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Farm Parents' Attitudes Towards Farm Safety Experts*

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ABSTRACT Using both qualitative and quantitative data, this article analyzes farm parents' attitudes towards the trustworthiness, usefulness, and use of advice from farm safety experts. The article evaluates four different perspectives on trust in expert: the Validity of Knowledge perspective, the Salient Values Similarity perspective, the Diffusion of Innovation perspective, and the Local Knowledge perspective. Among other factors, the results show that negative attitudes towards experts are strongly influenced by attitudes towards the validity of scientific knowledge vs. farm experience. They also show that experts who are more involved in farm production have higher levels of trust and usefulness. While all of the perspectives receive some degree of support, the results suggest that local knowledge and culture are critical in shaping attitudes towards experts. Attitudes towards experts are shaped not solely by expert characteristics but by the meanings and significance they assume in specific socio-cultural contexts.

Introduction

Trust in experts has become an increasingly important concern in contemporary society. Two leading theorists of contemporary society, Beck (1992) and Giddens (1990), both see contemporary society as characterized by an increasing reliance on expert knowledge, with important implications for the nature of trust. Beck (1992) sees modernity as a "risk society" characterized by growing concerns over environmental risks that increasingly threaten public health and welfare. Indeed, issues of risk increasingly replace social class as the basis for political conflict. Experts play an increasingly important role as individuals turn to them for knowledge and for protection from these risks. Giddens (1990) sees modernity as characterized by the increasing reliance on abstract systems, such as expert knowledge systems, that transcend geographic communities. As a result, trust rooted in social relationships and beliefs and values within local communities is increasingly replaced by trust in actors and systems that are absent in time and space (Veenstra 2002). Despite the importance of trust in

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experts in both of these accounts, neither provides a theory explaining trust in experts, including how trust in experts is formed and maintained.

Using both qualitative and quantitative data from a study evaluating a farm safety intervention for children, this paper discusses farm parents' attitudes towards farm safety experts. Specifically, it uses four different perspectives from the existing literature on trust in experts to explain differences in the trust, usefulness, and use of farm safety expert advice, as well as differences in the trust, usefulness, and use of different types of farm safety experts. Despite the prominence of experts and expert knowledge in all aspects of agriculture and the institutionalized connection between agriculture and scientific research through the land grant system, research on farm operator attitudes towards experts is currently fairly limited. At a theoretical level, understanding attitudes towards expert authority is important for understanding cultural meanings and beliefs concerning valid knowledge, and how those meanings and beliefs shape attitudes towards expert authority and specific sources of expert information. At a policy level, understanding attitudes towards expert authority and specific sources of expert information should shed light on patterns regarding the use of expert information and ways in which programs and interventions can be designed, developed, and implemented more effectively.

Literature Review

What is Trust?

Trust is a multi-dimensional concept that applies at different levels throughout the social system and that may have different bases in different situations. Lee-Treweek (2002) suggests that trust arises in situations where individuals lack the ability to assess risks and probabilities but choose to believe in something anyway. As a result, trust can be defined as a form of "faith" in which the confidence vested in probable outcomes expresses a commitment to something rather than just a cognitive understanding (Lee-Treweek 2002). In this sense, trust can be understood as a problem-solving tool that functions to reduce cognitive complexity (Earle and Cvetkovich 1995) and anxiety from risk and uncertainty (Siegrist and Cvetkovich 2000). As previously suggested, Giddens (1990) has distinguished between "interpersonal trust," which is rooted in day-to-day interaction and "facework commitments," from "system trust," which is trust in abstract systems such as expert systems or political institutions, that lacks a social referent (see also Volken 2002; Veenstra 2002). It is the latter that Giddens sees as characteristic of modernity.

Farmers and Experts

The issue of trust in experts seems particularly important in terms of farming. Scientific research has become an institutionalized part of agricultural production through the land grant college system (Gillespie and Buttel 1989), and expert knowledge is found in all aspects of farming, including agricultural production; business management, especially risk management; environmental issues and resource conservation; and health and safety issues. Despite this, little research on farm adults' attitudes towards experts currently exists. For example, summaries of the massive literature on the adoption and diffusion of agricultural innovations generally fail to discuss attitudes towards or trust in the source of innovation (Rogers and Shoemaker 1971; Rogers 1995; Fliegel 1993). Rogers (1995) and Rogers and Shoemaker (1971) discuss the role of "change agents," who serve as intermediaries in the adoption and diffusion process that help bridge gaps in technical knowledge, language, socioeconomic status, and beliefs and attitudes between the developers of an innovation and the targeted clients. "Change agents" usually help promote diffusion due to their "homophily," or shared characteristics, with targeted clients. In fact, the effectiveness of diffusion often depends in part on having change agents who share characteristics with clients. The implications of this view are discussed more below.

