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# Personal Resilience as a Predictor of Professional Development Engagement and Career Satisfaction of Agriscience Teachers

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**Abstract**

*The profession of teaching is inherently stressful. Resilience, or the ability to adapt and develop competence despite exposure to disruptive change, has been shown to be beneficial for teachers. The purpose of this study was to determine if personal resilience is a predictor of professional development engagement and career satisfaction of agriscience teachers. A census of agriscience teachers in four purposefully selected states was taken. Data were collected using the Tailored-Design Method, using multiple points of contact with multiple modes to minimize survey error. The overall response rate was 72.5% (n = 892). The linear combination of independent variables in a stepwise backwards regression model explained 13.7% of the variance of professional development engagement and 21.4% of the variance of career satisfaction. These findings suggested that increasing the resilience of agriscience teachers, specifically in the areas of positive: world and focused, could lead to increased engagement in professional development and career satisfaction, which has been shown to be a factor that increases teacher efficacy. Additional research is needed to explore how to increase the resilience of agriscience teachers and the relationship between teacher resilience and student outcome variables.*

**Key words:** Career satisfaction; inservice; professional development; professional development engagement; resilience

## Introduction

Achieving consensus for the ideal professional practice of teachers is somewhat straightforward. Teachers should have a certain set of professional commitments, or set of personal traits, that cause them to strive to constantly improve their practice and grow as a professional (Bransford, Darling-Hammond, & LePage, 2005). Teachers should also base their practice on a body of scholarly knowledge, ground their practice on experience and improvement through reflection, and develop a professional community to foster their growth (Shulman, 1986). However, little is known about the variables that contribute to ideal teacher practice. In the book *Mindset: The New Psychology of Success,* Dweck (2006) explored the difference between a fixed and a growth mindset. According to Dweck, some individuals are more apt to perceive they can grow, learn, and improve, whereas others tend to become more static in their thinking. While the main crux of Dweck's work has been applied to child and student behavior, the idea of mindset could be telling for teacher professional development. According to Dweck, individuals do not typically

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have one mindset but instead, fall on a continuum. Dweck also postulated that an individual's mindset could be changed if he or she is in the right environment.

The idea of a fixed verses growth mindset has been based on the notion that the ability to perform and improve is innate and amenable. Similarly, resilience is an innate characteristic that is related to how individuals cope with stressful or difficult situations. Resilience, or the ability to successfully adapt and develop competence despite exposure to disruptive change, may provide some explanation for how teachers respond to change as it relates to professional development (Henderson & Milstein, 2003; Hoopes & Kelly, 2004; Rirkin & Hooperman, 1991).

The idea of resilience began by examining children who were successful, despite being labeled as at-risk. According to Werner and Smith (2001), some individuals are innately more resilient, and, therefore, are able to overcome disruptive life changes. Henderson and Milstein (2003) applied the concept of resilience to teachers. They indicated that resilient teachers might be better able to cope with stressful situations common to the profession of teaching. Similar to the at-risk children who were successful, some teachers are better able to cope with the stress of teaching and create a meaningful impact for their students. According to Bobek (2002), teacher resilience can enhance teacher effectiveness, improve career satisfaction, and better prepare teachers to adjust to changing conditions.

Richardson, Neiger, Jensen, and Kumfer (1990) explained that resilient individuals are able to reintegrate, or bounce back, and function at a high level after experiencing a finite disruptive event. Gu and Day (2013) purported that normal teaching environments are inherently stressful and disruptive, and, thus, require resilience. This view of resilience rests on two assumptions: teaching is a chronically stressful and taxing career, and some teachers are better than others at dealing with this stress. Some researchers (Gu & Day, 2013; Henderson & Milstein, 2003; Hoopes & Kelly, 2004) have asserted that resilience is not a fixed trait, but can be improved and changed.

Most of the research in the area of teacher resilience has been qualitative. According to Howard and Johnson (2004), teachers rely on agency and a strong professional and personal support system to be able to persist, despite being described as high risk for burnout. Gu and Day (2013) reported that resilient teachers, who had a calling to teach and loved their students, were more connected with their students and their colleagues, worked to improve their self-efficacy, and had positive relationships with the school leaders. Further, teachers in socioeconomically disadvantaged schools were less resilient than their peers in other schools. Gu (2014) noted that when comparing resilient and non-resilient teachers, the former reported having someone who served as a positive support influence at a higher rate than non-resilient teachers.

