Quantifying agriculture involvement: Development and testing of a one-factor model

Dr. Cara Lawson
Oregon State University
Department of Agricultural Education and Agricultural Sciences
130 Strand Agriculture Hall
Corvallis, OR 97331
541-737-5469
cara.lawson@oregonstate.edu

Ginger Orton
Texas Tech University
Department of Agricultural Education and Communications
Box 42131
Lubbock, TX 79409
806-742-2816
ginger.orton@ttu.edu

Dr. Peng Lu
Texas A&M University
Department of Agricultural Leadership, Education, and Communications
2116 TAMU
College Station, TX 77843
979-845-2953
Peng.Lu@ag.tamu.edu

Dr. Courtney Meyers
Texas Tech University
Department of Agricultural Education and Communications
Box 42131
Lubbock, TX 79409
806-834-4364
courtney.meyers@ttu.edu

Introduction and Conceptual Framework

Recent public opinion research continues to find that sectors of the food supply chain, from on-farm production to food manufacturers, are mistrusted by consumers. Research suggests the mistrust stems from a public both far removed from the agricultural industry and saturated with conflicting messages from a variety of sources (Kurtzo, 2016). Agricultural communicators work against this well-cited public mistrust in food to deliver compelling scientific messages (Fischer et al., 2020). In this landscape ripe with misperception, message deliberation becomes the ultimate messaging goal. As issue involvement and personal relevancy increase, so does message saliency and ultimately message effectiveness (Fischer et al., 2020; Petty et al., 1981). An individual's issue involvement has been found to influence message deliberation as previous studies have found those with high agricultural involvement are attracted to and retain information from more scientifically framed messaging because of their established interest in the content (Fischer et al., 2020). Given the importance of this variable, the Agricultural Involvement Scale (AIS) was developed to measure a participant's relevancy to agriculture. The instrument's development draws from Laurent and Kapferer's (1985) marketing research, which measured consumer involvement profiles and suggested relevance should be measured on a scale. This abstract describes the revision of the Reysen and Brancombe's (2010) Fanship Scale to measure involvement with the agricultural industry. The purpose of this study was to validate an instrument to measure issue involvement related to agriculture topics.

Methods

To address the research purpose, a survey instrument was created and administered. The participants were U.S. adults who were members of the Qualtrics pool. A total of 869 responses were included in the analysis. Items for the survey instrument were adapted from a fanship and fandom scale (Reysen & Branscombe, 2010), which was "a unidimensional 11-item scale to measure degree of identification with a fan interest" (p. 176). The Fanship Scale (Reysen & Branscombe, 2010) was adapted for use in agricultural communication studies by removing "my interest" in each of the items and inserting "agriculture." Participants were instructed to report their levels of agreement or disagreement using a 7-point, Likert-type scale (1 = *strongly disagree*, 7 = *strongly agree*). Responses from the items were combined to generate an overall mean score of participants' involvement in agriculture ($M = 4.13$, $SD = 1.62$).

Exploratory factor analysis (EFA) was conducted to analyze the data. The five-step protocol developed by Williams et al. (2010) guided the EFA. Assumption tests were conducted (Bartlett, 1950; Kaiser, 1974) and principal axis factoring was implemented to extract factors (Field, 2017). Eigenvalues were used to determine the number of extracted factors (Tabachnick & Fidell, 2011). In order to achieve a simple and interpretable structure, oblique rotation was applied as correlations between the latent constructs were assumed (Field, 2017).

Results

An adequate sample was confirmed via a KMO measure of .94 (Kaiser, 1974), and the Bartlett's test of sphericity was significant $\chi^2(45) = 7978.60$, $p < .05$. These tests confirmed the data were appropriate for EFA (Williams et al., 2010). One construct emerged with good factor loading. Table 1 depicts the factor loading structure matrix following the employment of the oblique rotation method. Nine of the ten items loaded on factor one with loadings ranging from .92 to .67, explaining 66.79% of total variance. Only one item loaded on factor two. The item loading

for factor two was .99, and accounted for 10.15% of variance. An excellent alpha value (α = .96) was achieved to confirm internal consistency of the instrument (George & Mallery, 2003).

