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HANDLING NONRESPONSE IN SOCIAL SCIENCE RESEARCH

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Abstract

This study was designed to describe and explore how nonresponse in the Journal of Agricultural Education has been handled historically. All articles (N=364) published in the Journal of Agricultural Education during the years 1990 through 1999 were analyzed using content analysis techniques. Study findings show that not mentioning nonresponse error as a threat to external validity of a study, not attempting to control for nonresponse error, or not providing a reference to the literature were, unfortunately, the norm and not the exception. This study provides three statistically sound and professionally acceptable procedures and protocols for handling nonresponse: Method 1—Comparison of Early to Late Respondents; Method 2—Using "Days to Respond" as a regression variable; and Method 3—Compare Respondents to Nonrespondents.

Introduction

Social science research has advanced, in part, due to efforts of research designers and statisticians to produce reliable and valid techniques for the measurement of social variables (Ary, Jacobs, & Razavieh, 1996). Measures of characteristics assessed using these techniques, including probabilistic sampling techniques, can be used to estimate parameters of a population. The ability of social science researchers to draw conclusions, generalize results, and make inferences to broader audiences is enhanced by the use of these techniques (Gall, Borg, & Gall, 1996). Further, the consistent application of generally accepted methods in the design, conduct, analysis, and reporting of survey research is necessary to ensure the quality of much of our research–that which involves survey techniques (Tuckman, 1999).

According to Dillman (2000) there are four possible sources of error in sample survey research. He calls them the "cornerstones for conducting a quality survey" (p. 9). These four are Sampling Error, Coverage Error, Measurement Error, and Nonresponse Error. As any one of these types of error increases in a survey research study, the results and recommendations of that study become increasingly suspect and decreasingly valuable as evidence of the characteristic in the target population or in other audiences.

The first of these cornerstones, Sampling Error, is a result of the measuring a characteristic in some, but not all, of the units or people in the population of interest. Sampling Error always exists at some level when a random sample is drawn. It is reduced through larger samples, but cannot be eliminated completely unless one conducts a census. Sampling error is unknown when any of the methods for random selection or assignment of subjects to treatments are violated.

The second source of error, Coverage Error, exists when the list or frame from which the sample was drawn fails to contain all of the subjects in the population of interest. Using the dues-paying members of the American Association for Agricultural Education (AAAE) to sample the population of higher education faculty in agricultural education would introduce Coverage Error.

Measurement Error is contained in the instrument used to collect the data. Reducing this source of error requires that the researcher use items that are valid, reliable, and unambiguous to the research subjects.

The fourth cornerstone in good survey research is the handling of Nonresponse Error. This type of error exists to the extent that people included in the sample fail to provide usable responses and are different than those who do on the characteristics of interest in the study.

Of these four types, nonresponse has perhaps received the least attention. Entire courses are available in appropriate and statistically defensible sampling techniques to address both sampling and coverage error. Other courses are devoted to the construction and analysis of survey instruments. However, little time and attention has been expended on the fourth cornerstone of quality survey research.

Eighteen years ago Larry Miller and Keith Smith wrote an article regarding nonresponse error (Miller & Smith, 1983). Miller (1998) later said, "Numerous improvements can be made in our research" (p. 10), and suggested that the profession continue to devote personal time to renewing, maintaining, and improving our ability to use appropriate research methods and techniques.

The authors agree. Improving research in agricultural education requires that we periodically examine our methods and techniques. Nonresponse error should be handled through the systematic application of statistically sound and professionally accepted procedures.

Review of Cited Procedures for Handling Non-Response Error

In their widely accepted and highly cited article on handling non-response in survey research, Miller and Smith (1983) stated that Extension evaluators could use one of five general methods for controlling nonresponse error once appropriate follow-up procedures have been carried out: Ignore nonrespondents; compare respondents to population; compare respondents to nonrespondents; compare early to late respondents; and "double-dip" nonrespondents. These authors further state that nonresponse error is a concern for response rates as high as 90%.

Gall, Borg, and Gall (1996) suggested that if, after appropriate follow-up procedures have been carried out, a response rate of less than 80% was achieved, a random sample of 20 nonrespondents should be contacted ("double-dipped"). Responses should then be compared with each item of the instrument to determine if nonresponse error is a problem. Ary, Jacobs, and Razavieh (1996) noted that if, after appropriate follow-up procedures have been carried out, a response rate of less than 75% was achieved, the researcher should attempt to describe how respondents might differ from nonrespondents by comparing characteristics of respondents to those of the population, comparing early to late respondents, or comparing respondents to a small random sample of nonrespondents. Similarly, Tuckman (1999) recommended that "if fewer than about 80% of people who receive the questionnaire complete and return it, the researcher must try to reach a portion of the nonrespondents and obtain some data from them. Additional returns of all or critical portions of the questionnaire by 5 to 10% of the nonrespondents is required for this purpose" (p. 267).