The research on the resilience of agriscience teachers has been limited (Thieman, Henry, & Kitchel, 2012). Thieman et al. (2012) conducted a synthesis of literature related to resilient agriculture teachers. According to their review, teachers who are more resilient are better able to manage their professional relationships and balance personal relationships. The researchers also stated resilient teachers might be more adept at time management, dealing with difficult students, and responding to difficult relationships. Similarly, Clark, Kelsey, and Brown (2014) found career agriculture teachers relied on professional support and work-life balance to remain in the profession. According to Hoopes and Kelly (2004), one of the factors of resilience is closely related to high self-efficacy. There is also evidence to suggest a link between self-efficacy and career commitment (McKim & Velez, 2015), outcome expectations and interest (Bunch, Robinson, & Edwards, 2012), and coping mechanisms that can lead to resilience (Kelsey, 2006).

## Theoretical/Conceptual Framework

This study was guided by the theory of resilience, specifically the characteristics of resilient teachers as described by Henderson and Milstein (2003). These characteristics were operationalized using the factors of resilience described by Hoopes and Kelly (2004) and Conner (1993). Although the resilient factors described by Conner (1993) are intended to describe individuals in the context of organizational change and are not specific to teachers, schools, or teacher professional organizations, the description of resilience has implications for teachers and their capacity to deal with change. The profession of teaching occurs in a stressful environment with constant change from myriad sources (Gu & Day, 2013). Hoopes and Kelly (2004) described resilient individuals as having a capacity to deal with difficult change in stressful environments. Further, Conner's (1993) personal resilience characteristics, measured using the Personal Resilience Questionnaire (PRQ), have been used in research in the education field, (e.g., Isaacs, 2003). Resilience theory seeks to explore commonalities of individuals who are successful, despite difficult situations, and how others can develop similar characteristics, so they, too, can be successful.

This study drew on Conner's (1993) work which focused on resilience in the context of organizational change. Conner studied individuals' reactions to change situations. He noticed that individuals either focus on the risk associated with change or with the opportunity of change. According to Conner, resilient individuals are able to see the opportunity in change situations, and thus, tend to be more successful. These individuals possess similar characteristics. Conner purported these characteristics to be positive, focused, flexible, organized, and proactive. The positive characteristic was further described as positive: world, or being positive toward the environment around the individual, and positive: self, or being positive about one's own skills and abilities. Flexible was also divided into flexible: thoughts, which involves being open to new ideas, and flexible: social, which describes a person's ability to draw on resources from others.

This study was guided by a conceptual model that describes the relationship between resilience, career satisfaction, and teacher change (see Figure 1). The characteristics of resilient teachers are explored at the top of the model. The traits of personal resilience in the fields of organizational change management, as described by Hoopes and Kelly (2004), and resilience in schools, as described by Henderson and Milstein (2003), were used in this study. Characteristics of resilient teachers described in the literature were also explained in the model (Huisman, Singer, & Catapano, 2010; Johnson et al., 2015; Mansfield, Beltman, & Price, 2014). Professional development engagement is explained by the teacher change process described by Clarke and Hollingsworth (2002). Fessler and Christensen (1992) also explored the impact of career stage on professional development engagement and informed the study's model. The actions of participation, value, and implementation were used to describe the process of full engagement in professional development, which embodies the actions in the Clarke and Hollingsworth model. The components of career satisfaction, described by Lester (1987), are explored in the career satisfaction portion of the model. The focus of this inquiry was to explore the relationship between resilience, career satisfaction, and teacher change.

