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Laura L. (Lemons) Greenhaw
Mississippi State University,

M. Todd Brashears
Texas Tech University

Scott Burris
Texas Tech University

Courtney Meyers
Texas Tech University

Carley Morrison
Mississippi State University

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Preliminary Development of an Attrition Risk Assessment Instrument for Secondary Agricultural Educators

Laura L. (Lemons) Greenhaw[1], M. Todd Brashears[2], Scott Burris[3], Courtney Meyers[4], & Carley C. Morrison[5]

Abstract

Secondary agricultural education has consistently faced a shortage of teachers for the past several decades. Because there are not enough newly qualified teachers certified annually to fill all the vacancies, attrition must be addressed. The purpose of this research was to develop and pilot test an attrition risk assessment instrument. Items were written and included in a preliminary instrument based on existing literature as well as a qualitative study we conducted previously. Principal components analysis resulted in a 25-question instrument, with 17 questions measuring attrition risk in four constructs including alternative career opportunities, expectations versus realities, passions, and people frustrations. Cronbach's alpha indicated overall instrument reliability was α = .76. Individual construct reliabilities ranged from α = .57 to α = .85. Recommendations include further development and refinement of constructs and questions. Additionally, longitudinal data should be collected in order to identify the threshold magnitude of each risk factor that results in actual exit of a teacher from the profession. Finally, implementation of the instrument could assist researchers and teacher educators in identifying the most prevalent risks contributing to teacher attrition in a population.

Keywords: attrition, principal components analysis, instrument development, teacher education

Introduction

There is a perpetual shortfall of teachers in the secondary agriculture classroom (Kantrovich, 2010) and the broad profession of agricultural education recognizes this shortage of quality teachers. The National Council for Agricultural Education (The Council) and the American Association for Agricultural Education (AAAE) have both placed an emphasis on ensuring a sufficient quantity of high quality agricultural educators (Doerfert, 2011; The National Council for Agricultural Education, 2000). Three of the six research priority areas published in the 2011-2015 AAAE National Research Agenda related either directly or indirectly to ensuring an adequate

[1] Laura L. (Lemons) Greenhaw is an Assistant Professor in the School of Human Sciences at Mississippi State University, Box 9745, Mississippi State, MS, 39762, laura.l.greenhaw@msstate.edu.
[2] M. Todd Brashears is a Professor of Agricultural Leadership in the Department of Agricultural Education and Communications, Texas Tech University; 15th & Detroit Box 42131, Lubbock, TX 79409-2131, todd.brashears@ttu.edu.
[3] Scott Burris is a Professor of Agricultural Education in the Department of Agricultural Education and Communications, Texas Tech University; 15th & Detroit Box 42131, Lubbock, TX 79409-2131, scott.burris@ttu.edu.
[4] Courtney Meyers is an Associate Professor of Agricultural Communications in the Department of Agricultural Education and Communications at Texas Tech University; 15th & Detroit Box 42131, Lubbock, TX 79409-2131, courtney.meyers@ttu.edu.
[5] Carley C. Morrison is a doctoral candidate in the School of Human Sciences at Mississippi State University, Box 9745, Mississippi State, MS, 39762, cpc215@msstate.edu

supply of agriculture teachers (Doerfert, 2011). Further, the need to retain quality educators in secondary agricultural classrooms was embedded in similar priorities found in the 2016-2020 AAAE National Research Agenda (Roberts, Harder, & Brashears, 2016)

In 2009, over 660 (6.3%) of the 10,600 secondary agricultural education positions nationwide called for replacements (Kantrovich, 2010). Despite nearly 400 emergency certifications, 21 programs were unable to operate due to the lack of a qualified teacher (Kantrovich, 2010). The national agricultural education supply and demand study was repeated in 2014, revealing similar statistics (Foster, Lawver, & Smith, 2014). Just over 1,300 of the 10,874 school-based agricultural educators across the nation were newly hired for the 2014-2015 school year (Foster, Lawver, & Smith, 2014). Despite those 1,366 new hires, which included 183 non-licensed individuals, nearly 100 vacancies remained as of September 15, 2014 (Foster, Lawver, & Smith, 2016). Even more compelling, states participating in the study revealed that only 24.5% of teachers not returning to the classroom for the 2014-2015 school year were retiring (Foster, Lawver, & Smith, 2014).