Other Perspectives on Trust

In addition to the Diffusion of Innovation perspective, other perspectives on trust in experts exist. One perspective is that trust in experts reflects perceptions of the validity of expert knowledge, including perceptions of the competence and responsibility of experts in producing knowledge. For example, Frewer, Howard, and Hedderly (1996) found that respondents used a variety of constructs related to the validity of expert knowledge to describe their trust in different information sources. These constructs were captured in two main dimensions: one reflecting judgments about experts as responsible, trustworthy, accountable, accurate, and having a track record, with the other reflecting concerns about experts protecting themselves and their organizations (self-protection) and amplifying or exaggerating risks (amplification).

Another perspective on trust is Salient Values Similarity (SVS) theory (Cvetkovich and Lofstedt 1999; Cvetkovich 1999), which maintains that experts are trusted who share values deemed appropriate in a particular risk management domain. According to SVS theory, trust is inferred from "value-bearing narratives" (Earle and Cvetkovich 1999; Earle and

Cvetkovich 1995) that provide meaning guided processes for the selection and organization of information. As Earle and Cvetkovich (1999, pp. 9–10) write, "People tend to trust other people and institutions that 'tell stories' expressing currently salient values, stories that interpret the world in the same way they do."

A third perspective arises from literature examining the relationship between "local knowledge" and "scientific knowledge." According to this perspective, the successful extension of scientific knowledge depends on the ability of experts to adapt scientific knowledge to local conditions, and to communicate and "frame" scientific knowledge in culturally-friendly and meaningful ways (Clark and Murdoch 1997). This implies that experts who understand local cultures and can successfully adapt and communicate scientific knowledge to local communities will have higher levels of trust. In agriculture, this role of communicating and adapting expert knowledge appears to be done at least to some degree by extension agents, who often lie at the intersection between farmers and expert knowledge (Juntti and Potter 2002). For example, one study found that safety information from extension agents tends to be more "farmer friendly," emphasizing working around hazards rather than correcting hazards (Chapman et al. 1995).

The different perspectives on trust in experts produce various hypotheses regarding farm parents' trust in safety experts. According to the validity of knowledge perspective, farm parents will have more trust in experts who are seen as more knowledgeable about farming. Since farm parents should tend to see knowledge as based on experience rather than formal learning (Neufeld et al. 2002; Flyvbjerg 2001), farm parents should have more trust in safety experts perceived as having more farm experience.

According to the Salient Values Similarity perspective, farm parents will have more trust in safety experts with whom they have similar values. Since engaging in safety practices reflects attitudes towards safety, farm parents who emphasize safety practices should have higher trust in safety experts. Also, since safety experts often discourage children's early involvement in farm work, farm parents' who believe in children's early involvement in farm work should have lower trust in safety experts.

According to the Diffusion of Innovation perspective, farm parents will have greater trust in safety experts with whom they are homophilous. This suggests that respondents with higher education will have higher levels of trust in experts. The Diffusion of Innovation perspective also suggests that disseminators and appliers of safety knowledge should be trusted more than the experts who produce scientific knowledge, due to their greater homophily with targeted constituencies.

Finally, according to the Local Knowledge perspective, farm parents will trust safety experts who are better able to adapt scientific knowledge to local conditions and communicate knowledge in a "culturally-friendly" manner. This suggests that farm parents should have greater trust in experts who work with farmers more regularly around various farm issues, including farm production, and promote farm interests. This is likely to be extension agents, among possible others.

Methods and Data

Qualitative Methods and Data

The data come from a study evaluating the North American Guidelines for Children's Agricultural Tasks (NAGCAT), a voluntary farm safety intervention recently developed to reduce childhood farm injuries by delaying and limiting children's involvement in farm work. The study involved a two-stage data collection process. From May though November of 2001, 69 qualitative interviews were conducted with farm parents from the three agricultural regions around Spokane, Washington; Dubuque, Iowa; and Bowling Green, Kentucky. The goal of the interviews was to identify themes and categories to guide the development of a survey instrument, as well as to develop hypotheses that could be tested with quantitative data. The interview protocol addressed a variety of topics, including farm respondents' trust in safety experts and the legitimacy of different sources of safety information. Respondents also completed a short questionnaire providing background information on themselves and their farms.

Because of difficulties in locating farm families with children, a variety of sampling techniques were used. In Washington, where no available list of farm families with children was available, respondents were identified through referrals from key informants, random sampling, and snowball sampling using referrals from respondents. In Iowa and Kentucky, respondents were provided by persons involved in farm safety activities with significant knowledge of farm families in the region.