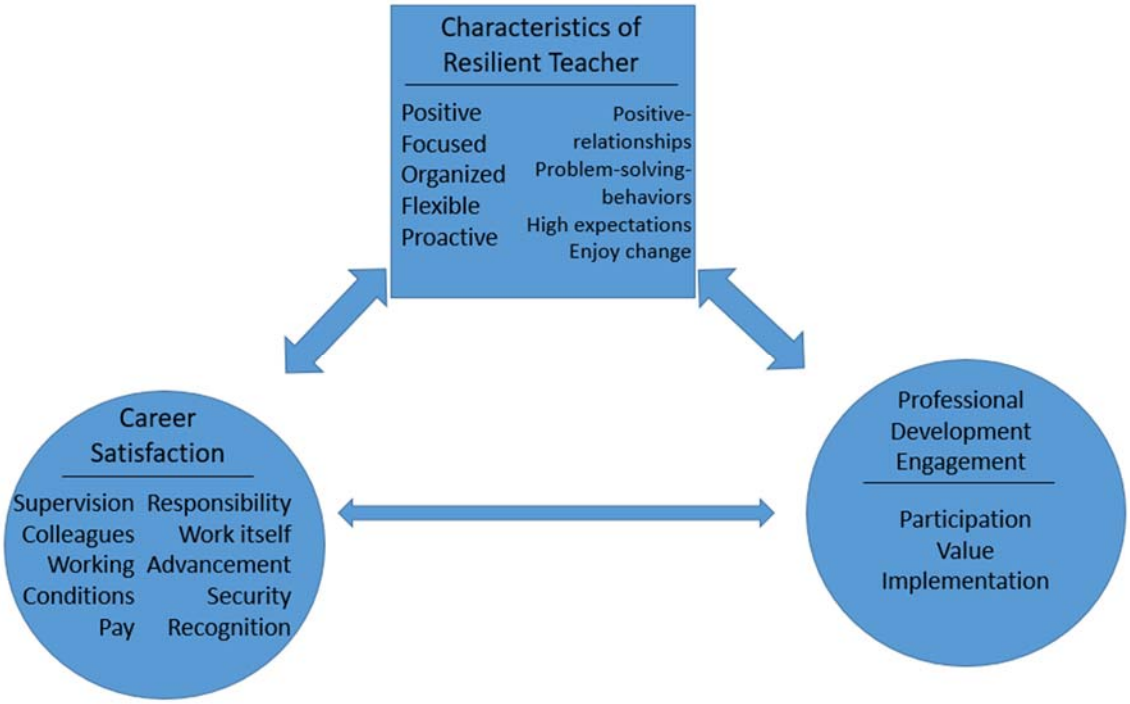


*Figure 1.* Conceptual model exploring the relationship between resilience, career satisfaction, and professional development engagement.

Evidence exists in the literature to suggest a link between professional development engagement, career satisfaction, and resilience. Patterson, Collins, and Abbott (2004) found resilient teachers placed a high premium on professional development and served as mentors for others. Castro, Kelly, and Shih (2010) described being engaged in professional growth as a manifestation of resilient behavior. Leroux and Theoret (2014) found a relationship between teacher reflection and resilience. Tait (2008) found resilient teachers had a high level of career satisfaction through their first year teaching despite reporting high levels of stress. Sorensen and McKim (2014) found a relationship between job satisfaction and professional commitment for agriscience teachers. Some evidence also suggest demographic factors could influence resilience (Rutter, 1979; 1985).

## Purpose and Objectives

The purpose of this study was to determine if personal resilience is a predictor of professional development engagement and career satisfaction of agriscience teachers. This study explores research in research priority area 5 of the American Association for Agricultural Education national research agenda: efficient and effective agricultural education programs, specifically improving program development, delivery, and evaluation of professional development programs (Thoron, Myers, & Barrick, 2016). The study was guided by four objectives:

1. Describe the personal resilience of agriscience teachers, based on personal and professional characteristics.
2. Describe the relationship between personal resilience, professional development engagement, career satisfaction, personal characteristics and professional characteristics.
3. Determine if personal resilience predicts the professional development engagement of agriscience teachers.

4. Determine if personal resilience predicts the career satisfaction of agriscience teachers.

## Methods

The population of interest for this study was middle school and high school agriscience teachers in the United States. Four states were purposefully selected to participate in this study. Geographical diversity was the primary selection factor. The American Association for Agricultural Education regions were used to define the regions. Two states, Florida and North Carolina, represented the southern region. Minnesota represented in the North-Central region, and Colorado represented the Western region. Multiple states were also selected by the researcher to represent variations in professional development opportunities and dynamics in the teacher groups that existed from state to state and could have impacted teachers' professional development participation. A census of agriscience teachers was taken in each state. One-hundred and twenty seven teachers were found in Colorado, 400 teachers in Florida, 243 teachers in Minnesota, and 483 teachers in North Carolina. The sampling frame was obtained from the respective state agricultural education coordinators. The instrument was pilot tested with 110 teachers in West Virginia.

The instrument contained three sections. The Personal Resilience Questionnaire was a preexisting scale comprised of 70 questions with a six-point Likert-type scale with response options ranging from *strongly disagree* to *strongly agree*. Ten questions comprised each construct. The proprietary scoring system yielded responses for each construct that ranges on a scale of 0 to100. Missing scores were imputed based on the average responses from those scales where more than one half of the answers in the scale were available (Enders, 2010). Cronbach's alpha coefficients on the pilot test were .83 for positive: the world, .81 for positive: self, .82 for focused, .71 for flexible: thoughts, .74 for flexible: social, .68 for organized, and .65 for proactive. According to Nunnally (1978), the acceptable levels of reliability must be above .70. Because two of the subscales fell below the recommendation of Nunnally, Cronbach's alpha coefficients were calculated *post hoc*. The subscales positive: world (.80), positive: self (.75), focused (.77), and organized (.71) were found to be in the acceptable range.