Two solutions have been proposed to address this shortage: preparing more newly qualified teachers to be recruited into the profession, and reducing the number of teachers who choose to leave the profession. Ingersoll (2003) suggested that retaining qualified teachers is of greater value than increasing the number of newly certified teachers entering the profession, providing the analogy of pouring more water into a bucket riddled with holes, while failing to patch any of the holes. Our profession must begin to remedy some of the holes through which our teachers are falling. In order to keep qualified agricultural educators in classrooms and reduce attrition, we must identify and address their reasons for leaving the profession.

A number of studies have investigated variables in current teachers such as satisfaction with their job or problems they encounter (Cano & Miller, 1992; Murray, Flowers, Croom, & Wilson, 2011; Myers, Dyer & Washburn, 2005; Walker, Garton, & Kitchel, 2004), while other studies have investigated teachers' intent to remain in or commitment to the profession (Edwards & Briers, 2001; Kelsey, 2006; Knobloch & Whittington, 2003; Rice, LaVergne, & Gartin, 2011; Thobega & Miller, 2003). Few studies have investigated agriculture teacher attrition from the perspective of those who already exited the profession. We identified no studies that attempted to quantify the degree of attrition factors that ultimately results in a teacher's decision to leave. In addition, no instrument has been consistently used in the profession to identify the presence and magnitude of attrition risk factors in secondary agricultural educators. In a meta-analysis of research on teacher retention and attrition, Borman and Dowling (2008) suggested the problem of attrition could be addressed through policies and initiatives. However, with continually diminishing resources, the agricultural education profession would benefit from the ability to identify the most prevalent and pressing attrition risk factors. It is toward this end that we sought to develop an instrument to assess the presence of known attrition risk factors for secondary agricultural educators.

Conceptual Framework and Literature Review

Educational data is most frequently collected through the use of questionnaires (Radhakrishna, 2007). Radhakrishna (2007) outlines five sequential steps to developing a valid and reliable instrument, including: 1) background, 2) conceptualization, 3) format and data analysis, 4) establish validity, and 5) establish reliability. Step one provides a foundation for the process by clarifying the proposed research including purpose, objectives, audience, and other specifics. Steps two and three generate the questions or statements to be included, along with appropriate

measurement scales. Steps four and five establish validity and reliability which are necessary to reduce measurement error (Radhakrishna, 2007).

Regarding steps two and three, literature supports the use of several considerations for the identification and development of salient scales, including review of existing literature related to the research topic, review of existing instrumentation previously designed to measure constructs related to the research topic, qualitative investigation with relevant participants to confirm/contribute items and information associated with the research topic, and connection of developed scales to relevant theory (Aude, Mitchell, & Cordes, 2005; Milton, Watkins, Studdard & Burch, 2003; Walker & Fraser, 2005).

The attrition risk assessment instrument developed in this study was informed by Chapman's (1984) model of influences on teacher retention and the theory on teacher attrition as proposed by Grissmer and Kirby (1987). A review of literature regarding retention and attrition was conducted and helped to guide the development of the instrument. Finally, the instrument items and scales were influenced by qualitative interviews conducted with former secondary agriculture teachers regarding their decision to exit the profession (Lemons, Brashears, Burris, Meyers, & Price, 2015).