The interviews were transcribed and then coded by a research team consisting of the authors and several undergraduate students trained in coding methods. An initial coding scheme was developed collectively by the research team after reading some of the initial Washington interviews. The codes were then collectively discussed and organized into 12 major categories, with each category containing specific codes that reflected concepts from the interview protocol or emergent concepts and themes in the data. Research team members were then trained in the use of the coding scheme through the coding of an additional interview, followed by a collective discussion and synthesis of

Table 1. Qualitative Sample, State, and National Comparisons Using 1997 Census of Agriculture

Variable	Spokane Sample	Washington	Dubuque Sample	Iowa	Bowling Green Sample	Kentucky	U.S.
Mean Acres	2,326	523	485	343	590	162	487
Median Acres	2,000	45	355	206	280	84	120
% Full-Time Farm Employment	96.2	53.3[1]	83.3	62.0[1]	56.0	41.1[1]	50.3[1]
% Off-Farm Employment	26.9	52.0	33.3	50.0	52.0	58.9	54.5
Mean Age of Farm Operator	41.9	51.9	39.6	53.1	41.8	54.0	54.3

[1] The Census asks the % who identified farming as principal occupation, rather than full-time employment per se.

the results. The initial coding scheme was modified and expanded during the coding process as new codes and sub-codes were added to the original coding scheme as necessary. Earlier interviews were recoded to incorporate changes made to the original coding scheme. Inter-rater reliability was achieved by having two people code each interview and jointly resolve any discrepancies. Typically, the author coded each interview with one of the research assistants, thus helping ensure continuity and reliability.

Coded data were analyzed using Atlast.ti 4.2, a qualitative data management program. Categories and concepts were developed from a careful reading and analysis of the coded data using the grounded theory approach (Glaser and Strauss 1967; Strauss and Corbin 1990). One of the broad categories included attitudes and beliefs about experts, and contained codes about trust in experts, the comparative legitimacy of different experts, and the credibility of experts. Responses in these codes were categorized and tabulated using categories that emerged through an interactive reading and analysis of the data.

Data from the background questionnaires were analyzed using SPSS 10.1. Using comparable indicators where possible, Table 1 compares characteristics of the qualitative samples in each region to their respective states and the U.S. as a whole using the 1997 *Census of Agriculture.*

In each case, the sample farms are larger than the state farms and U.S. farms as a whole, especially the Spokane, Washington sample. Sample farm operators are also younger, more likely to be full-time farmers, and less likely to have off-farm employment. These differences may reflect regional variations within each state and the U.S. as a whole. They may also reflect the fact that the *Census of Agriculture* represents the entire population of farms, rather than farm families with children under 18 at home.

Table 2. Comparison of Survey Sample with 1997 Census of Agriculture

Variable	Survey Sample	1997 Census
Mean Acres	1009	487
Median Acres	500	120
% Off-Farm Employment	35.3	58.0
Mean Age of Farm Operator	43.5	54.3
% Farms in Northeast[1]	9.5	6.2*
% Farms in South[2]	12.5	42.5*
% Farms in Midwest[3]	63.6	37.3*
% Farms in West[4]	14.4	14.0*

[1] Includes CT, ME, MA, NH, NJ, NY, PA, RI, VT.
[2] Includes AL, AR, DE, FL, GA, KY, LA, MD, MS, NC, OK, SC, TN, TX, VA, WV.
[3] Includes IL, IN, IA, KS, MI, MN, MO, NE, ND, OH, SD, WI.
[4] Includes AK, AZ, CA, CO, HI, ID, MT, NV, NM, OR, UT, WA, WY.
* Data are from NASS (2002).

Quantitative Methods and Data

The second phase of the study involved a national telephone survey of farm parents with any children under 18 at home conducted with the assistance of an area survey research laboratory. After a preliminary analysis of some of the coded interviews, a survey instrument was developed, in part to test the validity of some of the initial findings and hypotheses from the qualitative interviews. In March and April of 2002, a national telephone survey was conducted with farm adults with any children under 18 still living at home. Because of difficulties identifying farm families through random digit dialing methods, a random sample was obtained from a multi-source list of registered farm businesses compiled by a survey research firm. This list contained a total of 428,976 farms, compared to 1,911,859 farms identified in the 1997 *Census of Agriculture*. Out of a total of 3,273 persons contacted, 2,045 were ineligible, 545 were eligible, and 683 were unknown. This resulted in a response rate of 59.7 percent and a refusal rate of 11.2 percent. Out of the final sample of 411 respondents, 168 or 40.1 percent were male, and 243 or 59.1 percent were female.

As Table 2 shows, the survey sample shows considerable differences from the farm population as a whole.

As with the qualitative sample, farms in the survey sample are larger, while farm operators are younger and have less off-farm employment. Again, these differences may be due to differences in the respective populations. The sample also considerably overrepresents farms in the Midwest and underrepresents farm in the South. The reasons for these regional discrepancies are unclear.

In the survey, attitudes towards experts were measured in terms of three separate dimensions: trust in safety expert advice, the usefulness of safety expert advice, and the use of safety expert advice regarding children's abilities. Each dimension was initially measured using a four point ordinal scale, although the categories for trust and usefulness were subsequently collapsed into three. Spearman Rho correlations between these items are all highly significant, with a correlation of .464 for trust and usefulness (N= 393, sig. = .000), .438 for trust and use (N= 384, sig. = .000), and .364 for usefulness and use (N= 378, sig. = .000).