The professional development engagement scale was developed by the researchers. Because the objectives of the study required an investigation of professional development participation for agriscience teachers, scales developed by researchers in other fields did not provide sufficient relevance. Moreover, a preexisting scale was not found in the agriscience teacher literature. Therefore, a scale was created using the definition of professional development and core conceptual framework for studying the effects of professional development proposed by Desimone (2009).

The definition of professional development established by Desimone (2009) provided 10 unique areas of professional development practice suitable for contextualization for agriscience teachers, which included (a) workshops related to agricultural education, (b) workshops in the school/district, (c) coaching and/or mentoring, (d) serving in leadership roles, (e) professional reading, (f) formal coursework, (g) informal dialogue, (h) professional learning communities, (i) observing others teach, and (j) feedback from others observing their teaching. The proposed core conceptual framework for studying the effects of professional development on teachers and students provided three levels for each item. The first level measured teachers' participation in each type of professional development, the second measured the teacher's perceived value of professional development, and the final measured the level of integration of the professional development practice into each teacher's instruction. The instrument contained 30 statements designed to measure professional development. The instrument was determined to be a valid

instrument by a panel of experts, including a professor in agricultural education, an assistant professor in extension education, and an associate professor in education. The internal reliability was above the acceptable range with a Cronbach's alpha of 0.91. Personal and professional characteristics were also collected.

The professional development engagement scale was a five-item semantic-differential developed from the Teacher Job Satisfaction Questionnaire (TJSQ) (Lester, 1987). The TJSQ and the five-item scale were given to the pilot group. The Cronbach's alpha for the five-item scale was .97 for the pilot group and was found to have a strong positive correlation ($r = .68$) with the TJSQ. Because the researcher-developed semantic differential, career satisfaction scale was found to be a valid and reliable instrument, the TJSQ was not included in the study's instrument.

A mixed-mode survey that employed a web-preferred approach was delivered according to the Tailored Design Method (Dillman, Smyth, & Christian, 2014). A pre-notice letter with a $1.00 incentive was provided to the Florida, Minnesota, and North Carolina teachers. Store coupons, including a certificate for a free hat from Murdock's, were provided to the Colorado teachers. Email contacts with a link to the survey instrument were used after the initial contact. A thank-you/reminder post-card was sent after three rounds of email contacts. A postal mailed paper questionnaire was sent to the non-respondents with a business reply envelope after a fourth email contact was made. The usable response rate was 72.5% ($n = 892$). A Chi-square test was not significant when compared to the distribution of non-respondents' and respondents' by state ($X^2 = 2.92$; $p = .57$). Differences in personal and professional characteristics were compared between early and late respondents (Lindner, Murphy, & Briers, 2001). Five-hundred thirteen early respondents responded to the first two contacts and 355 late respondents responded after the first two contacts. No significant differences for age were found with a $X^2$ value of 38.46 and a *p-value* of .74. In addition, no significant differences in the number of years of teaching experience were found ($X^2 = 32.36$; $p = .35$).

Data were analyzed using SPSS version 23. Basic descriptive statistics and correlations were calculated for the major variables in the study. Backwards linear regression was used to determine if the characteristics of resilience was a predictor for professional development engagement and career satisfaction when controlling for personal and professional variables. Two separate regression models were used for each dependent variable. According to Agresti and Finlay (2009), the assumptions of multiple linear regression are linearity exists between the variables, little or no collinearity, normality, and homoscedacity. Correlation coefficients were calculated to ensure collinearity did not exist in the model. Hoyt, Imel, and Chan (2008) explained correlations above .70 should be examined for collinearity. A correlation between the variables positive: world and focused, both from the personal resilience questionnaire, was $r = .76$ and above the threshold. The Pearson *r* was above .50 for several other variables in the overall PRQ scale as well, which was described by Miller (1998) as a substantial correlation. Collinearity diagnostics were analyzed post hoc in the linear regression analysis using tolerance and Variance Inflation Factor (VIF) values. Both values were established a priori and followed the recommendations of Agresti and Finlay. The assumption of normality was examined by analyzing histograms and by using the indexes of skewness and kurtosis. The assumptions of collinearity and normality were not found to be violated. Skewness and kurtosis were determined to be within the acceptable bounds for inclusion in linear regression models (George & Mallery, 2010). Scatterplots were examined and the assumption of linearity was not violated (Miller, 1998). Residual scatterplots showed no evidence of homoscedacity or heteroscedacity.

