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Sorting Through the Spheres of Influence: Using Modified Pile Sorting to Describe Who Influences Dairy Farmers' Decision-Making About Safety

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Abstract

Objectives: The primary goal of this study was to describe the mutually perceived influence of bankers and insurers on their agricultural clients' decision-making regarding health and safety.

Methods: Semistructured interviews were conducted with 10 dairy farmers, 11 agricultural bankers, and 10 agricultural insurers from central Wisconsin. Three of the interview questions involved pile sorting. Pile sorting included 5-point Likert-like scales to help participants sort through 32 index cards. Each card represented an individual or group that was thought to possibly affect farmers' decision-making, both generally and about health and safety. Results (photographs of piles of cards quantified into spread sheets, fieldnotes, and interview transcripts) were analyzed with SAS and NVivo.

Results: All three groups expressed moderate-to-strong positive opinions about involving agricultural bankers ($x2(2) = 2.8155$, $p = 0.2695$), although bankers qualitatively expressed apprehension due to regulations on the industry. Insurance agents received more positive support, particularly from bankers but also from dairy farmers themselves, and expressed more confidence in being involved in designing and implementing a farm safety program.

Conclusion: Agricultural bankers and insurers can influence individual farmer's decision-making about health and safety. Both are believed to be good purveyors of safety programs and knowledge, especially when leveraging financial incentives. Insurance agents are thought to be more critical in the design of safety programs. Insurers and bankers being financially tied to safety

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programs may prove both positive and negative, as farmers may be skeptical about the intention of the incentives, making messaging critical.

Keywords

Dairy; Health Belief Model; mixed-methods; pile sorting; Socio-Ecological Model

Introduction

Approximately 90% of farms in the United States are small family farms with less than $250,000 in annual sales.[1] With limited funds and often exempt from certain safety oversights (depending on the state), owners of small family farms often ignore or grapple with accommodating the safety needs of their farm.[2-6] Two eras have characterized safety efforts to ameliorate risk on farms. Prior to the late 1980s, agricultural health and safety largely resided in the realm of engineering.[2] Then in 1980, the National Institute of Occupational Safety and Health (NIOSH) "recognized agriculture as one of the highest risk sectors for occupational fatalities in the United States."[7] In fact, Public Law 101–517 in the 1990s defined farm safety as "a public health concern to be addressed by the traditional public health approach of surveillance, research, and intervention."[8,4] The move marked a shift in the federal government's approach to agricultural health and safety. Public health began to assume a larger role in addressing the risk posed by farm exposure.

Generally, public health interventions are education based, often identifying the farmer as the object of intervention. The Health Belief Model (HBM) (see Figure 1) is a longstanding source for intervention design. Many later models were built upon HBM.[5] The model, when interpreted in the context of agricultural health and safety, describes how demographic factors (age, gender, ethnicity, personality, etc.) influence a person's perception of his/her susceptibility to injury, the benefits and barriers of engaging in safety behaviors, and the person's self-perception in practicing the behaviors. In combination with how the individual perceives the threat of injury, these concepts constitute the array of "individual beliefs." Individual beliefs with cues to action are thought to influence the behaviors a person engages in, according to HBM. A cue to action spurs the individual "to adopt the preventative behavior by some additional element"[10] or is "exposure to factors that prompt action."[11] These cues can be external, "such as a mass media campaign, social influence… events, people, or things that spur people to change their behavior."[11] One study used recommendations from a health care provider as a cue to action for HPV vaccination.[12] Thus, HBM incorporates the environment, particularly the social environment, through cues to action. Here, the research team endeavored to learn more about the community around central Wisconsin dairy farmers and their ability to influence their decisions and actions.