In order to further explore farm parents' attitudes towards experts, an open-ended question was used that asked respondents to describe the first thought that came to their mind regarding farm safety experts. The open-ended answers to this question were recorded and transcribed verbatim. Open-ended responses were initially coded into 37 different categories and then recoded into 9 groupings in order to simplify the data analysis.

The survey also contained a number of items that were used to test the various hypotheses. In terms of safety attitudes, the survey asked respondents how often they wear personal protective equipment (PPE) as recommended, and how often they let children ride as passengers on machinery without a cab or passenger seat. Thus, the survey contained one item measuring personal safety and another measuring safety with one's children, both using ordinal scales.

In terms of attitudes towards children's farm work, respondents were asked about the importance of children helping with farm chores as soon as they are able to, with responses on a four-point scale from "very important" to "not at all important." Respondents were also asked a series of five questions about the age they thought most children raised on farms were able to use different types of farm machinery, from which an overall mean was computed. This variable about the appropriate age for using farm machinery is also, in part, a measure of safety attitudes and a measure of the importance of farm production, since decisions to start children's farm work are sometimes influenced by production needs (Kidd et al. 1997).

Farm knowledge was measured by two items reflecting farm background and experience. One item asked the number of years the respondent was raised on a farm, while the other asked the extent of the respondent's off-farm employment, measured as no off-farm employment, part-time off-farm employment, and full-time off-farm employment.

Finally, demographic variables including age, sex, education, and household income are included as controls in the regression analysis. Education was measured in terms of six educational levels: less than

high school, high school or GED, some college, associates degree, bachelor's degree, and advanced degree. Household income was measured in terms of five categories: less than $15,000, $15,000 to $30,000, $30,000 to $50,000, $50,000 to $100,000, and over $100,000. The education variables and to a lesser extent the income variables also serve as a test of homophily between farm parents and safety experts.

The data were analyzed using SPSS 11.0. Variation in trust, usefulness, and use was analyzed using an ordinal regression procedure in SPSS 11.0 known as PLUM. PLUM provides parameter estimates of the effects of factors and covariates on polytomous, ordinal dependent variables using maximum likelihood estimation. The iterative estimation process attempts to reduce the –2 log likelihood until the improvement is marginal or the maximum number of iterations is reached. In addition to parameter estimates and Wald statistics to judge their significance, the procedure provides likelihood ratio chi-square measures of model fit and several pseudo *R*-square statistics comparable to *R*-square in OLS (SPSS 2001). Because of the relatively small sample size as well as the corroborative nature of the qualitative data, significance will be reported at the .1 level.

Results

Qualitative Results

While discussions about safety experts in the qualitative interviews occurred mostly in terms of the NAGCAT safety intervention, generalized discussions of experts also occurred. Discussions about trust in experts focused to a significant extent on attitudes towards scientific knowledge. Some farm parents trusted recommendations from safety experts because they were based on research and/or the systematic study and analysis of information from a wide range of sources. For example, one husband explained his trust of safety experts in terms of their superior knowledge and information:

> I think I would trust the people who are working in these centers. For one, they have a lot of access to this type of information than what I have. They have put together statistical information about it and all. So I would tend to believe what they said.

However, while a number of respondents ($N = 24$ or 35.8% of valid responses) expressed trust in safety experts and safety expert knowledge, a considerably larger number ($N = 43$ or 64.2% of valid responses) expressed negative attitudes towards safety experts. Most of these ($N = 28$) criticized safety experts for possessing only "book

learning" rather than actual farm experience, which rendered their knowledge invalid. Referring to the NAGCAT, for example, one farm wife explained:

> With the farm, a lot of that education doesn't come out of a book. You cannot learn how to farm coming out of a book. Like a child psychologist knows children. Obviously, they've gotten a degree in it. But unless that psychologist grew up on a farm, he doesn't know what he's talking about.

Indeed, on several occasions, participants described safety experts as "idiots" and "so-called experts" to illustrate their perceived lack of knowledge. In contrast, some parents perceived themselves as the "true" experts on farm safety. As one farm husband commented, "I think we know more about (farm safety) than these guys sittin' wherever they're sittin' writing these books on it."

In addition to lack of experience, numerous respondents suggested that the validity of safety expert advice was affected by the exaggeration of risks and organizational self-protection. Overall, 35 persons described the NAGCAT recommendations as being too cautious. Many felt this was done to in order to promote and encourage safety, which some respondents applauded. However, other respondents suggested that developers of the NAGCAT were overly cautious in part to protect themselves against liability issues. As one husband explained,

> Well, this is probably more overprotective. On the other hand I could see, what if they'd had come out and say lowered all these ages five years and so then we read this and say oh, I can put my eight-year-old out there. And then they get killed and you come back and sue them. So I see that as a problem with their guidelines anyway, they need to have this on the safe side to cover themselves . . .