## Results

The characteristics of resilience of agriscience teachers based on personal and professional factors was determined. Because the subscales that measured flexible: thoughts, flexible: social, and proactive were not found to be reliable, the mean scores were not calculated for those variables. Each characteristic of resilience was calculated as a value from 0 to 100, which represented the range of possible scores. The overall resilience measured for the four subscales was 68.9 (*SD* = 12.9) for positive: the world, 76.6 (*SD* = 11.0) for positive: self, 73.1 (*SD* = 11.9) for focused, and 60.8 (*SD* = 13.3) for organized (see Table 1).

The PRQ is a widely used instrument with more than 50,000 completed PRQ instruments. Due to the size of the data, standardized percentage (percentile) scores were available for the respondents in this study. These standardized percentage scores show the characteristics of resilience as compared to the general population. The mean standardized percentage scores for the personal resilience characteristics were 41.3 (*SD* = 28.3) for positive: world, 59.7 (*SD* = 27.2) for positive: self, 46.1 (*SD* = 27.8) for focused, and 45.0 (*SD* = 29.3) for organized. The standardized percentages showed that the agriscience teachers had moderate levels of personal resilience compared to others who had taken the PRQ. The standard deviation scores were fairly high for these areas, especially when compared to the standard deviations of raw scores, which indicated a more erratic distribution of the standardized scores.

Table 1

*Mean Scores for Personal Resilience Characteristics*

| | *M* | *SD* |
|---|---|---|
| All Participants (*n* = 892) | | |
| Positive: world | 68.9 | 12.9 |
| Positive: self | 76.6 | 11.0 |
| Focused | 73.1 | 11.9 |
| Organized | 60.8 | 13.3 |

*Note*. Characteristics of Personal Resilience are on a scale from 0 to 100

The purpose of objective two was to describe the relationship between the characteristics of resilience, professional development engagement, career satisfaction, personal variables, and professional variables. Pearson *r* correlations were used for comparisons between continuous variables. Point-biserial correlations were used for comparisons that included dichotomous variables, such as the categorical variables dummy-coded for entry in the study's regression model. Although several of the correlations were significant, Miller (1998) explained that statistical significance and practical significance have different implications. Therefore, significant correlations were not reported. The relationship between the teachers' personal resilience characteristics ranged from *r* = .76, a very high and positive relationship between the variables focused and positive: self, and .23, a low and positive correlation between the variables positive: world and organized. Positive: world had substantial and positive correlations with the variables positive: self (*r* = .66) and focused (*r* = .64).

Professional development engagement and career satisfaction had a moderate and positive correlation (*r* = .34). The relationships between the teachers' personal resilience characteristics, professional development engagement, and career satisfaction ranged from *r* = .41 (positive: world and career satisfaction) to *r* = .16 (Organized and professional development engagement).

A moderate and negative relationship existed between those teachers who taught middle school students and those who taught high school students ($r_{pb}$ = -.34), where teachers could indicate yes or no for both options. The nature of this relationship indicated more teachers taught high school courses and those teachers who taught high school were more likely to only teach high school courses. A moderate and negative relationship was found between sex and years teaching ($r_{pb}$ = -.34), which showed that more new teachers were female. Years teaching was also correlated to teaching a subject other than agriculture ($r_{pb}$ = -.29), where teachers with less experience were more likely to teach other subjects. A substantial and negative correlation ($r_{pb}$ = -.34) was found between the dummy-coded variable that differentiated between those who earned $40,000-$59,999 in their household to those who earned less than $40,000 with the variable that compared single individuals and married individuals.

A stepwise backwards multiple-linear regression model was used to determine if the personal resilience characteristics and personal and professional characteristics served as predictors for professional development engagement. This type of regression modeling was determined to be the most appropriate because of the exploratory nature of this study (Agresti & Finlay, 2009). The multi-collinearity diagnostics did not indicate any violations of the assumption of multi-collinearity. The regression model contained 26 factors, which included the categorical characteristics as dummy-coded variables. The 18th model was the most parsimonious model and was significant [$F$ (11, 824) = 12.85; $p < .01$]. The linear combination of all independent variables in the final model predicted 13.7% of the variance in professional development engagement, as indicated by the adjusted $R^2$. The standardized beta coefficients are displayed in Table 2. Because standardized beta coefficients were used, the model should be interpreted using z-scores. As the z-score for each of the variables increased by the amount of each beta coefficient, the predicted professional development engagement score increased by one. The personal resilience characteristics positive: world ($\beta$ = .18; $p < .01$) and focused ($\beta$ = .20; $p < .01$) were both significant predictors of resilience.