For example, even an experienced farmer may not recognize the susceptibility and severity of a rollover on a tractor without a rollover protection structure (ROPS). Thus, he perceives the threat of a tractor rollover as low because he has ridden on a tractor without ROPS for many years. In accordance, he does not perceive the benefits of a ROPS as particularly high. If he struggles financially, it increases the barriers to fitting his tractor with a ROPS. Given this scenario, this farmer would likely have low self-efficacy to fitting his tractor with

ROPS. Perhaps, farmer's insurance agent reminds him of the dangers of a tractor without ROPS (cues to action). Many times, the concept of social cues (i.e., the environment) is not included when HBM is applied in practice.[13,14] For example, Anderson, Velez, and Anderson documented how agricultural students perceived themselves as more susceptible to welding injury. However, students viewed safety behaviors as not beneficial in preventing welding injuries and rated low on measures of self-efficacy in employing such behaviors.[13]

In a systematic review of HBM in public health programs, Jones, Smith, and Llewellyn state "cues to action was least likely to be addressed in the interventions."[15] In a meta-analysis, Carpenter (2010) concurred that cues to action "is the most underdeveloped and rarely measured or researched element of the model…it is not examined in the current review, as there are not enough studies that measured it."[10] Thus many public health programs ignore the potential influence of the environment on behavioral change. Even the concept of social cues provides an incomplete picture of the environment as a whole. Such cues to action are likely to be temporary (a verbal caution or an informational poster in the workplace) and not attend to a systemic and holistic definition of environment. Thus, educational programs risk excluding important actors in a farmers' environment to provide important social or material reinforcement for safety behaviors. Education may not be retained, particularly when only delivered to employees/farmworkers, and may not be feasible in a given environment due to financial constraints, lack of equipment, or other resources. Thus, more effective interventions could include a greater or more nuanced concept of the environment, particularly the social relationships of farmers, such as agricultural insurance agents and bankers.

Furthermore, research to demonstrate safety interventions employed on individuals known by and socially close to farmers or farmworkers remain largely unexplored. The Socio-Ecological Model (SEM), in contrast to HBM, focuses exclusively on the environment. Intervention within the so-called spheres of influence of a farmer may target the level of the interpersonal and community levels of the SEM (see Figure 2)—i.e., within the organizations and individuals with personal or business relationships with farmers. SEM and spheres of influence models (used interchangeably here) can assist intervention researchers and practitioners understand how individuals and institutional forces affect their health population.[16-19] Such individuals and institutions constitute not only an important part of the social environment of a farmer, but also a more pervasive and permanent fixture on the social landscape. Put another way, how could concepts like cues to action within HBM be better integrated when examined through the lens of the SEM and the spheres of influence? How would the interventions that follow include a broader, more holistic concept of the environment?

Anthropologists endeavor to connect macrolevel forces (interpersonal, community, and policy levels in the socioecological model) and structures to the everyday behavior of individuals as SEM theorizes. Thus, the labor of an anthropologist is useful in understanding ways in which friends, family, and community (i.e., the environment and cues to action) ultimately end up impacting whether or not individuals engage in safety behaviors. Anthropological methods provide a means to understand exactly how these individuals are situated in the life of a farmer and how they exert their influence. Unlike the approach

historically taken by engineering or public health, anthropology allows the perceptions so heavily emphasized in the HBM to be privileged, and theoretically increasing the likelihood of successful adoption of behavior change.

In order to capture the wide array of people that interact with farmers at the interpersonal and community level of the SEM, the team developed an interview instrument that included semistructured questions and pile sorting. Pile sorting is a common method in psychology and social sciences.[12] The use of cards in pile-sorting tasks is often associated with cognitive mapping and is useful for giving structure to what seems like abstract concepts. For example, pile-sorting methods (also known as card sorting) combined with interviewing strategies have been recently used to measure criminal offenders' beliefs in "redeemability,"[13] analyze adolescents' thoughts of self-worth and self-harm,[22] characterize the influence of caregivers' appraisal in dementia patients' safety,[23] determine the consensus of medical students' understandings of supervisors' comments on their clinical narratives,[24] conceptualize teens' asthma symptoms and their self-management responses,[25] measure how acute stress impairs cognitive flexibility in men more than women,[26] and explore the causes of farmer suicide in India.[27] In contrast to surveys, which also commonly measure peoples' behaviors, attitudes, and beliefs, pile-sorting is more interactive providing additional qualitative data and reveals connections between individuals at the community level. For example, participants often pick up and discuss individual cards and provide justifications for their placement. This provides depth beyond a written survey and more efficiently than an oral survey.