In addition, attitudes towards safety experts also appeared to be affected by the sharing of salient values. Expert advice that was seen as incompatible with the farm operation and the farm "way of life" was often deemed impractical and, therefore, useless. One important value was a concern with productivity and farm production. Many respondents tended to distrust advice that failed to take into account other important values and priorities besides safety. For example, on several occasions, respondents expressed views that safety information and recommendations that undermined economic considerations and needs were unacceptable:

> Well, I think that given the task of what you're trying to accomplish with these kinds of handouts and booklets, the

> safety issue is their number-one concern. And granted, like (the wife) said, that's our concern too. We don't want our children or anybody to be doing something that they shouldn't be doing. But I think that the economic point of view is something that they probably would not consider when they made these booklets as much as I would. Because it's not going to do me any good at all to be over-safe and then go out of business by doing that. So I have to balance these things, and especially today, very delicately to try to just stay in business (author's emphasis).

Attitudes towards children's farm work also appeared to affect attitudes towards trust and usefulness. Other respondents expressed concerns that adhering to the NAGCAT would limit their ability to train and employ their children, thus undermining cultural goals and values in terms of their ability to use them as a source of labor and socialize them into hard-working, responsible people. Although respondents did not explicitly state that safety experts with a farm background and/or farm experience would be more likely to share these goals and values, they did often complain about safety experts without a farm background or farm experience not understanding farming and the farm "way of life." As a result, criticisms about the lack of farm background and experience seemed to imply criticisms about the lack of both knowledge and values of safety experts.

Participants in some cases were also questioned about what sources they trust for safety information. Participants most often mentioned information coming from the county extension office and the 4-H program as reliable. Farm magazines, such as *Successful Farming*, also appeared to be used and trusted sources of information. In contrast, the recommendations given by equipment manufacturers were usually not considered a reliable source of information by several interviewees. Participants felt that liability interests and profit motives were likely to create biases that would affect the accuracy of their information. As a result, equipment manufacturers were usually seen as less trustworthy than safety professionals, such as the authors of the NAGCAT. Several persons felt that different sources were valid, including safety professionals as reflected in the NAGCAT, or at least all worth consulting. When considering safety information, however, many farmers stated that they would want to see additional evidence, such as statistics or research, to evaluate the validity of the information.

Quantitative Results

In contrast to the qualitative data, the survey questions seem to show more favorable attitudes towards experts, especially in terms of trust. In

Table 3. Images of Farm Safety Experts (Open-ended)

Image of Safety Expert	Frequency	Percent of All Responses	Percent of Valid Responses
Lacks farm knowledge and experience/ common sense	63	15.3	19.4
Knows/promotes farm safety	50	12.2	15.4
Needs or has experience	40	9.7	12.3
Extension/FSA/Farm Bureau	43	10.5	13.2
OSHA/government regulation	27	6.6	8.3
Equipment manufacturer/sales/knows machinery	19	4.6	5.8
Farmers/farm parents	29	7.1	8.9
Scientist/engineer/researcher	15	3.6	4.6
Farm safety/farm safety programs	39	9.5	12.0
Don't know/no answer	86	20.9	—
Total	411	100.0	100.0

terms of trusting advice from farm safety experts ($N = 401$), 47.4 percent of respondents reported having a lot of trust, with 45.4 percent reporting having some trust and only 7.2 percent reporting little or no trust. In terms of the usefulness of advice from farm safety experts ($N=$ 397), 38.8 percent said expert advice was very useful, compared to 55.4 percent who said somewhat useful and 5.8 percent who said not very or not at all useful. In terms of using expert advice regarding children's capabilities ($N= 386$), only 30.8 percent reported doing so a lot, 53.1 percent reported doing so some, 8.8 percent reported doing so a little, and 7.3 percent reported doing so not at all. The reasons for the seemingly more positive response to the survey question about trust compared to the qualitative data are not entirely clear. Still, less than half of respondents have a lot of trust in safety expert advice, only 39 percent say it is very useful, and only 31 percent say they use safety expert advice on children's capabilities a lot.

In contrast, the responses to the open-ended question asking respondents their first thought concerning farm safety experts are more similar to the qualitative data.