The statistically significant professional characteristics were years of teaching experience ($\beta$ = -.09; $p < .05$), and Florida agriscience teachers ($\beta$ = -.08; $p$ = .02). The statistically significant personal characteristics included in the final model were female ($\beta$ = .09; $p < .05$), having one child ($\beta$ = -.07; $p < .05$), and non-white and Hispanic ($\beta$ = .11; $p < .01$). The model indicated that as positive: world increased by 12.9, the predicted professional development engagement increased by 2.41 assuming the other variables remain constant. The model also indicated that as focused increased by 11.9 the predicted professional development engagement increased by 2.68 assuming the other variables remain constant. As years of teaching increased by 9.46 the predicted professional development engagement decreased by 1.20 assuming the other variables remain constant. The model also indicated Florida agriscience teachers, individuals with one child, and white/non-Hispanic individuals were less likely to be engaged in professional development than the study's comparison groups assuming the other variables remain constant.

Table 2.

*Backwards Multiple Regression of Professional Development Engagement on Selected Factors*

| | Standardized $\beta$ | $p$ |
|---|---|---|
| Constant | 81.88 | |
| Positive: World | .18 | <.01** |
| Focused | .20 | <.01** |
| Years of Teaching Experience | -.09 | .02* |
| Colorado Agriscience Teacher[a] | -.02 | .63 |
| Florida Agriscience Teacher[a] | -.08 | .02* |
| Minnesota Agriscience Teacher[a] | .07 | .06 |
| Female | .09 | .01* |
| One Child [b] | -.07 | .03* |
| Two Children[b] | -.05 | .14 |
| Three Children[b] | .00 | .99 |
| Non-white and Hispanic | .09 | <.01** |

*Note.* Adjusted $R^2$ = .137

[a]North Carolina served as the comparison group. [b]No children served as the comparison group. *$p$ < .05; **$p$ < .01

The statistically significant professional characteristics were years of teaching experience ($\beta$ = -.09; $p$ < .05), and Florida agriscience teachers ($\beta$ = -.08; $p$ = .02). The statistically significant personal characteristics included in the final model were female ($\beta$ = .09; $p$ < .05), having one child ($\beta$ = -.07; $p$ < .05), and non-white and Hispanic ($\beta$ = .11; $p$ < .01). The model indicated that as positive: world increased by 12.9, the predicted professional development engagement increased by 2.41 assuming the other variables remain constant. The model also indicated that as focused increased by 11.9 the predicted professional development engagement increased by 2.68 assuming the other variables remain constant. As years of teaching increased by 9.46 the predicted professional development engagement decreased by 1.20 assuming the other variables remain constant. The model also indicated Florida agriscience teachers, individuals with one child, and white/non-Hispanic individuals were less likely to be engaged in professional development than the study's comparison groups assuming the other variables remain constant.

A stepwise backwards multiple regression model was used to determine if the personal resilience characteristics, as well as professional, and personal characteristics served as predictors for career satisfaction. The tests of multi-collinearity did not indicate any violations of assumptions. Twenty-six variables were entered in the initial regression model, which included the categorical characteristic variables as dummy-coded variables. The 24th model was the most parsimonious model and was significant [F (3, 802) = 73.61; $p$ < .01]. The linear combination of the variables in the model predicted 21.4% of the variance in career satisfaction as determined by the adjusted $R^2$. The standardized beta coefficients are displayed in Table 3.

The personal resilience characteristics positive: world ($\beta$ = .22; $p$ < .01) and focused ($\beta$ = .25; $p$ < .01) were both significant predictors of resilience (see Table 3). The professional

characteristic years of teaching experience was also a significant predictor in the model ($\beta = .11$; $p < .01$). The standardized beta coefficients describe the change in predicted career satisfaction score in terms of standard deviation increases in the predictor variables when controlling for the other variables in the model. This model predicted as individuals' positive: world increased by 12.9, their predicted career satisfaction increased by 0.97; as focused increased by 11.9, their career satisfaction increased by 1.10; and as years of teaching experience increased by 9.46, teachers' career satisfaction increased by 0.48.

Table 3

*Backwards Multiple Regression of Career Satisfaction on Selected Factors*

| | Final Model | *p* |
|---|---|---|
| Constant | 7.10 | |
| Positive: world | .22** | <.01 |
| Focused | .25** | <.01 |
| Years of teaching experience | .11** | <.01 |

*Note*: Adjusted $R^2 = .214$; $^{**}p < .01$

## Conclusions and Recommendations

The purpose of this study was to determine if personal resilience was a predictor of professional development engagement and career satisfaction of agriscience teachers. The results revealed the linear combination of personal resilience characteristics positive: world and focused, along with the personal and professional variables, explained 13.7% of the variance in professional development engagement. Thus, as these personal resilience factors increased, the predicted professional development engagement increased. If personal resilience were a static variable, these findings would not hold implications for agriscience teachers. However, because personal resilience can be improved, so too can professional development engagement.