Preliminary research

Prior research with agricultural bankers during the winter of 2013 and 2014 provided the impetus for this project. The research team was connected to a seasoned agricultural banker with his own agricultural background. His passion for agricultural health and safety as a risk management issue led to his premise that bankers could be more influential in farmers' decision-making about health and safety on their operations. This person became a key gatekeeper and consultant during the larger project. Prior to the submission for funding, this gatekeeper allotted the research team space and access to do interviews and observations at a Wisconsin agricultural bankers' conference. Over the two day meeting, a researcher queried with roughly 80 agricultural bankers whether they valued farm health and safety and whether they felt they could incentivize change on the farms in their portfolio. Researchers sensed that bankers had interest, but felt they had lower capacity to influence than insurance agents. They often cited federal and state laws governing loan giving processes as a primary reason. Given the agricultural bankers interest in health and safety and their common belief that insurance agents could be influential as well, the team pursued the topic further to pursue the pilot project being reported on here.

Methods

To reveal more about the community of influential relationships surrounding farmers, pile sorts and semistructured interviews were conducted with 10 dairy farmers, 11 agricultural bankers, and 10 agricultural insurers from the central Wisconsin region. The region included

a 7 county area (Adams, Clark, Jackson, Langlade, Marathon, Portage, and Wood counties). Bankers and insurance agents likely serviced farms outside these counties. Agricultural bankers and agricultural insurance agents were defined as those whose portfolio was at least half agriculture. These professionals were chosen as the focus given their financial investment in the success of their clients' farms. However, as will be shown, a number of different individuals and institutions can be influential of farmers' decision-making. The study was reviewed and approved by the Marshfield Clinic Research Institution's Institutional Review Board.

Prior to research activities, one to three advisors representative of each group were recruited to assist in the development of the pile-sorting and interview instruments. Advisors were not included as research participants. These advisors reviewed possible cards and interview questions. Advisors also assisted in participant recruitment conducted through snowball sampling.

Three of the interview questions were framed as pile-sorting prompts, asking the participants to sort 32 index cards. On each card was written an individual or group that was thought to possibly affect farmers' decision-making, both generally and about health and safety. Three of the pile-sorting prompts included 5-point Likert-like scales. The pre-established scales eased some of the burden for the participants and provided researchers with additional quantitative data. All Likert-like responses were assigned scores of 1–5, 5 being favorable in terms of possible influence that person or institution may exert on farmers' decision-making whether it be measured by time, knowledge, or trust. It is important to note that farmers, agricultural bankers, and insurance agents were the study participants as well as individual index cards. In other words, they were asked to rank themselves during pile-sorting activities. The initial analysis (presented here) focuses in on how the three participant groups (farmers, agricultural bankers, and insurance agents) rated themselves and each other. Future manuscripts will focus on the application of the methods to developing public health interventions and the full results of all 32 cards. Interviews ranged from 45 to 80 minutes; time variability was largely dictated by the amount of detail research participants shared as they placed cards into piles. Results (photographs of piles of cards quantified into spreadsheets, fieldnotes, MP3 audio recordings, and interview transcripts) were analyzed with SAS (SAS Institute Inc., Cary, NC) and NVivo. Nvivo is a qualitative analysis software program that allows users to identify common themes and code data.

The research team consisted of the principal investigator, two research associates, two MPH student interns, and a biostatistician. Research activities were conducted from summer of 2014 to fall of 2016. Three research team members with a background in farming initially formulated a draft of the interview questions and 60 possible cards. Three consults were conducted with farmers to field test the questions and cards. Farmer-advisors suggested changes to wording and helped reduce the number of cards to 32, a process that included consolidating, omitting, and adding cards (see Figure 3). Per most pile-sorting instruments, this process was essentially the free-listing stage.