As Table 3 shows, attitudes regarding the importance of experience versus scientific knowledge are significant themes. The single largest category involves comments about safety experts lacking experience and safety being common sense, accounting for one-fifth (19.4 percent) of all responses. Indeed, these comments, along with comments about safety experts needing or having experience, representing government regulation, and being farmers and farm parents combined account for virtually half (48.9 percent) of all responses. Most of the remaining responses describe various types of farm safety experts or farm safety

Table 4. Ordinal Regressions of Trust, Usefulness, and Use by Images of Safety Experts

Independent Variable	Dependent Variable		
	Trust	Usefulness	Use
Lacks knowledge/experience/is common sense	−1.821***	−1.823***	−1.719***
Knows/promotes farm safety	−.366	−.932*	−.364
Needs or has experience	−.863(.1)	−1.590***	−.210
Extension/FSA/Farm Bureau	−.065	−.466	−.501
Government regulation	−1.886***	−2.295***	−1.890***
Equipment manufacturers/sales/knows machinery	.251	−.000	−1.642**
Farmers/farm parents	−.916(.1)	−1.057*	−.659
Scientist/researcher/engineer	−.634	−.871	−1.534*
Farm safety/farm safety info and programs[1]	0(a)	0(a)	0(a)
Cox and Snell *R*-square	.125	.113	.110
Nagelkerke *R*-square	.150	.138	.124
Sig. of final model[2]	.000***	.000***	.000***
N	319	316	307

[1] Parameter is set to zero because it is redundant.
[2] Difference in –2 log likelihood between model with intercept only and final model.
*** Significant at the .001 level.
** Significant at the .01 level.
* Significant at the .05 level.
(.1) Significant at the .10 level.

information without any clearly expressed attitudes towards safety experts. As a result, despite reasonably high levels of trust and usefulness, a significant number of respondents expressed concern over safety experts' perceived lack of experience.

In order to see if trust, usefulness, and use of advice on children's abilities were related to images of safety experts, ordinal regressions were performed, with trust, usefulness, and use as dependent variables and the image of safety experts as a factor. Table 4 shows the parameter estimates for the images of safety experts, as well as two pseudo *R*-square statistics and the significance of the final model in reducing the –2 log likelihood. The Nagelkerke *R*-square statistic adapts the Cox-Snell *R*-square statistic so that it varies between 0 and 1. As a result, it is normally higher.

The data show that images of experts have highly significant relationships with trust in, usefulness of, and use of expert advice. Respondents who thought of safety experts in terms of farm safety and farm safety information and programs, which is the omitted category, are second highest in trust and highest in usefulness and use of safety information. However, images of safety experts as persons who are knowledgeable about farming and/or familiar with farm interests were also associated with high levels of trust and usefulness. Specifically,

respondents who thought of safety experts in terms of equipment manufacturers and persons who know farm machinery were highest in trust and second in usefulness, while respondents who thought of safety experts in terms of county extension, the Farm Service Agency (FSA), and the Farm Bureau were third in trust and usefulness. In contrast, images of farm experts as lacking experience were associated with significantly lower levels of trust and usefulness. Images of safety experts as government and government regulation were associated with the lowest levels of trust, usefulness, and use, with the negative effect being highly significant in all three equations. In terms of trust and usefulness, these were followed by respondents who thought of experts as lacking farm knowledge and experience (sig. = .000 in all three equations), as needing or having farm experience (sig. = .1 on trust and sig. = .000 on usefulness), and as farmers and farm parents (sig. = .1 on trust and sig .= .05 on usefulness). Respondents who thought of safety experts in more neutral terms as farm safety professionals ("knows and/or promotes farm safety") and scientists and academics ("engineers, scientists, and researchers") were generally in the middle, with the negative effect of "knows/promotes farm safety" on usefulness being significant at the .05 level. Overall, the Nagelkerke *R*-squares are 15.0 percent for trust, 13.8 percent for usefulness, and 12.4 percent for use, with all of the equations being highly significant at the .000 level.

The ANOVA results also show that while rankings of trust and usefulness are highly correlated, they are less correlated with using expert advice on children's capabilities. For example, images of safety experts as equipment manufacturers are associated with high levels of trust and usefulness, but low levels of using expert advice on children's abilities (sig. = .01). This latter fact corresponds to the qualitative findings, in which manufacturers were generally seen as a poor source of information for children. Conversely, the category "needs or has experience" ranks relatively low in trust and usefulness (sig. = .1 and sig. = .000), but is second in terms of use. This discrepancy in rankings between trust and usefulness on one hand and using expert advice on the other hand suggests that trust and usefulness regarding safety experts are not necessarily associated with perceptions that those experts are knowledgeable specifically about children's abilities. It is also possible that some expert characteristics and criteria, such as motivations and intentions or having conflicting interests, have different effects on trust and usefulness than they do on the use of expert advice regarding children.

In order to test if differences in trust, usefulness, and use were related to individual differences in experience, safety orientation, and values regarding children's farm work, ordinal regression equations were

estimated using the following independent variables: importance of children helping, beliefs about age appropriate farm work using machinery, wearing PPE, not letting children ride on machinery without a cab or passenger seat, off-farm employment, and years raised on a farm. In addition, sex, age, education, and household income were included as controls. The results of the ordinal regression analyses are presented in Table 5, which shows the parameter estimates, the Nagelkerke and Cox-Snell *R*-square statistics, and the significance of the final model in reducing the –2 log likelihood.