Chapman (1984) proposed that a teacher's decision to remain in the profession is the result of several factors including 1) personal characteristics, 2) educational preparation, 3) initial commitment, 4) quality of first employment, 5) integration into teaching, 6) external influences, and 7) career satisfaction. Grissmer and Kirby (1987) proposed a complementary theory of teacher attrition, suggesting that a teacher's exit from the profession is influenced by natural life and career cycles, where attrition occurs more frequently among novice teachers, decreases as experience increases, and then rises again as teachers near retirement age. In addition to this natural cycle, Grissmer and Kirby (1987) suggested that the following factors contribute to a teacher's decision to leave the profession: 1) the amount of human capital possessed in regard to teaching, 2) the amount and accuracy of information possessed when deciding to enter the profession, 3) previous work and teaching experience, 4) the likelihood of changes in family status after becoming employed, 5) salary and working conditions, and 6) characteristics and compensation of alternative job opportunities.

Literature related to teacher retention and attrition, including literature specific to CTE teachers, and even more specifically to agriculture teachers, lends support to the factors presented in these models. Novice and experienced agriculture teachers have reported problems related to low salaries, extensive responsibilities, lack of administrative support, balancing home and work life, and experiencing burnout (Boone & Boone, 2009; Cano & Miller, 1992; Chenevey, Ewing, & Whittington, 2008; Delnero & Montgomery, 2001; Foster, 2001; Murray, Flowers, Croom, & Wilson, 2011). Furthermore, while some literature differs slightly from the model of teacher retention and the theory of teacher attrition, specifically research regarding personal characteristics, studies investigating teacher commitment and intent to remain in the profession largely support them. It has been found that agricultural work experience, commitment to teaching agriculture, self-efficacy, and human capital investment in teaching agriculture all have a positive relationship with career longevity (Edwards & Briers, 2001; Kelsey, 2006; Knobloch & Whittington, 2003). Previous research has also shown that positive working environments including being surrounded by supportive people and having positive past experiences in high school and post-secondary agricultural education are related to teachers' decisions to enter and remain in the profession (Rice et al., 2011; Thobega & Miller, 2003; Todd, 1983).

Finally, Chapman (1984) illustrated job satisfaction as the final influence on teachers' decision to remain in the profession. Research on agriculture teachers largely disputes this, indicating that both leavers and stayers reported being satisfied with their agriculture teaching position (Bennett et al., 2002; Walker et al., 2004). Additionally, teachers currently teaching agriculture do not indicate dissatisfaction (Bennett, et al., 2002).

Our (Lemons et al., 2015) preceding qualitative research with former secondary agriculture teachers revealed themes supporting the model of teacher retention (Chapman, 1984), the theory of teacher attrition (Grissmer & Kirby, 1987) and existing literature on agricultural educators. Five themes emerged based on former agricultural educators' statements about the career they exited: 1) passion for the profession; 2) alternative opportunities; 3) expectations; 4) burdens, retrospectively; and 5) people (Lemons et al., 2015). Sub-themes of students, agriculture, and competition were identified under passion for the profession. Expectations resulted in sub-themes of self-expectations for the profession and expectations of others. Finally, multiple responsibilities, time, money, and satisfaction appeared as sub-themes of burdens, retrospectively. Some themes described motivators for teachers to remain in the profession, such as the passion held for their career and the people with whom they interacted. Other themes addressed the factors motivating them to exit the profession, even if these factors were recognized retrospectively.

The supporting nature of the four components (Chapman's model, Grissmer & Kirby's theory, existing literature, and preceding qualitative investigation) provided a strong framework within which to begin development of a survey instrument intended to measure the presence of risk factors related to attrition of secondary agricultural educators.

Radhakrishna (2007) indicates that a panel of experts should be used to establish validity of an instrument, and a pilot test is necessary to establish reliability. Factor analysis is performed to identify groups or clusters of variables within a data set (Field, 2009). According to Field (2009), factor analysis can be used to construct a questionnaire for measuring an underlying variable. In this case, we sought to measure the underlying variable of attrition risk through a set of possible factors identified through the conceptual framework, literature review and qualitative findings. Different types of factor analysis can be conducted, with principal components analysis (PCA) being the most common.

Purpose/Objectives

The purpose of this research was to develop a valid attrition risk assessment instrument for current secondary agricultural educators. The single objective of this study was: determine items and constructs for inclusion in an instrument to assess the presence of attrition risk factors for current secondary agricultural educators.