More than 86% of the variance regarding professional development engagement was explained by other variables. Determining these variables should be the focus of future studies. It is important to note, only four personal resilience characteristics were included in this model, and only two were significant. For individuals to improve their resilience, Conner (1993) recommended that individuals focus on the weak areas in their resilience profile and improve those areas. The implications for this finding should be examined on several levels. First, those who are planning and implementing professional development should consider ways to improve the resilience of agriscience teachers in the areas of positive: world and focused. Second, agriscience teachers should consider ways to improve their own resilience and work to become more resilient individuals.

Years of teaching experience served as a significant predictor of professional development engagement and career satisfaction in the study's regression models. These findings indicated teachers who are later in their careers may be less engaged in professional development. Further research is needed to determine the types of professional development appropriate for teachers at different times in their careers. Fessler and Christensen (1992) proposed similar practices for teacher professional development.

Florida agriscience teachers was a significant predictor in the model, where Florida teachers had lower scores in their professional development engagement when compared to North

Carolina teachers. The possibility of professional development differences was a reason multiple states were selected for the study. An analysis of the effective characteristics of professional development that lead to engagement would illuminate these findings and is recommended. While making comparisons between states was not the purpose of this study, these findings do suggest that variability in professional development exists between states. Because professional development opportunities are unique to each state, school-based agricultural education leaders should examine the professional development offerings in their state to encourage full engagement for teachers and encourage them to develop their resilience. Future studies should be conducted to determine how differences in state professional development structures impact engagement and ultimately influence student learning.

Female agriscience teachers, compared to males, served as a predictor variable in the model. The beta for the variable was positive, which indicated females were more likely to be resilient than males. The mean score for professional development engagement was three points higher for females, which was not tested for significance. The point-biserial correlation between males and females and years teaching was -.33, which matched the findings of Foster, Lawver, and Smith (2014) that showed females are entering the profession at a much higher rate than males. Werner and Smith (2001) and Rutter (1979, 1985) found females tend to be more resilient than males, which was not indicated by the means of the personal resilience characteristics used in this study. However, because sex served as a significant predictor, evidence existed of a possible interplay among the variables.

Having no children compared to having one child under 18 living in the household was a significant predictor of professional development engagement in the model. It is interesting to note that comparisons between no children, two children, and three or more children were not significant predictors. Fessler and Christensen (1992) theorized that a significant life event may lead to change in professional development participation. Although the age of the children was not part of the instrument, the inclusion of this variable in the model raises questions about the impact of having a child on teachers' professional development engagement. Further studies should be conducted to determine what effects significant life events may have on professional development engagement, and, more important, what support should be provided to help agriscience teachers grow and develop. Resilience affects an individual's ability to maintain a high level of performance despite difficult or stressful events. Further research is needed to determine if resilience is useful during times of family change or if a decrease in professional development engagement is temporary and should be expected.

The mean scores for professional development engagement were slightly higher for the non-white and Hispanic group than the rest of the population. Despite having a low number ($n$ = 43) for this group, these findings showed that non-white or Hispanic agriscience teachers may be more likely to engage in professional development practices, particularly as their resilience increases. Further research is needed to explore the relationship between resilience and ethnicity.

The linear combination of personal resilience characteristics positive: world, focused, and years of teaching experience predicted 21.4% of the variance in career satisfaction. Because this model explained 21.4% of the variance in career satisfaction, resilience should be considered a significant factor in explaining career satisfaction of agriscience teachers. This study did not establish time order; therefore, it cannot be concluded that an increase in these personal resilience characteristics will cause an increase in career satisfaction. It does, however, point to a relationship between these variables.

These data showed that more experienced teachers are more likely to be satisfied in their careers. However, it is reasonable to assume that those who enjoy teaching agriscience are more likely to remain in that career over a longer period of time, and those who are unsatisfied are likely to seek other career opportunities. This also suggests that career satisfaction could be a predictor of career exit or burnout, but drawing conclusions about these variables was beyond the scope of this study.

The areas of positive: world and focused are particularly telling for agriscience teachers. Positive: world describes an individual's optimism about the world around them. Individuals who are resilient in this area are able to see the positive aspects of disruptive change. Teachers are faced with a high level of change and uncertainty (Henderson & Milstein, 2003). They should be encouraged to develop strategies to cope with disruptive change and to see the positive outcomes that come from change. Although change may seem frustrating and bring about unknowns, it could have positive implications for students.