As Table 5 indicates, attitudes towards experts have little or no relationship to experience, safety orientation, or attitudes towards children's farm work. None of these variables has a significant effect on trust, although beliefs about age appropriate farm work for children have a significant effect on usefulness and use. Of the background variables, having an advanced degree has a significant positive effect on trust at the .05 level compared to having a high school degree (sig. = .014), some college (sig. = .038), or an associates degree (sig. = .032), while its effect is significant at the .1 level compared to having a high school (.064) or a bachelor's degree (sig. = .063). Overall, the equations for usefulness and use are quite similar, suggesting that the causes of usefulness and use are distinct from the causes of trust. The pseudo *R*-square statistics are also slightly higher for usefulness and use, although none of the final models is significant at the .05 level. Indeed, both pseudo *R*-square statistics for trust are lower than the corresponding statistics from Table 4, suggesting that images of safety experts explain a larger percent of the variation in trust than all of the respondent characteristics combined.

Discussion

Because of the focus of the study, the farms in both samples are not representative of the farm population as a whole. They are larger and have younger farm operators who are more involved with farming and have younger children. These characteristics may affect children's involvement in farm work, the use of machinery with its associated risks, and the extent of contact with experts, all of which may affect trust in experts. For the samples analyzed here, however, the qualitative and quantitative results show some degree of support for each of the four perspectives on trust. The qualitative results suggest that trust in farm safety experts is affected by the attitudes towards the validity of expert knowledge, which depends mainly on attitudes towards the validity of scientific knowledge vs. experiential knowledge. It also appears to be affected by concerns about experts protecting themselves

Table 5. Ordinal Regressions of Trust, Usefulness, and Use by Respondent Characteristics

Independent Variable	Dependent Variable		
	Trust	Usefulness	Use
Age appropriate	−.048	.197*	.171*
Age	.017	−.000	.015
Male	−.209	−.704*	−.702*
Female[1]	—	—	—
Less than High School	−1.516[(.1)]	−.260	.492
High School Degree	−1.623*	.202	.796
Some College	−1.378*	.333	.526
Associate Degree	−1.555*	−.071	.270
Bachelors Degree	−1.242[(.1)]	−.732	.403
Advanced Degree[1]	—	—	—
Income < $15,000	−.506	.042	−.418
Income < $30,000	.627	.345	.175
Income < $50,000	.335	.045	.275
Income < $100,000	.120	.503	.337
Income > $100,000[1]	—	—	—
Never wear PPE	.084	−.768	−.288
Rarely wear PPE	−.000	−.451	.308
Sometimes wear PPE	−.177	−.690	−.613
Mostly wear PPE	−.230	−.219	.005
Always wear PPE[1]	—	—	—
Never let kids ride	−.133	−.1571	−.693
Rarely let kids ride	−.067	−1.983	−.891
Sometimes let kids ride	−.257	−1.271	−.1301
Mostly let kids ride	1.017	−2.344	−.1767
Always let kids ride[1]	—	—	—
Full-time off-farm	.280	.183	.090
Part-time off-farm	−.083	−.547	.105
No off-farm[1]	—	—	—
0 years on farm	.067	.038	−.304
1–9 years on farm	.097	−.254	−1.105
10–17 years on farm	−.547	−.008	−.552
18 years on farm[1]	—	—	—
Helping very important	.449	−.395	1.096
Helping somewhat important	.778	−.569	1.349
Helping not very/not at all important[1]	—	—	—
Cox and Snell *R*-square	.079	.120	.127
Nagelkerke *R*-square	.095	.147	.147
Sig. of final model[2]	.639	.105	.076
N	288	285	280

[1] Parameter is set to zero because it is redundant.
[2] Difference in –2 log likelihood between model with intercept only and final model.
*** Significant at the .001 level.
** Significant at the .01 level.
* Significant at the .05 level.
[(.1)] Significant at the .10 level.

(self-protection) and exaggerating risks (amplification). The qualitative results also suggest that shared values may affect trust in farm safety experts, especially attitudes towards farm safety vs. farm production and attitudes towards children's involvement in farm work. The qualitative results contain little data relevant to the Diffusion of Innovation perspective or the Local Knowledge perspective.

In terms of the survey results, the ordinal regression of images of safety experts by attitudes towards experts also highlights how attitudes towards scientific knowledge affect attitudes towards safety experts. However, the results also show variation in attitudes regarding the validity of experience vs. scientific knowledge, with some respondents having favorable attitudes towards safety experts and safety expert knowledge. The causes of this variation in attitudes towards scientific knowledge are not particularly clear. Overall, images of safety experts have significant effects on trust, usefulness, and use. In general, groups and individuals that disseminate safety information are associated with higher levels of trust than scientists and other experts who conduct safety research, with extension agents and equipment manufacturers and dealers having the highest levels of trust. This supports the Diffusion of Innovation hypothesis that the disseminators of knowledge are more likely to be trusted than the experts who produce scientific knowledge. It also supports the Local Knowledge perspective that individuals more familiar with farming and farm culture will have higher levels of trust. The fact that images of government rank lowest in trust suggests concerns not only about government's lack of knowledge and experience, but also possibly about government's willingness to address local culture and knowledge given its authority to mandate decisions.