Methods/Procedures

The scope of this study extends only through the completion of the pilot test of the instrument with rigorous statistical analysis to establish its validity and reliability.

Instrument Development

As indicated in the literature review and purpose/objectives sections of this manuscript, Radhakrishna's (2007) first two steps of instrument development were completed. The third step, writing statements and questions, was addressed through the following procedures. According to Martinez-Pons (1997) there are four steps in developing items for an instrument: 1) determining

the number of items to use, 2) generating item prototypes, 3) determining the items' format, and 4) writing the items. Several items were developed for each construct, because, as Martinez-Pons (1997) explains, one single item does not completely and accurately measure a construct, but many items are needed to measure a portion of the construct. The more items measuring a construct, the more the construct is measured, thereby increasing accuracy of the instrument (Martinez-Pons, 1997). The number of items for the attrition risk assessment instrument was dependent on the framework previously described. Several item prototypes were drafted.

Once the items were determined, the format of a 5-point Likert scale was selected. Bradburn, Sudman, and Wansink (2004) identify the Likert scale as the most popular scaling technique in the field of attitude measurement. Furthermore, research shows that while including a median category does increase the number of respondents in that category, it does not affect the ratio of pro to con responses, therefore, Bradburn et al., (2004) recommend including a middle category unless there is a persuasive reason to exclude it.

To ensure validity of the instrument, drafted items were reviewed by a panel of experts, including former agriculture teachers, interviewees from the qualitative phase, and university agricultural education faculty with expertise in instrument development for survey research (Radhakrishna, 2007). Based on this expert review, a number of items were edited for clarity or eliminated as duplicate questions.

In accordance with protocol approved by the Texas Tech University Institutional Review Board, utilizing the tailored design method (Dillman, Smyth, & Christian, 2009), the instrument was administered electronically through Qualtrics™, an online survey website. An email invitation to participate in the research containing a link to the instrument was sent on January 31, 2013. A second email reminder was sent February 8, 2013. A third and final reminder was sent February 18, 2013.

Sample

The target population for this research was all secondary agriculture teachers in Texas. However, this was a pilot test with plans to implement the instrument once reliability and validity were established, therefore we restricted the sample to all agriculture teachers in three FFA Areas in Texas ($N = 321$).

Gorsuch (1983, as cited in Warmbrod, 2000) suggested that to perform PCA a minimum ratio of five individuals to every variable with no fewer than 100 individuals can be used when communalities are high and several items load to each factor. It was expected that adequate response would be received from the sample population ($N = 321$) to establish reliability and stability of factors. Further, Field (2009) reported that stability of factors can be established based on the combination of absolute sample size and absolute magnitude of factor loadings, where higher values of one can compensate for lower values of the other. Smaller sample sizes may be acceptable if factor loadings are high enough, and smaller factor loadings may be deemed acceptable with larger sample sizes. Of the 321 possible responses, 133 were received, a response rate of 41%. However only 114 (36%) of those were complete and acceptable to be included in the data analysis. Given a sample size of greater than 100, and satisfying the minimum ratio of five responses per variable, excluding the eight demographic questions, PCA was conducted on the data.

Data Analysis

Exploratory factor analysis in the form of principal components analysis (PCA) was conducted in SPSS® 18.0 to explore the data collected through the pilot test. Data were exported from Qualtrics™ directly into SPSS®18.0 for analysis. Eleven items, 13 – 19 and 22 – 25, were reverse coded so that all low scores reflected a negative response, indicating great potential for attrition, while higher scores reflected a positive response indicating greater potential for retention.

Reliability was calculated using Cronbach's alpha (Field, 2009). Reliability was calculated for each of the four subscales resulting from PCA, as well as for the instrument overall. Reliability scores are reported in the results.

Results

Thirty-two items were formatted for inclusion in the electronic questionnaire. Eight questions collected demographic information including birth year, sex, marital status, and number and ages of children. Additionally, participants were asked to report the year they began their career as an agriculture teacher. Finally, participants were asked to list the certifications or licensures they currently possessed as well as any that were in progress.