Examples of How Non-Response is Being Handled

The following are examples of how various authors addressed nonresponse errors in articles published in the *Journal of Agricultural Education*.

Dollisso and Martin (1999, p. 41) noted that "To determine if there was a difference between the respondents and non-respondents to the written questionnaire, the researcher did a telephone follow-up survey of 22% of the non-respondents using the entire instrument. The t-test analysis indicated no significant differences between respondents and non-respondents."

With a response rate of 58%, Born and Miller (1999, p. 33) noted, "No additional follow-ups were conducted. Nonresponse error was controlled by comparing faculty with the population on known characteristics as recommended by Miller and Smith (1983)."

Allen, Frick, and Field (1995, p. 51) noted, "In addition to the 627 individuals who responded to the survey, a randomly selected sample of 20 non-responding subjects were contacted by telephone. According to Borg and Gall (1989), 20 cases are adequate to compare the responses of both groups to determine if the non-responding group was biased. Calls were made until twenty (20) individuals agreed to answer the survey over the phone".

With a response rate of 87%, Connors and Elliot (1994, p. 16) noted, "Respondents were grouped as early or late respondents. The two groups were compared on their responses to the Likert scale questions using t-tests. No differences were found between the responses of early and late respondents so the results are generalizable to the target population (Miller & Smith, 1983)".

"Because of the high response rate," Smith and Kotrlik (1990, p. 14) stated, "a planned telephone follow up of nonrespondents was not conducted since a 97.8% response rate was considered adequate (Borg & Gall, 1983)".

Purpose

The purpose of this line of inquiry was to describe and explore how nonresponse in the *Journal of Agricultural Education* was handled for the years 1990 through 1999.

Specific objectives include:

1. Describe the number and type of articles published in the *Journal.*
2. Describe the sampling procedures used to select research participants in articles published by the *Journal.*
3. Describe the response rate of research articles published by the *Journal.*
4. Describe how often nonresponse error as a threat to external validity was mentioned in articles published by the *Journal*.
5. Describe how nonresponse error was controlled for in articles published by the *Journal*.
6. Describe the literature cited in handling nonresponse error for articles published by the *Journal*.
7. Describe results from attempts to control for nonresponse error in articles published by the *Journal*.

Methods

All articles (N=364) published in the *Journal of Agricultural Education* during the years 1990 through 1999 were analyzed using content analysis techniques. Data were analyzed using SPSS, and appropriate descriptive statistics (e.g. frequencies and percentages) were presented. Based on a review of literature, the researchers developed an instrument to collect data related to the objectives of the study (Dillman, 2000; Gall, Borg, & Gall, 1996; Fraenkel & Wallen, 1996; Ary, Jacobs, & Razavieh, 1996; Miller & Smith, 1983). The following seven coding categories were developed. Type of article was coded as sampling procedures used or sampling procedures not used (level of measurement=nominal). Response rate was coded as actual rate achieved (level of measurement=ratio). Mentioning of nonresponse error as a threat to external validity was coded as mentioned nonresponse, did not mention nonresponse, or 100% response rate achieved (level of measurement=nominal). How nonresponse error was handled was coded into categories (level of measurement=nominal) proposed by Miller and Smith (1983). Literature cited was coded by actual reference to the literature (level of measurement=nominal). Results of efforts to control for nonresponse errors were coded as no differences found, differences found, or did not indicate results (level of measurement=nominal). Sampling procedures used were coded as one of nine categories (level of measurement=nominal).

A panel of experts at Texas A&M University and Texas Tech University established content validity. Each article was read and analyzed independently by two of the researchers. Researcher-generated data were entered onto the data collection instrument. Results generated by the two researchers were compared to determine discrepancies between researchers. Less than one discrepancy per issue existed. When discrepancies existed the two

researchers, working together, reanalyzed the data and agreed on the correct code.

Findings

The following section presents findings by objective for the years 1990 through 1999.

Objective One

The first objective was to describe the number of articles published and whether sampling procedures were used. As shown in Table 1, 364 articles were published in the *Journal* during the 1990s. Approximately 84% (n=304) of articles published in the *Journal* used sampling procedures.

