work" which included 45.3% of respondents.

Table 1

Demographic Characteristics for Early Career Agriculture Teachers in California, Idaho, Oregon, Utah, and Washington

	n	Percent of respondents
Sex[1]		
Male	48	32.0
Female	101	67.3
Age[1]		
20-25 years	50	33.4
26-29 years	61	40.7
30-39 years	28	18.6
40 and over	10	6.7
Year of Teaching		
First	39	26.0
Second	32	21.3
Third	35	23.3
Fourth	25	16.7
Fifth	19	12.7
Education		
Bachelor's Degree	39	26.0
Some Graduate Work	68	45.3
Master's Degree	43	28.7

[1]One non-respondent (0.7%)

Select program demographics were also collected. The average number of students enrolled in the agriculture programs of early career agriculture teachers was 280 students; the smallest agriculture program included 8 students with the largest program serving 1,700 students. On average, respondents taught 65 minute class periods and facilitated an average of 1.3 agri-science labs per week in each agriculture class they taught. The most common response to the number of teachers in the agriculture program was one (39.3%) with a range in the number of teachers per agriculture program from one to nine; the average number of teachers per program was 2.34.

Differences among early career teachers' career commitment and self-efficacy areas were compared by years of teaching experience (see Table 2). Fourth year teachers perceived the highest level of career commitment (M = 4.48) with fifth year teachers feeling the least amount of career commitment (M = 4.24). On average, these early career teachers felt moderately to highly confident in their commitment to stay in the teaching profession (M = 4.39). The differences among the career commitment of these five groups were not statistically significant (F = 0.15, p-value = .965). Further analysis, using effect size, found years of teaching experience had a negligible effect on teachers' career commitment (η = .06). These findings provide evidence there is no statistical difference in the career commitment of teachers throughout the first five years of teaching agriculture.

Table 2

Comparison of Career Commitment and Perceived Efficacy among Early Career Agriculture Teachers

	Year of Teaching								
	First	Second	Third	Fourth	Fifth	Total	*F*-value	*p* - value	Eta (η) effect size
Career Commitment[1]	4.45	4.34	4.40	4.48	4.24	4.39	0.15	.965	.06
Instructional Strategies[2]	4.79	4.81	5.02	5.05	4.88	4.90	1.16	.333	.18
Classroom Management[2]	4.77	5.00	5.13	5.23	5.05	5.02	2.10	.084	.23
Leadership of Students[2]	4.60	4.77	4.94	4.88	4.87	4.80	1.40	.237	.19
Math Teaching[2]	3.98	4.00	4.01	4.13	4.18	4.04	0.22	.952	.08
Science Teaching[2]	4.43	4.29	4.46	4.46	4.37	4.41	0.57	.687	.12

[1] Item scaled from 1 "No Confidence" to 6 "Extreme Confidence."
[2] Item scaled from 1 "Strongly Disagree" to 6 "Strongly Agree."

Fourth year teachers perceived the highest level of instructional strategies efficacy (M = 5.05), first year teachers perceived the lowest level of instructional strategies efficacy (M = 4.79). On average, early career teachers had moderate levels of self-efficacy toward their instructional strategies (M = 4.90) (see Table 2). No statistically significant differences among instructional strategies efficacy within the five groups were found (F = 1.16, p-value = .333). Additional analysis revealed that although the differences among groups were not statistically significant, a small effect (Cohen, 1988) on instructional strategies was observed due to years of teaching experience (η = .18).

In the classroom management construct, fourth year teachers were the most efficacious group (M = 5.23) and first year teachers were the least efficacious group (M = 4.77). Overall, early career agriculture teachers felt moderately efficacious toward their classroom management (M = 5.02) (see Table 2). Differences among the five groups of teachers were statistically insignificant in the classroom management construct (F = 2.10, p-value = .084). Although no statistical differences were found, a small (Cohen, 1988) effect was observed on early career teachers' classroom management efficacy due to years of teaching experience (η = .23).

The highest perceived efficacy in the leadership of students variable was observed among third year teachers (M = 4.94) with the lowest leadership of students efficacy being observed among first year teachers (M = 4.60). Overall, teachers perceived a moderate level of efficacy toward their leadership of students (M = 4.80) (see Table 2). No statistical differences in leadership of students efficacy among the five groups were observed (F = 1.40, p-value = .237). However, it was found that years of teaching experience had a small effect (Cohen, 1988) on early career agriculture teachers' perceived efficacy in the leadership of students construct (η = .19).

Fifth year teachers were identified as the most efficacious toward their math teaching abilities (M = 4.18), first year teachers were again identified as the least efficacious group, this time in their math teaching (M = 3.98). On average, teachers were mildly efficacious toward their math teaching (M = 4.04) (see Table 2). The differences among teachers' math teaching efficacy were not statistically significant (F = 0.22, p-value = .952). Furthermore, years of teaching experience had an insignificant effect on early career agriculture teachers' math teaching efficacy (η = .08).