The remaining 24 items referred to the identified potential attrition risk factors. One question (Q9) was dichotomous, requiring a "yes" or "no" response. Twenty three questions (Q10 – Q32) utilized a 5-point Likert scale for response (1 = *strongly disagree*, 5 = *strongly agree*) (see Figure 1).

Principal Components Analysis

The correlation matrix for questions nine through 32 was inspected for clusters or groups of correlations among variables. Finding that question nine showed only one significant correlation with another item, it was eliminated from any further analysis. PCA was conducted on the remaining 23 items, using oblique direct oblimin rotation. Oblique rotation should be used when there is reason to believe that the factors should be related (Field, 2009). The Kaiser-Meyer-Olkin measure verified the sampling adequacy for the analysis, $KMO = .68$, indicating that the patterns of correlations among the variables were compact enough for factor analysis to yield distinct and reliable factors (Kaiser, 1970, as cited in Field, 2009). Any value less than .5 is unacceptable, while values .5 to .7 are mediocre, .7 to .8 are good, .8 to .9 are great and greater than .9 are superb (Hutcheson & Sofroniou, 1999, as cited in Field, 2009). The KMO values for each item were also inspected, revealing a less than acceptable value for question 14, $KMO = .43$. Therefore, question 14 was excluded from any further analysis. Bartlett's test of sphericity $X^2 (231) = 953.42$, $p < .001$, indicated that correlations between items were sufficiently large for PCA.

An initial analysis was run with the remaining 22 components, using the Kaiser criterion (Field, 2009) to extract factors with Eigenvalues greater than 1. This resulted in seven factors being extracted with too few items loading per factor, causing difficulty in interpretation. The scree plot was inspected and found to have a clear point of inflection at four factors (see Figure 2). The four components had Eigenvalues over Kaiser's criteria of 1 and in combination explained 51.58% of the variance, therefore four factors were retained for the final analysis.

Please respond to each statement by indicating your level of agreement.	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
10. I teach agriculture because I enjoy helping students succeed.	❍	❍	❍	❍	❍
11. I teach agriculture because I want to share my passion for agriculture with others.	❍	❍	❍	❍	❍
12. I teach agriculture because I enjoy competition.	❍	❍	❍	❍	❍
13. I am often frustrated because an increasing proportion of my students are not "traditional" agriculture students.	❍	❍	❍	❍	❍
14. I struggle to maintain a good relationship with my teaching partner.	❍	❍	❍	❍	❍
15. I am often frustrated when working with students' parents.	❍	❍	❍	❍	❍
16. My administrators are often a source of frustration for me.	❍	❍	❍	❍	❍
17. I would leave my position as an agriculture teacher for a job that requires less time away from home.	❍	❍	❍	❍	❍
18. I would leave my position as an agriculture teacher for a job that provided greater opportunity for advancement.	❍	❍	❍	❍	❍
19. I would leave my position as an agriculture teacher for a job with a higher salary.	❍	❍	❍	❍	❍
20. My family depends on my income contribution.	❍	❍	❍	❍	❍
21. I expect to teach secondary agriculture until I retire.	❍	❍	❍	❍	❍
22. I expect to pursue a position in administration in the future.	❍	❍	❍	❍	❍
23. Others expect too much from me as an agriculture teacher.	❍	❍	❍	❍	❍
24. I will be willing to leave my position as an agriculture teacher when I accomplish all the goals I have set for myself.	❍	❍	❍	❍	❍
25. I am preparing to take advantage of the right opportunity to leave my position as an agriculture teacher.	❍	❍	❍	❍	❍
26. It would take a unique set of circumstances for me to leave my position as an agriculture teacher.	❍	❍	❍	❍	❍
27. Time required	❍	❍	❍	❍	❍
28. Amount of work required	❍	❍	❍	❍	❍
29. Type of work required	❍	❍	❍	❍	❍
30. Difficulty of work	❍	❍	❍	❍	❍
31. Number of responsibilities	❍	❍	❍	❍	❍
32. My ability to be successful	❍	❍	❍	❍	❍