Table 1
Number of Articles Published in the Journal of Agricultural Education and Whether Sampling Procedures Were Used, 1990-1999

Were Sampling Procedures Used?	f	%
Sampling used	304	83.5
Sampling not used	60	16.5
Total	364	100.0

Objective Two

The second objective was to describe the sampling procedures used to select research participants and reported in articles published by the *Journal of Agricultural Education* during the years 1990 through 1999. As shown in Table 2, the sampling procedures used most were census (44.4%), simple random sampling (15.1%), stratified sampling (15.1%), and purposive sampling (10.5%). The sampling procedures used least were cluster sampling (4.4%), Delphi sampling (4.4%), convenience sampling (3%), and systematic sampling (3%). One article did not report a sampling procedure.

Table 2
Sampling Procedures Used in Articles Published in the Journal of Agricultural Education, 1990-1999

Sampling Procedure	f	%
Census	135	44.4
Simple Random Sampling	46	15.1
Stratified Sampling	46	15.1
Purposive Sampling	32	10.5
Cluster Sampling	13	4.4
Delphi Sampling	13	4.4

Table Continues

Sampling Procedure	f	%
Convenience Sampling	9	3.0
Systematic Sampling	9	3.0
Not Reported	1	0.1
Total	304	100.0

Objective Three

The third objective was to describe the response rate described in research articles published by the *Journal of Agricultural Education* during the years 1990 through 1999. Table 3 shows response rates of studies published. The average response rate was 81.6% (SD=18.2). The minimum response rate reported was 28%, and the maximum was 100%. In fact, almost 30% of the studies reported that a 100% response rate was achieved. Approximately 11% of the studies reported response rates of 90-99% (f=34), and another 19% reported rates of 80-89% (f=57).

Table 3
Response Rate of Research Articles Published in the Journal of Agricultural Education, 1990-1999

Response Rate[a]	f	%
100%	90	29.6
90 – 99%	34	11.2
80 – 89%	57	18.8
70 – 79%	52	17.1
60 – 69%	31	10.2
50 – 59%	24	7.9
Less than 50%	14	4.6
Did not report response rate	2	0.7
Total	304	100.0

Note: [a]M=81.6; SD=18.2; Min=28%; Max=100%

Objective Four

The fourth objective was to describe how often nonresponse error was mentioned as a threat to the external validity of the study. Table 4 shows that approximately 45% of the articles published in the *Journal* during the 1990s mentioned nonresponse error as a threat to external validity. For almost 30% of the articles published in the *Journal*, nonresponse error was not a threat to external validity because a 100% response rate was achieved. Approximately 25% of the articles did not mention nonresponse error as a threat to external validity. Of the 304 research articles published in the *Journal*, nonresponse was a threat to external validity of the findings in approximately 70% of the studies (see Table 3); that is, it was a threat to all studies that did not achieve a 100% response rate.

Table 4
Frequency That Nonresponse Error as a Threat to External Validity Was Mentioned in Articles Published in the Journal of Agricultural Education, 1990-1999

Factor	f	%	f	%
Less than 100% response rate achieved	214	70.4		
Mentioned nonresponse	139	45.7	139	65.0
Did not mention nonresponse	75	24.7	75	35.0
Nonresponse a threat to external validity	214	70.4	214	100.0
100% response rate achieved	90	29.6		
Mention of nonresponse not necessary	90	29.6	90	100.0
Nonresponse not a threat to external validity	90	29.6	90	100.0
Total	304	100.0		

Objective Five

The fifth objective was to describe how nonresponse error, in which nonresponse was a threat to external validity (f=214), was controlled in articles published by the *Journal of Agricultural Education* during the years 1990 through 1999 (see Table 5). No attempts were made to control for nonresponse error in 46.7% of the articles (f=100). Twenty-five of the articles in which no attempts were made to control for nonresponse error mentioned nonresponse as a threat to external validity. Nonresponse error was controlled by comparing early to late respondents in approximately 30% of the studies. Almost 20% of the studies attempted to control for nonresponse error by following up with nonrespondents. Specific procedures for handling nonresponse varied.

Following are examples of different procedures used to compare early versus late respondents: compared early, middle, and late respondents; compared early and late respondents on scaled items; compared early and late respondents on demographic items; compared early and late respondents on scaled and demographic items; compared early (first 2 weeks) and late (next 2 weeks) on demographic characteristics; compared early (those responses received before follow-up letter) and late (those received after first follow-up letter); and compared early (first 4 weeks) and late (next 4 weeks.)