Second year teachers were the least efficacious toward their science teaching (M = 4.29), third and fourth year teachers perceived the highest level of science teaching efficacy (M = 4.46). Overall, early career agriculture teachers perceived mild to moderate levels of science teaching efficacy (M = 4.41) (see Table 2). No statistical differences in science teaching efficacy were observed over the first five years of teaching (F = 0.57, p-value = .687). Although no statistical differences were observed, a small effect (Cohen, 1988) on science teaching efficacy was found due to years of teaching experience (η = .12).

These findings provide evidence to answer research question two "How does perceived efficacy differ among early career agriculture teachers?" Although no statistically significant differences were observed using ANOVA, the effect size measure revealed years of teaching experience had a small effect (Cohen, 1988) on respondents' instructional strategies efficacy, classroom management efficacy, leadership of students efficacy, and science teaching efficacy.

Due to the limited research investigating the role of the perceived efficacy of early career agriculture teachers on career commitment utilizing multiple linear regression, a simultaneous entry linear regression was used (Cohen & Cohen, 1983) to answer research question number three: "How does perceived efficacy relate to the career commitment of early career agriculture teachers?" Research recommends the use of simultaneous entry linear regression when past research on a topic is limited, especially in the use of linear regression analysis (Cohen & Cohen, 1983). The proposed model was found to be a significant predictor of teachers' career commitment (F = 7.20, p-value < .001). The self-efficacy variables, in combination were found to explain a total of 20% (r^2 = .20) of the variance in early career agriculture teachers' career commitment.

Table 3

Multiple Linear Regression of Teachers' Sense of Efficacy Explaining Career Commitment

	Dependent variable: Career commitment[1, 2]					
	Zero-order correlation (r)	p-value	B	SEB	β	p-value
Classroom Management Efficacy[3]	.38	<.001	.47	.19	.27	.013
Instructional Strategies Efficacy[3]	.30	<.001	-.03	.21	-.01	.895
Leadership of Students Efficacy[3]	.32	<.001	.04	.20	.03	.822
Math Teaching Efficacy[3]	.15	.065	.02	.11	.02	.817
Science Teaching Efficacy[3]	.38	<.001	.61	.23	.24	.010

[1] R = .45, R^2 = .20, F = 7.20, p-value < .001
[2] Item scaled from 1 "No Confidence" to 6 "Extreme Confidence"
[3] Item scaled from 1 "Strongly Disagree" to 6 "Strongly Agree"

Two of the five self-efficacy variables were identified as significant predictors of early career agriculture teachers' career commitment: classroom management efficacy (β = .27, p-value = .013) and science teaching efficacy (β = .24, p-value = .010). Using the standardized coefficients (β) we observe classroom management efficacy as the strongest predictor of early career agriculture teachers' career commitment followed by science teaching efficacy. These findings provide evidence that increasing the classroom management efficacy and/or the science teaching efficacy will relate to an increase in the career commitment of early career agriculture teachers.

Conclusions and Recommendations

The goal of the first research question was to analyze the differences in career commitment among early career agriculture teachers. The results indicate career commitment is statistically similar throughout first, second, third, fourth, and fifth year agriculture teachers. These findings suggest the career commitment issue is not localized to one year of teaching agriculture. This implies remedial efforts to increase career commitment among early career agriculture teachers should impact all teachers in their first five years. Additional research is required to identify at what point the career commitment of agriculture teachers differs to define a potential tipping point.

The small (Cohen, 1998) effect of years of teaching experience on early career agriculture teachers' science teaching efficacy, instructional strategies efficacy, classroom management efficacy, and leadership efficacy indicates experience has a minimal influence on these agriculture teachers' self-efficacy. These findings support previous research in agricultural education which has found small differences in agriculture teachers' self-efficacy based on their years of teaching experience (Burris, McLaughlin, McCulloch, Brashears, & Fraze, 2010; Hartfield, 2011; Wolf, 2008). The observed trend in the efficacy scores over the first five years of teaching agriculture, especially first year teachers having lower perceived efficacy, provide some support to Bandura's theory of self-efficacy. Bandura (1986) identified a lack of positive self-efficacy experiences in a given task will yield a lower level of self-efficacy; therefore, we can assume teachers earlier in their career have not built up the amount of positive experiences necessary for higher levels of self-efficacy.