Figure 1. Pilot instrument administered through Qualtrics™

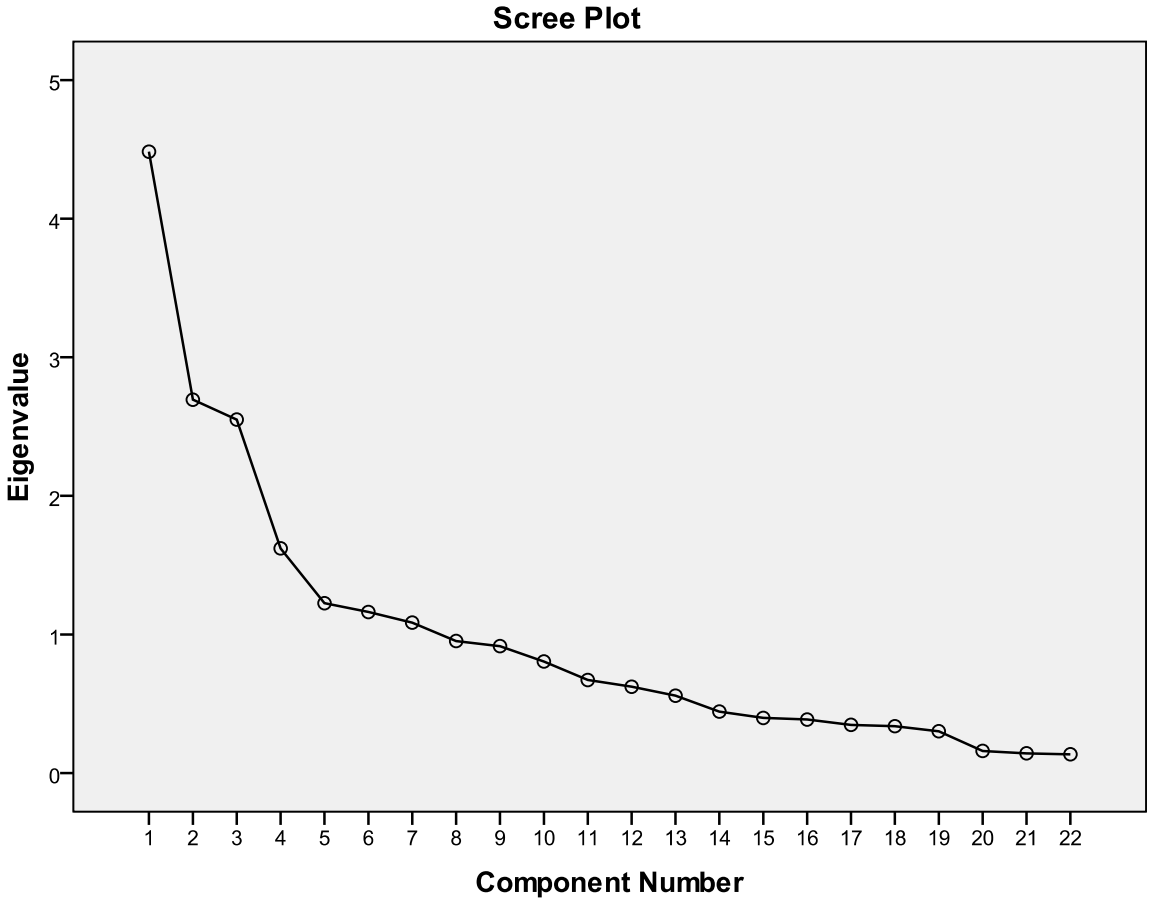

Figure 2. Scree plot depicting Eigenvalues of components

Oblique rotation, was selected, under the assumption that factors were not theoretically likely to be independent (Field, 2009). Specifically, direct oblimin, known as direct quartimin rotation, was selected to ensure high correlation of factors was not allowed (Field, 2009). Table 1 shows the pattern matrix factor loadings after rotation. The items that cluster on the same components suggest that component 1 represents alternative career opportunities, component 2 represents expectations versus realities, component 3 represents passion, and component 4 represents people frustrations.