The interview instrument used with farmers began with three demographic questions regarding the size of their dairy operation, how many people worked on the farm, and how

they utilized their acreage. These questions were useful for easing the farmer into discussing their operations and revealed features of the farm that might explain why some people are more influential than others. For example, more or less milking cows per acre used for crops might explain why a veterinarian is more or less influential than an agronomist. Bankers and insurance agents were asked demographic questions regarding the amount and kinds of agricultural clients, their years of experience, and whether farm injuries and deaths had impacted their business.

Following the opening line of questions, the pile-sorting prompts began for all three groups. Farmers were first asked, “How often do you talk with these people?” The Likert-like scale to assist participants’ sorting included categories of: daily, weekly, monthly, yearly, and hardly ever. After all the cards were sorted, follow-up questions were asked regarding why some people and groups were spoken to so often or seldom. Agricultural bankers and agricultural insurance agents were asked to sort the cards according to “role they play in the success of a dairy farm.” This was occasionally clarified to mean the financial success of the dairy farm. The Likert-like scale to assist both groups with this question consisted of the categories: critical to success, advantageous, neither critical nor impeding, can be harmful, and impedes success. Participants were asked to think aloud while they placed cards into categories. Thus, the method produced more in-depth data than if they had independently completed a survey. Digital photographs were taken of the sorted cards. Cards were then collected and reshuffled after each question.

Follow-up questions for the initial pile-sorting prompts of both bankers and agents probed why some people and groups were considered so important to a successful farm and why others impede success. The questions allowed researchers to investigate the role of other parties in dairy farmers’ daily lives. These questions also provided more depth around how substantive each actor's role was in the financial and general success of a farm. The question for dairy farmers generated lists of actors most involved in the daily operations on a farm.

The second pile-sorting question for all three groups queried who was thought to have knowledge about farm safety and who would be capable collaborators in designing a farm safety program. Emphasis was placed on the design of a farm safety program and not its implementation. Likert-like scales provided participants with categories of responses that included: know the danger and how to prevent it; know the danger and how to be cautious; know to be cautious but are unaware of specific dangers; no knowledge of danger or caution or; reckless.

The third pile-sort questions prompted participants to sort cards according to which person or group would do best at delivering and implementing a farm safety program because of the trust established between them and the farm community. The initial question was edited after the first four participants to improve clarity. The phrase, “In terms of how quickly you would make changes,” was added to the question “how much do you trust these individuals/groups?” The addition reflected necessary explanations provided to the initial four participants and are not expected to differentially bias the data of the dairy farmers. Likert-like scales for this pile-sorting question included: change as quickly as feasible;

change eventually; change after further consultation with other people; not likely even with other consults or; skeptical about the truth and will not make a change.

Numerical values were assigned to the categories on the five-point scale where a low score (1) indicated lesser elements of trust, knowledge, or involvement on the farm and a high score (5) indicated greater elements of trust, knowledge, or involvement on the farm. Kruskal–Wallis tests were performed to evaluate the overall differences in the three groups across all items and for select individual cards/items. If the Kruskal–Wallis test achieved at least marginal significance for a particular card/item, pairwise comparisons between groups were undertaken by performing exact Jonckheere–Terpstra tests.[28] These tests revealed when agricultural bankers, insurance agents, and dairy farmers were agreeing (or disagreeing) about the relationship and possible role a person or an institution could play in the health and safety of a dairy farm. In addition, qualitative data collected during the interview and pile sorting activities provided further depth and detail as to the content and nature of the relationship between the individuals and institutions.

Results

Ten dairy farmers, 11 agricultural bankers, and 10 agricultural insurers from the central Wisconsin region participated in the study to rank 32 cards in three pile-sort questions. Participants also answered open-ended questions and were asked to think aloud while sorting the cards. Again, this included cards that had “dairy farmer,” “agricultural banker,” and “insurance agent” written on them. That is, participants were asked to rank or sort themselves in each pile-sorting exercise. In total, pile-sorting activities resulted in 2,976 data points.