Following are examples of different procedures used to compare respondents to nonrespondents: compared 10% of nonrepondents with respondents on scaled items; compared 50% of nonrespondents with respondents on demographic items; compared 10 nonrespondents with respondents; compared 10% of nonrespondents with respondents on 15 randomly selected scale items; compared 20% of nonrespondents with respondents; and compared 25% of nonrespondents with respondents on scaled items.

Table 5
How Nonresponse Error was Handled in Articles Published in the Journal of Agricultural Education, 1990-1999

How Nonresponse Was Handled	f	%
No attempts to control for nonresponse were mentioned	100	46.7
Compared early to late respondents	67	31.3
Followed up with sample of nonrespondents	40	18.7
Compared respondents/nonrespondents on characteristics known *a priori*	5	2.3
Compared respondents to population on characteristics known *a priori*	2	0.9
Total	214	100.0

Objective Six

The sixth objective was to describe the literature cited in handling nonresponse error for articles published by the *Journal of Agricultural Education* during the years 1990 through 1999. For studies where nonresponse error was a threat to external validity, almost 70% (f=141) did not provide a reference to the literature for how nonresponse was or should be handled (see Table 6). Fifty articles (24.5%) cited Miller and Smith (1983) for how nonresponse was handled. Four articles (2%) cited Borg and Gall (1989 or 1983) for how nonresponse was handled.

Table 6
Reference to the Literature of How Nonresponse Was or Should be Handled in Articles Published in the Journal of Agricultural Education, 1990-1999

Reference Cited	f	%
No reference provided	141	69.0
Miller & Smith, 1983	50	24.5
Borg & Gall, 1989 or 1983	4	2.0
Goldhor, 1972	3	1.5
Dillman, 1978	3	1.0
Kingery, Bryant, Palmer, & Araghi, 1989	1	0.5
Goode & Hatt, 1952	1	0.5

Table Continues

Table 6 (Continued)

Reference Cited	f	%
Brinkerhoff & Associates, 1983	1	0.5
Salant & Dillman, 1994	1	0.5
Kerlinger, 1986	1	0.5
Ary, Jacobs, & Razavieh, 1996	1	0.5
Total references cited	207	100.0

Objective Seven

The seventh objective was to describe results from attempts to control for nonresponse error in articles published by the *Journal of Agricultural Education* during the years 1990 through 1999. Table 7 shows the results of efforts to control for nonresponse. Seventy-five percent of the articles published indicated there were no differences between respondents and nonrespondents and that nonresponse error was not a threat to external validity. Almost 20% of articles did not report results of efforts to control for nonresponse errors. Approximately 6% of articles (f=7) found differences between early/late respondents or respondents/nonrespondents. The results of four of the articles where differences were found were generalized to the target population. The results of three of the articles where differences were found were limited to the sample. No differences in early/late responses or respondents/nonrespondents were found when a response rate of 85% was achieved; however, this represented only eleven of the 86 articles.

Table 7

Results of Efforts To Control For Nonresponse Error in Articles Published in the Journal of Agricultural Education, 1990-1999

Results of Effort to Control for Nonresponse Error	f	%
No difference found	86	75.4
Did not indicate results	21	18.4
Differences found	7	6.2
Total	114	100.0

Conclusions

Based on the results of this study, the following conclusions were drawn and discussion provided. To ensure the external validity or generalizability of research findings to the target population, the researcher must satisfactorily answer the question of whether the results of the survey would have been the same if a 100% response rate had been achieved (Richardson, 2000). Controlling for nonresponse error begins with designing and implementing research, following generally acceptable protocols and procedures (Dillman, 2000). Appropriate sampling protocols and procedures should be used to maximize participation in a study. Once participation has been maximized, the researcher will have obtained a high enough

response rate to conclude that nonresponse is not a threat to external validity or obtained a response rate that warrants additional procedures for ensuring that nonresponse is not a threat to external validity.

Eight different general sampling procedures were used to collect data for the 304 articles published in the *Journal of Agricultural Education*, 1990-1999. Nonresponse error can be a threat to the external validity of a study when any of these sampling procedures are used and less than 100% response rate is achieved. A 100% response rate was achieved in 90 of the articles published in the *Journal of Agricultural Education.* Nonresponse, therefore, was a threat to external validity in 214 articles. In approximately 35% of these 214 articles, nonresponse error, as a threat to external validity, was not mentioned. In almost 50% of these 214 articles, no attempts to control for nonresponse were mentioned. The external validity of those findings is, therefore, unknown.