Only items loading above the critical value .512 were retained (Stevens, 1996, as cited in Warmbrod, 2000). Additionally, items which cross-loaded on more than one factor at the critical value of .512 were eliminated. This resulted in five items being eliminated, including questions 21, 16, 23, 20, and 22. The remaining 17 items are summarized in Table 2.

Table 1

Summary of PCA with Oblique Rotation Results (Pattern Matrix) (N = 114)

	Rotated Factor Loadings			
Question Number	Alternative Career Opportunities	Expectations versus Realities	Passions	People Frustrations
18	**.85**			
19	**.78**			
25	**.76**			
17	**.69**			
21	.60			.51
26	**.60**			
24	**.57**			
16	.47			
23				
28		**.85**		
31		**.77**		
27		**.74**		
29		**.63**		
30		**.60**		
32		**.53**		
10			**.90**	
11			**.89**	
12			**.80**	
13				**-.76**
15				**-.51**
20				.50
22				.45
Eigenvalues	4.48	2.69	2.55	1.62
% variance	20.38	12.25	11.59	7.37

Note: only factor loadings above .40 are reported, bolded items are those retained

Table 2

Summary of retained items by component

Component	Question	Item
Alternative Career Opportunities		
	18*	I would leave my position as an agriculture teacher for a job that provided greater opportunity for advancement.
	19*	I would leave my position as an agriculture teacher for a job with a higher salary
	25*	I am preparing to take advantage of the right opportunity to leave my position as an agriculture teacher.
	17*	I would leave my position as an agriculture teacher for a job that requires less time away from home.
	26	It would take a unique set of circumstances for me to leave my position as an agriculture teacher.
	24*	I will be willing to leave my position as an agriculture teacher when I accomplish all the goals I have set for myself.
Expectations versus Realities		The realities of being a secondary agriculture teacher match my expectations in:
	28	Amount of work required
	31	Number of responsibilities
	27	Time required
	29	Type of work required
	30	Difficulty of work
	32	My ability to be successful
Passion		
	10	I teach agriculture because I enjoy helping students succeed.
	11	I teach agriculture because I want to share my passion for agriculture with others.
	12	I teach agriculture because I enjoy competition.
People Frustrations		
	13*	I am often frustrated because an increasing proportion of my students are not “traditional” agriculture students.
	15*	I am often frustrated when working with students’ parents.

Note. * indicates items that are reverse-coded.

Reliability

Reliability indicates how consistently an instrument reflects the construct it is designed to measure (Field, 2009). Cronbach's alpha was calculated for each of the attrition risk assessment subscales, as well as for the instrument overall (see Table 3).

Table 3

Summary of reliability scores (Cronbach's alpha)

Scale	Cronbach's alpha	N of Items
Alternative Career Opportunities	.83	6
Expectations versus Realities	.79	6
Passions	.85	3
People Frustrations	.57	2
Overall	.76	17

Cronbach's alpha indicates high reliability on subscales alternative career opportunities ($\alpha = .83$), expectations versus realities ($\alpha = .79$), and passions ($\alpha = .85$), as well as for the attrition risk assessment instrument overall ($\alpha = .76$). Reliability for the fourth subscale, people frustrations, was relatively low ($\alpha = .57$). However, the reliability statistics for the overall instrument were not affected by the deletion of the two items in the subscale people frustrations, so those items were retained on the final instrument.

Conclusions/Recommendations/Implications

This study sought to develop a valid attrition risk assessment instrument for current secondary agricultural educators. The research resulted in a 25-question instrument: eight demographic questions and 17 Likert scale items. The 17 items loaded onto four factors, subsequently named passion, alternative career opportunities, expectations versus realities, and people frustrations. Together, these four factors explain 51.58% of the variance. The first factor, passion, accounted for 20.38% of the variance. The second factor, alternative career opportunities, accounted for 12.25% of the variance. The factors expectations versus realities and people frustrations accounted for 11.59% and 7.37% of the variance, respectively. High reliability scores on three of the four subscales as well as the instrument overall indicated that the instrument is capable of collecting data identifying the presence of attrition risk factors among a sample of current agriculture teachers.