Comparing the three participant groups across all items

A Kruskal–Wallis test indicated that differences between the three groups of participants were present in their composite responses (i.e., sum of Likert responses for the 32 cards) on designing a farm safety program ($p = 0.07$) (Figure 4). Pairwise comparisons revealed a significant difference between dairy farmers and bankers ($p = 0.02$, exact Jonckheere–Terpstra test) and a marginally significant difference between bankers and insurance agents ($p = 0.10$). No differences in composite responses were detected between the three groups with respect to implementing a farm safety program ($p = 0.52$).

Bankers, insurers, and farmers believe that bankers are not critical or harmful to the design of farm safety program (see Table 1). Insurers were more confident in their own ability to assist in the design of farm safety programs (mode = 5, necessary to the design of a farm safety program) compared to bankers gauging their own ability (mode = 4, helpful).

The agricultural banker item/card

Among the three groups of participants, agricultural bankers and insurance agents most closely resembled each other regarding the potential role of agricultural bankers in designing and implementing a farm safety program. Dairy farmers were slightly less confident in the role of a banker on a farm safety program. Ultimately, the three participant groups did not

differ significantly ($p = 0.27$ for design and $p = 0.25$ for implementation of a farm safety program).

Qualitative data support and deepen the quantitative results. Bankers reported being encumbered by regulation, restricting their ability to design or implement a safety program. One banker explained,

> No, you don't get part of the write-up that has anything to do with how I perceive safety. It would certainly be a risk if indeed I did see major issues out there – one thing or another – but, up to this point, there hasn't been… nothing that I've ever been involved with in regards to safety as far as a write-up or discussions on a loan…Well, if you made it law, that's another law that you have to deal with.

Bankers saw their job as only secondarily or tertiarily related to safety.

> I guess you can kinda see [safety hazards], but I don't address it. I address a management issue like are you trying to bite off more than you can chew. It would be better if you got someone else in here to help do things, but I do it more as trying to improve and help the management …not so much safety. I would say in general good management is gunna correlate with better safety.

The insurance agent item/card

Attitudes toward involving insurance agents in designing a farm safety program differed significantly in a Kruskal–Wallis test ($p < 0.05$). Farmers constituted most of the difference as their pairwise comparison in Jonckheere–Terpstra tests revealed farmers to differ significantly from bankers ($p < 0.05$) and insurance agents ($p < 0.05$), but bankers and insurance agents were in general agreement with each other ($p = 0.35$). Similar results were obtained regarding the implementation of a farm safety program, although the comparison of bankers and insurance agents yielded a p-value of 0.98.

Insurance agents were more confident in their ability to implement a safety program (mode = 5, farmer would make the change as quickly as possible) than bankers had in their own ability (mode = 4, farmer would make the change eventually, see Table 2).

Similar trends can be observed in the qualitative data. While bankers were reluctant to see a role for themselves in designing and implementing a safety program, bankers lauded the potential of insurance agents to do the same.

> Maybe [the farmer] gets a discount from their insurance agent if they're doing [farm safety programs] – maybe that's the way you can leverage your safety program as to the insurance company might consider you a safer insurance risk if you are doing X, Y and Z.

Insurance agents echoed bankers' confidence regarding the role insurance agents can play in designing a safety program. In response to why he had put insurance agents as "necessary" to this work, one agent replied,

> You've got the – your professional associations, your ag and health safety experts, your medical people, insurance company, they either see the injuries or the claims

from the injuries to have input about “Hey, we’re seeing this type of injury in this situation, but not in this situation,” so you can put the pieces together to figure out how to make it safer.

Insurance agents were believed to be less encumbered by regulation, more motivated to achieve safer farms, and more confident in their own ability to do so.