Of the articles attempting to do so, nonresponse error was handled primarily by comparing early to late respondents or comparing respondents with a sample of nonrespondents. As described previously, specific procedures for making such comparisons varied and were not standardized. In addressing nonresponse error, researchers cited a total of 66 references to the literature. During the 10 years of research covered in this paper, few differences were found to exist between early and late respondents or between respondents and nonrespondents. Only seven articles reported differences between early/late respondents or respondents/nonrespondents. Results from procedures used to address nonresponse error provide evidence that both early/late comparison and follow-up with nonrespondents are defensible and generally accepted procedures for handling nonresponse error as a threat to external validity of research findings. Early respondents were similar to late respondents, and respondents were similar to nonrespondents. Further, during the 10 years of research covered in this paper, no differences were found between early and late respondents or between respondents and nonrespondent when a response rate of 85% was achieved. We tentatively conclude that additional procedures for control of nonresponse error are not necessary when a response rate of 85% is achieved.

As noted throughout this paper, not mentioning nonresponse error as a threat to external validity of a study, not attempting to control for nonresponse error, or not providing a reference to the literature were, unfortunately, the norm and not the exception. To ensure external validity of research findings, statistically sound and professionally acceptable procedures and protocols for handling nonresponse error are needed and should be reported. The results presented in this paper represent how nonresponse has been handled in the past. Given these results, our findings, and the literature, we propose the following procedures for handling nonresponse in the future and challenge ourselves and our colleagues to address and report more directly how nonresponse was addressed. We recommend a follow-up study of the handling of nonresponse in the *Journal of Agricultural Education* in five years to describe the outcomes of proposed procedures. We recommend replication of this study for articles published in other scholarly publications and in other professions to describe the generalizability of these findings to other populations and applicability of recommendations.

Proposed Procedures for Handling Nonresponse Issues

Based on the findings of this study and the review of literature, we propose the following three protocols and procedures for addressing nonresponse error as a threat to external validity of a study.

Method 1—Comparison of Early to Late Respondents. Armstrong and Overton (1977) discuss "extrapolation methods" for estimating the response of nonrespondents. Extrapolation methods are based on the concept that subjects who respond late are similar to nonrespondents (Pace, 1939). This method has been used frequently in the *Journal of Agricultural Education.* However, there is no consistent/standardized

operational definition of "late respondent." One technique to operationally define late respondents is based on responses generated by "successive waves of a questionnaire. 'Wave' refers to the response generated by a stimulus, e.g., a follow-up postcard" (Armstrong & Overton, 1977, p. 397). So, we recommend that late respondents be defined operationally as those who respond in the last wave of respondents in successive follow-ups to a questionnaire, that is, in response to the last stimulus. To ensure that the number of late respondents is large enough to be meaningful practically and statistically, we recommend further that the minimum number of late respondents be 30. Then, if the last stimulus does not generate 30 or more responses, the researcher should "back up" and use responses to the last two stimuli as his or her late respondents. Comparison, then, would be made between early and late respondents on primary variables of interest. Only if no differences are found should results be generalized to the target population. On the other hand, if differences are found, those differences should be described and limitations in generalizing should be noted. Discussions of differences should be "richly" reported to provide valuable information about populations studied in agricultural education.

If respondents cannot be categorized by successive waves or if a wave of 30 respondents cannot be defined by successive stimuli, then we recommend that late respondents be defined operationally and arbitrarily as the later 50% of the respondents. Why 50%? Any other arbitrary dichotomy of more or less than 50%, i.e., the early and late respondent groups are not equal in size, reduces the statistical power of any comparison.

Method 2—Using "Days to Respond" as a Regression Variable. Similar to the alternative above is a procedure in which "days to respond" is coded as a continuous variable, and it is used as an independent variable in regression equations in which primary variables of interest are regressed on the variable "days to respond." As in method one, this is an extrapolation method in which nonrespondents are considered to be a linear extension of the latest respondents, and a trend may be detected across respondents based on relative earliness or lateness to respond. Then, if the regression model does not yield statistically significant results, it is assumed that nonrespondents do not differ from respondents. Comparisons between respondents and differences, if found, should be handled as described above.