The constructs developed as a result of PCA reflect the components from which the items were developed: Chapman's (1983) model of teacher retention, Grissmer and Kirby's (1987) theory of teacher attrition, existing literature related to agriculture teacher retention and attrition, as well as our preceding qualitative findings (Lemons et al., 2015). This lends support to the accuracy of these components with regard to explaining agriculture teacher attrition. The factor loadings and reliability scores for the developed instrument imply that the foundational components provided accurate instrument items and constructs, which were similar to the perceptions of current

agriculture teachers. Strong reliability scores further confirmed that the instrument items and constructs consistently represented the attrition risk factors.

While these results and conclusions come with limitations due to the nature of the sample and the sample size, it remains a logical conclusion that the attrition risk assessment instrument can be utilized to begin identifying attrition risk factors present in a sample of current agriculture teachers. Once identified, those factors might be addressed and possibly reduced in some manner. Overall, low scores indicate greater presence of attrition risk factors in a sample. For example, agricultural educators who report a level of agreement within the alternative career opportunities construct may indicate a perception that teachers can achieve similar or greater benefits pursuing a different career. This could provide support for teacher advocates to pursue increased benefits for agricultural educators that make the career path more competitive with other careers. Similarly, data indicating disagreement that the realities of teaching secondary agriculture align with teachers' expectations may warrant consideration of modifications to pre-service preparation.

The primary recommendation for further research is continued development and refinement of this preliminary instrument, followed by implementation of the attrition risk assessment instrument on a larger sample of agriculture teachers. We suggest administering the instrument to additional populations of secondary agriculture teachers. Reliability should be recalculated as larger and more diverse samples complete the instrument.

As with any instrument development, it is necessary to create additional items as well as edit or remove items that do not contribute to the intended purpose of the instrument. Alternatively, items that better measure the construct may be developed also. Specifically, the fourth subscale, people frustrations, currently consists of only two items. If that factor is to be retained, additional items should be written and analyzed for loading onto this factor.

Grissmer and Kirby's (1987) theory of teacher attrition suggested that attrition rates follow a cycle where teachers are more likely to leave early in their career and later in their career as they near retirement. Attrition rates are lower among those teachers who are between these early and late stages. Similarly, Chapman (1984) included personal characteristics as a component in his model of teacher retention. This suggests that demographics such as age and number of years in the profession contribute to attrition risk. While this instrument contained demographic questions to collect this data, those questions were not included in the principal components analysis. It is suggested that a larger sample be utilized in order to include these demographic questions in the factor analysis. Although this is not a construct teacher educators can develop an intervention to address, it is important to determine how much of the decision to leave is explained by these variables.

Currently, no scoring procedure has been developed for the instrument, thus interpretation of any quantitative results would be subjective. We recommend that as baseline data is collected, follow-up studies are conducted with participants to determine who chose to exit. This may provide an opportunity to identify the presence of a threshold score at which stayers turn into leavers, allowing for more meaningful and objective interpretation of subsequent data collection.

It should be noted that the instrument constructs describe reasons for remaining in the profession, such as passion for agriculture and agricultural education, as well as reasons for leaving, including alternative career opportunities. This assumes the lack of a specific reason for remaining in the profession contributes to attrition risk just as the presence of reasons to leave the profession contribute to attrition risk. Thus, it is necessary to develop a scoring process that accurately assesses the relative weight of the factors, whether present or absent.

Finally, while we acknowledge the need for further development and refinement of this instrument, it is recommended that it be implemented in populations of secondary agriculture teachers and the identified risk factors be addressed in that population or sample. This may come in the form of professional development workshops for current teachers or administrators, changes or modifications to teacher preparation programs, development of teacher mentor programs, legislative lobbying, or open discussions about the current agricultural education paradigm.

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