While images of safety experts have a significant effect on trust, characteristics of respondents seem less important in the quantitative data. In contrast to the qualitative results, the ordinal regression results indicate that respondents' farm experience, attitudes towards children's farm work, and safety attitudes have no relationship to trust in experts. The reasons for this are not entirely clear. It is perhaps not surprising that attitudes towards children's farm work do not affect trust in safety experts in the quantitative data, since the qualitative data dealt with a safety intervention designed to limit children's introduction to farm work. Still, believing children should be older before using farm machinery has a significant effect on the usefulness and use of expert advice. The only variable affecting trust in safety experts is having an advanced degree, presumably in part because persons with an advanced degree have a greater familiarity with or respect for scientific research. This supports the Diffusion of Innovation perspective that homophily promotes greater trust.

Overall, the research suggests the plausibility of each of the four perspectives on trust. Farm parents' trust in farm safety expert advice, as well as the usefulness and use of safety expert advice, are affected by the perceived validity of scientific vs. local knowledge; by shared values concerning children's farm work and also perhaps the importance of farm production vs. farm safety; by shared background characteristics with experts, especially education; and by perceptions of expert familiarity with farm culture. Specifically, trust is higher among farm parents who accept the validity of scientific knowledge, who place less emphasis on children's early involvement in farm work, who have graduate degrees, and who think of experts in terms of persons more familiar with farm production and farm culture. Rankings of experts' trust and usefulness are highly correlated, but they are somewhat less well correlated with using expert advice for children. This discrepancy may be due to perceptions of safety expert knowledge regarding children's abilities. It may also suggest that some expert characteristics have different effects on trust and usefulness than on the use of expert advice regarding children.

The findings also suggest that trust in experts can only be understood in terms of the larger socio-cultural context in which experts operate. Each of the four perspectives on trust in experts suggests that trust is influenced by certain characteristics of experts per se—the validity of their knowledge, their values, their background characteristics, or their ability to adapt and communicate knowledge. These findings suggest that the meaning and significance of these different characteristics depends in part on the socio-cultural context, including the nature of cultural knowledge and values, especially cultural knowledge and values that are locally produced. This is because attitudes towards experts are shaped by trust in local knowledge, attitudes towards experiential and scientific knowledge, and cultural values and attitudes towards the activity in question. Overall, the findings suggest that understanding the bases of trust requires an understanding the knowledge and values of lay constituencies. They also suggest that farm parents' trust in farm safety experts involves elements of both "systems trust" and "interpersonal trust" (Giddens 1990), as well as being influenced by the substantive content of expert knowledge.

Conclusion

Given the prominent role of experts in all aspects of farming, it is somewhat surprising that more research on farm operator attitudes towards experts has not been conducted. This article has analyzed both qualitative and quantitative data on farm parents' attitudes towards

farm safety experts using hypotheses generated from four perspectives on trust in experts. Because the data come from a study whose main goal was to evaluate a farm safety intervention for children rather than study farm parents' attitudes towards farm safety experts per se, the data on farm safety experts are limited in some respects. Nevertheless, the research suggests the potential plausibility of all four perspectives on trust: that trust is influenced by judgments regarding the validity of expert knowledge, by shared salient values, by homophily between experts and farm parents, and by experts' ability to translate and communicate expert knowledge based on their own knowledge and understanding of farming. Even more importantly, it suggests that the effects of various expert characteristics on attitudes towards experts are shaped by the social and cultural context, especially the extent of local knowledge, the level of trust in local vs. scientific knowledge, and attitudes towards the activity in question.

As noted earlier, Giddens (1990) has suggested that trust in experts is based on trust in abstract systems that transcends geographic communities and interpersonal relations. This research suggests that trust in abstract knowledge systems, while important, is only one potential basis for trust, and that trust in experts may be based on local culture and interpersonal relations, depending in part on the socio-cultural context. As Beck's (1992) account of the social construction of expert knowledge implies, attitudes towards experts may also be influenced by the substantive content of expert knowledge, especially when activities in question are highly valued and involve significant commitments. Thus, a complete perspective on trust in experts requires an understanding of expert characteristics, expert knowledge, and the socio-cultural characteristics of lay constituencies. Additional research is clearly needed on attitudes towards safety experts and other experts in agriculture, and especially on the role of experts in the dissemination and implementation of scientific knowledge. It may show that trust in farm safety experts contains elements of both "systems trust" and "interpersonal trust," and that the nature of trust as well as the content of expert knowledge is influenced by local culture and local ways of knowing.

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