Method 3—Compare Respondents to Nonrespondents. Perhaps the most acceptable method historically of addressing nonresponse bias has been to sample nonrespondents, work extra diligently to get their responses, and then compare their responses to other (previous) respondents. Comparisons between respondents and nonrespondents and differences found should be handled as described above. We recommend this method be used if a minimum of 20 responses from a random sample of nonrespondents can be received. Using fewer than 20 responses threatens the statistical power to detect differences between respondents and nonrespondents. Thus, if fewer than 20 nonrespondents are obtained, their responses could be combined with other respondents and used in conjunction with method 1 or 2.

By employing these methods, and then measuring their effectiveness, the profession will verify or refute the utility of the methods proposed here for reducing nonresponse error. These methods, further, are consistent with and supportive of Miller and Smith's (1983) article on handling nonresponse error. If the three protocols and procedures (described above) for addressing nonresponse error as a threat to external validity of a study are effective, we will continue to use them; if ineffective we will have evidence of that and a deeper understanding of the problem.

References

Allen, P. B., Frick, M. J., & Field, W. E. (1995). The safety education training needs of farmers and ranchers with physical disabilities. *Journal of Agricultural Education,* 36(3), 50-56.

Armstrong, J. S., & Overton, T. S. (1977). Estimating nonresponse bias in mail surveys. *Journal of Marketing Research, XIV* (August 1977), 396-402.

Ary, D., Jacobs, L., & Razavieh, A. (1996). *Introduction to research in education.* (5th ed.). Ft. Worth, TX: Holt, Rinehart, and Winston, Inc.

Borg, W. R. & Gall, M. D. (1983). *Educational research: An introduction* (4th ed.). New York: Longman.

Borg, W. R., & Gall, M. D. (1989). *Educational research: An introduction* (5th ed.). New York: Longman.

Born, K. A., & Miller G. (1999). Faculty perceptions of web-based distance education in agriculture. *Journal of Agricultural Education, 40*(3), 30-39.

Brinkerhoff, R. O. & Associates. (1983). *Program evaluation: A practitioner's guide for trainers and educators.* Boston, MA: Kluwer-Nijhoff.

Connors, J. J., & Elliot, J. (1994). Teacher perceptions of agriscience and natural resources curriculum. *Journal of Agricultural Education 35*(4), 15-19.

Dillman, D. A. (1978). *Mail and telephone surveys: The total design method.* New York: Wiley and Sons.

Dillman, D. A. (2000). *Mail and internet surveys: The tailored design method.* New York: Wiley and Sons.

Dollisso, A. D. & Martin, R. A. (1999). Perceptions regarding adult learners' motivation to participate in educational programs. *Journal of Agricultural Education 40(4),* 38-46.

Fraenkel, J. R., & Wallen, N. E. (1996). *How to design and evaluate research in education.* New York: McGraw-Hill.

Gall, M. D., Borg, W. R., & Gall, J. P. (1996). *Educational research: An introduction* (6th ed.). White Plains, NY: Longman.

Goldhor, H. (1972). The use of late respondents to estimate the nature of non-respondents. (ERIC Document Reproduction Service NO. ED 003 309, TM 003 274).

Goode, W. J. & Hatt, P. K. (1952). *Methods in social research.* New York: McGraw Hill.

Kerlinger, F. N. (1986). *Foundations of behavioral research.* (3rd ed.). New York: Holt, Rinehart, and Winston.

Kingery, D. W., Bryant, L. D., Palmer, L. K., & Araghi, F. A. (1989). *A handbook of survey research.* Athens, GA: The University of Georgia, Survey Research Center, Institute for Behavioral Research.

Miller, L. E. (1998). Appropriate analysis. *Journal of Agricultural Education, 39(2),* 1-10.

Miller, L. E., & Smith, K. L. (1983). Handling nonresponse issues. *Journal of Extension, 21(5),* 45-50.

Pace, C. R. (1939). Factors influencing questionnaire returns from former university students. *Journal of Applied Psychology, 23* (June 1939), 388-397.

Richardson, A. J. (2000). *Behavioural mechanisms of non-response in mailback travel surveys.* Paper presented at the 79th Annual Meeting of the Transportation Research Board, Washington, DC.

Salant, P., & Dillman, D. A. (1994). *How to conduct your own survey.* New York: John Wiley & Sons.

Smith, M. N., & Kotrlik, J. W. (1990). Computer anxiety levels of southern region Cooperative Extension agents. *Journal of Agricultural Education, 31(1),* 12-17.

Tuckman, B. W. (1999). *Conducting educational research* (5th ed.). Fort Worth, TX: Harcourt Brace.