Table 1
Factors and Items of Agricultural Involvement following Factor Rotation

	Factor	
	1	2
I strongly identify with agriculture.	**.92**	
I want everyone to know I am connected to agriculture.	**.91**	
I spend a considerable amount of money on my agriculture-related interest.	**.90**	
I am emotionally connected to agriculture.	**.89**	
When agriculture is popular, I feel great.	**.89**	
I would be devastated if I were told I could not pursue agriculture.	**.86**	
I want to be friends with people who like agriculture.	**.85**	
I have rescheduled my work to accommodate agriculture.	**.83**	
Agriculture is part of me.	**.67**	
I do not devote much energy to agriculture.*		**.99**

Note. *Negatively coded item was reverse coded. Extraction method was Principal Component Analysis. Rotation method was Oblimin with Kaiser Normalization.

Conclusions and Discussion

As agricultural communicators work to create messages to address this mistrust, knowing the audience's involvement in agriculture is key to effective message framing (Fischer et al., 2020). The development of this instrument is a first step is at an attempt to measure a key variable in agricultural communications research. As argued above, when those in agricultural communications have insights to the relevancy of a topic for their audience members, more in-depth analysis can occur and lead to better message development. Knowing the audience's levels of involvement with agriculture may help agricultural communicators better target and market specific messages to certain audiences.

In social science, 50 to 60% of variance explained is reasonable (Pett et al., 2003). The instrument presented in this abstract explained 66.79% of the total variance. Of note, one item (I do not devote much energy to agriculture) loaded separately from factor one and accounted for 10.15% of total variance. While at least three items must load to be considered as a factor, this finding is interesting and warrants further investigation as an emerging factor. It is suggested that future studies create and test additional items that may contribute to explaining additional variance via this additional factor. The multi-dimensional nature of the Fanship Scale also explains this singular loading and provides an intriguing route for future enhancement of the AIS. Moving forward, the instrument should continue to be utilized in studies where an understanding of audience involvement in agriculture is needed for crafting messages, creating communications campaigns, and to increase public and policy maker understandings of agriculture (Enns et al., 2016). As factors associated with social, economic, environmental and political contexts shift, the addition of new items to this instrument should be considered.

References

Bartlett, M. S. (1950). Tests of significance in factor analysis. *British Journal of Psychology*, *3*(2), 77-85. https://doi.org/10.1111/j.2044-8317.1950.tb00285.x

Enns, K., Martin, M., & Spielmaker, D. (2016). *Research Priority 1: Public and Policy Maker Understanding of Agriculture and Natural Resources.* American Association for Agricultural Education national research agenda: 2016-2020. Gainesville, FL:

Field, A. (2017). *Discovering statistics using IBM SPSS Statistics* (5th edition). London: Sage.

Fischer, L., Meyers, C., Cummins, R.G., Gibson, C., & Baker, M. (2020). Creating relevancy in agricultural science information: Examining the impact of motivational salience, involvement and pre-existing attitudes on visual attention to scientific information. *Journal of Applied Communications, 104*(2). https://doi.org/10.4148/1051-0834.2287

George, D., & Mallery, P. (2003). *SPSS for Windows step by step: A simple guide and reference* (4th ed.). Boston: Allyn & Bacon.

Kaiser, H. F. (1974). An index of factorial simplicity. *Psychometrika*, *30*(1), 31-36. https://doi.org/10.1007/BF02291575

Kurtzo, F., Hansen, M.J., Rucker, K.J., & Edgar, L.D. (2016). Agricultural communications: Perspectives from the experts. *Journal of Applied Communications, (100)*1. https://doi.org/10.4148/1051-0834.1019

Laurent, G., & Kapferer, J. (1985). Measuring consumer involvement profiles. *Journal of Marketing Research, 22*(1), 41-53. https://doi.org/10.2307/3151549

Pett, M. A., Lackey, N. R., & Sullivan, J. (2003). Extracting the initial factors. *Making sense of factor analysis.* Thousand Oaks, CA: Sage Publications, Inc, 85-130.

Petty, R. E., Cacioppo, J. T., & Goldman, R. (1981). Personal involvement as a determinant of argument-based persuasion. *Journal of Personality and Social Psychology*, *41*(5), 847–855. https://doi.org/10.1037/0022-3514.41.5.847

Reysen, S., & Branscombe, N. R. (2010). Fanship and fandom: Comparison between sport and non-sport. *Journal of Sports Behavior, 33*(2), 176-193.

Tabachnick B.G., & Fidell, L.S. (2011). *Using multivariate statistics* (6th ed). Boston, MA: Pearson.

Williams, B., Onsman, A., & Brown, T. (2010). Exploratory factor analysis: A five-step guide for novices. *Australasian journal of paramedicine*, *8*(3), 1-13. https://doi.org/10.33151/ajp.8.3.93