Focused refers to an individual's ability to have a purpose or direction that guides his/her actions and is defined by clear goals. Because agriscience programs are diverse and have so many opportunities for students and teachers, it is imperative teachers have a level of focus that guides their programs. Without this focus, it may be easy for some agriscience teachers to become overwhelmed by the myriad available opportunities. Agriscience teachers should be encouraged to set clear, long-term goals and priorities that guide their actions. Organizations that provide support for agriscience teachers should also offer support and structure for helping teachers to establish these goals.

The literature has shown that resilience could be enhanced for teachers, in general, through collegial and collaborative support (Gu, 2014), positive relationships, work-life balance (Gu & Day, 2013), and participation in professional development (Huisman et al., 2010). This study provided quantitative data to support for these qualitative findings. Thieman et al. (2012) conducted a cursory investigation regarding the potential of improved resilience for agriscience teachers. We echo their call for more research on the resilience of agriscience teachers. Agriscience teachers are faced with unique and challenging career responsibilities (Phipps, Osborne, Dyer, & Ball, 2008). Further, they operate in a complex web of professional development and growth systems (Greiman, 2010). Because of these challenges, the individuals involved in these systems, including teachers, teacher educators, school staff, FFA staff, state school-based agricultural education leaders and state and national NAAE leaders, should be encouraged to provide high quality professional development offerings and work with teachers to improve their resilience in hopes of making them more satisfied in their careers.

The PRQ was used because it was an established instrument in an emerging area of study. However, only four constructs of the instrument were deemed reliable. The PRQ has significant value as a commercial instrument to help individuals and groups become aware and improve their resilience. Moreover, because of the issues encountered in this research study, new measures should be developed that accurately measure the resilience of agriscience teachers. Because the flexible: thoughts, flexible: social, and proactive variables were not included in the model, we can only speculate as to their predictive power as related to the study's other major variables. Further research is needed to develop a comprehensive instrument that provides a valid and reliable measure of resilience for agriscience teachers.

Additional investigation is needed in the area of resilience as it relates to agriscience teachers. This study found that two of the characteristics of resilience were predictors for professional development engagement and career satisfaction. More studies using various measures

of resilience could be informative. Research related to personal resilience should determine the utility of resilience for agriscience teachers. The data in this study suggested resilient agriscience teachers tend to be more engaged in professional development and more satisfied in their careers. However, resilience could lead to other factors for agriscience teachers. Future studies should examine if resilience is related to student learning outcome variables.

Research related to resilient agriscience teachers should also examine the nature of resilience for agriscience teachers. Hoopes and Kelly (2004) proposed that resilience is amenable. However, how often or how much resilience changes during a person's career is not known. Future research should investigate how resilience changes for agriscience teachers over time. Research should be conducted to determine effective ways to improve resilience for agriscience teachers throughout their careers. The literature has shown that positive relationships could have an impact on resilience (e.g., Johnson et al., 2015). The findings of this study suggested teachers value mentor/mentee relationships and informal dialogue with peers. Inquiries should be conducted to determine the effects, particularly as they relate to the development of personal resilience, of programs that foster the development of mentor/mentee relationships and informal dialogue between agriscience teachers. Because Henderson and Milstein (2003) postulated that resilience can be fostered in teachers, further research is needed to determine other ways to improve the resilience of practicing and preservice agriscience teachers.

Agriscience teachers are often confronted with change. National policy, local school initiatives, state school-based agricultural education groups, and national and state FFA associations are just a few of the agents that can introduce significant change into the practice of teachers. The findings of this study suggests teachers are more satisfied in their career if they focus on the positives of disruptive change. Agriscience teachers should be encouraged to develop collaborative support systems to help them manage change and focus on its positive impacts for themselves and their students.

The data in this study also showed a connection between the personal resilience characteristic of focused and professional development engagement and career satisfaction. Agricultural education began with the simple purpose of educating boys to be more productive on their farms or in specific agricultural vocations (Phipps et al., 2008). Today, the focus of school-based agricultural education has changed, and agriscience teachers are charged with providing education for diverse students to prepare for a number of careers in the agricultural industry, as well as education to create an agriculturally literate citizenry (Roberts & Ball, 2009). The opportunities for students have multiplied, which can create a burden on teachers to provide as many opportunities for their students as possible. The findings of this study showed that agriscience teachers may benefit from focused goal setting for their programs and themselves. Having a clear aim for their programs and students could encourage teachers to emphasize the opportunities that help meet the overall goals of their program and avoid becoming overcommitted. Mentor relationships or informal dialogue could provide this support. Advisory councils and FFA Alumni chapters also could be a source of such support for agriscience teachers.

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