The regression of teachers' career commitment and self-efficacy identified two significant predictors of career commitment: classroom management efficacy and science teaching efficacy. Previous research in agricultural education has identified a positive relationship between perceived classroom management efficacy and job satisfaction, a construct strongly related to career commitment (Blackburn & Robinson, 2008). Prior findings, along with the findings of this study, support Bandura's (1986) theoretical conceptualization of the role of self-efficacy on an individual's commitment to a given task. Previous studies in agricultural education have identified classroom management as a major issue faced by early career agriculture teachers (Myers et al., 2005; Talbert et al., 1994). The significant relationship between career commitment and perceived classroom management efficacy suggests early career agriculture teachers with lower classroom management efficacy perceive challenges associated with classroom management which reduces their commitment to remain an agriculture teacher.

The relationship between career commitment and perceived classroom management efficacy implies a need for self-efficacy building experiences in the area of classroom management. Bandura (1977) identified four types of experiences which have the potential to increase an individual's self-efficacy. The first of these experiences are mastery experiences. Mastery experiences encompass opportunities for individuals to be successful in a given task. Successfully completing a given task has been identified as the strongest builder of self-efficacy. Therefore, it is recommended early career teachers, during a professional development experience, have an opportunity to reflect in a small group on successful classroom management

strategies they have utilized in their classrooms. While these reflections may not initially be considered mastery experiences, they do require early career teachers focus on times where they have accomplished mastery experiences in their own classroom. Future research into the effectiveness of such experiences is recommended.

The second classification of experiences identified as self-efficacy builders are vicarious experiences. Vicarious experiences are those where an individual observes another individual successfully accomplish a given task. Vicarious experiences are especially powerful when the observed individual overcomes a challenge the observer had originally perceived as a deterrent to the successful completion of the task. A recommended vicarious experience targeted at increasing the classroom management efficacy of early career agriculture teachers is for states and/or teacher development programs to provide an on-line database of videos showing current agriculture teachers successfully utilizing classroom management strategies. This resource would assist early career agriculture teachers who are struggling with classroom management issues by allowing them to navigate to a specific classroom management problem and see a variety of videos illustrating different management strategies. An additional recommendation is for leaders in the field of agricultural education to facilitate opportunities for early career teachers to observe fellow agriculture teachers, identified as effective classroom managers, in the classroom.

Two additional experiences have been identified as self-efficacy builders: social persuasion and physiological and emotional states. Social persuasion is the support you receive from those around you. Social persuasion can be something as simple as hearing *"you can do this"* before you engage in a given task. Developing a mentor system in which early career agriculture teachers are paired with more experienced teachers may increase the amount of positive social persuasion received by early career teachers. Additional research into the successful strategies of established mentor programs and how these programs relate to early career teachers' self-efficacy will benefit the development of future mentoring programs in agricultural education.

Physiological and emotional states refer to the internal feelings you have when contemplating engaging in a given task. Anxiety will often lower an individuals' self-efficacy because they perceive anxiety as a sign they will not be successful. Negative physiological and emotional states have been found to be reduced through a process called desensitization (Bandura, 1986). In desensitization exercises, participants' negative physiological and emotional states toward a given task are reduced through a process called modeling, in which individuals repetitively engage in the given task until their negative physiological and emotional states recede. Providing teachers with an opportunity to repetitively exercise overcoming classroom management challenges is recommended. Additionally, educating preservice and early career teachers on effective modeling strategies may increase their ability to reduce negative physiological and emotional states throughout their teaching career.

In addition to perceived classroom management efficacy, early career teachers' science teaching efficacy was identified as a significant predictor of career commitment. Similarly to the observed positive relationship between teachers' perceived classroom management efficacy and career commitment, it can be reasoned that early career agriculture teachers perceive challenges associated with teaching science. These challenges could be outweighing early career agriculture teachers' perceived ability to teach science. The question becomes, what are the perceived challenges associated with teaching science among early career agriculture teachers? We suggest the following potential challenges: the weight of educational shifts toward STEM integration across disciplines including agricultural education (Sanders, 2009), science credit classes being offered in the agriculture department, increasing science-oriented college credits offered through the agriculture department, and science-oriented agriculture curricula being integrated into agricultural education.

Future investigation into early career agriculture teachers' perceived challenges associated with teaching science in agriculture classrooms is recommended. We recommend

qualitative analyses guide the development of quantitative instruments to understand early career agriculture teachers' perceived challenges associated with teaching science. Once these perceived challenges are clearly established, researchers can investigate specific experiences targeting the development of self-efficacy necessary to overcome these challenges.

The results of this research broaden our understanding of career commitment and point toward the importance of self-efficacy, especially in the areas of classroom management and science teaching, in the retention of early career agriculture teachers. Future research in agriculture education should expand the areas of self-efficacy research to include unexplored areas of agriculture teachers' sense of efficacy. Recommended areas for future research include: engineering integration in agriculture, technology integration in agriculture, community outreach including establishing and running alumni and advisory boards, and time management. Additionally, we recommend agriculture education specific instruments, like the questionnaire created by Wolf (2008), be utilized in studies exploring the relationship between agriculture teachers' self-efficacy and career commitment.

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