Discussion

This mixed-methods approach utilizing pile-sorting and semi-structured interviews revealed great detail in the kinds of relationships that can span across the interpersonal and community levels of the SEM model. It also revealed what the content and power of potential cues to action might be. Agricultural bankers and insurers can influence an individual farmer’s decision-making about health and safety. However, the potential role of each in either designing or implementing a farm safety program is not viewed uniformly across the three groups of participants—dairy farmers, insurance agents, or bankers. The three groups disagreed more regarding who should help design a program than who should help implement such a program. Across all 32 cards, dairy farmers expressed more variability in their responses and generally had more negative opinions regarding who should be included, particularly when compared to bankers. Bankers were much more likely to include numerous individuals and institutions in the design of a farm safety program. Insurance agents were generally more confident in their ability to participate in the implementation of farm safety interventions than bankers had in their own ability to do the same. Bankers and farmers generally reiterated the possible roles of insurance agents.

Dairy farmers were more supportive of involving an insurance agent in designing and implementing a farm safety program, rating insurance agents higher than bankers for those tasks. These qualitative and quantitative data support involving insurance agents in particular in agricultural health and safety. This approach revealed that the content and power of the cues to action from the insurance agent may prove more impactful than the agricultural bankers' cues to action. Such cues to action can include an insurance agent identifying the most common and deadliest farm hazards while visiting the farm and discussing hazard remediation to reduce insurance premiums.

Dairy farmers, agricultural bankers, and insurance agents expressed a high rate of acceptance for the project. Several participants requested follow-up materials and project summaries. Not only is support for farm safety quantitatively and qualitatively evident, but it emerged as early as the recruitment phase for the study. This may be a possible bias amongst farmers, but is likely representative of bankers’ and insurance agents’ attitudes, though the true representativeness of this group is discussed in the limitations. As the data supports, insurance agents were excited to be recruited to do the study and interested in materials to help inform their discussions with farmers, which is another kind of cue to action detailed in HBM.

While SEM and HBM did not directly inform the questions posed in interviews and pile sorts, the constructs of these models were represented in the barriers identified by agricultural bankers (encumbered by regulations), the insurance agent-identified cues to

action (using agricultural health and safety information to inform their conversations with farmers), and, the self-efficacy insurance agents demonstrated in ranking their capability to intervene highly during the pile sorts. In fact, self-efficacy is one of the most predictive concepts within HBM.[11-12] Additionally, the data allowed the connection between cards and their relationship to the farm, essentially constructing the SEM from “the ground, up”, and identifying through statistical analyses (Kruskal-Wallis and exact Jonckheere-Terpstra tests) where a card’s placement by one group generally differed from its placement by another group.

The other cards

The primary foci for this project were the relationships between central Wisconsin dairy farmers and agricultural bankers and agricultural insurance agents. These are the only three groups that the data can reveal mutual consensus about one another. However, the other cards in the pile-sorting questions emerged as important possible agents of change or influence, often with agreement across all three groups. These results are currently under further analysis and testing. The preliminary results may lead to important next steps. First, as expected, fellow farmers, spouses, and immediate family were highly ranked in terms of their knowledge and even more so for the level of trust that might enable the implementation of a safety program. Previous researchers have explored these individuals, but not necessarily in any large intervention endeavor.[21-25] Second, all three groups held veterinarians and agronomists in high regard for their ability to convince farmers to make changes in their operation. Third, agricultural health and safety experts were held in high regard toward the design of a safety program, but often fell in standing when it came to implementation. Last, results for extension agents were somewhat scattered. Interview data revealed that this assessment is highly dependent on the particular extension agent in the county where the participant resides, there being no choice as with insurance agents and bankers.

Unanticipated findings

The snowball recruiting process often led to questions of how many and of what quality agricultural insurance agents the research team was seeking. This led to three important and unanticipated findings. First, research participants felt that 10–11 agricultural bankers and agricultural insurers represented at least half of those in the professions in the region. If true, this bodes well for intervention design, as small clusters of the dominant agricultural insurers and bankers could be recruited and organized much more easily than farmers. Banks and insurance companies with regional focus and coverage may be particularly viable, though they may lack the financial leverage of larger companies. Given the confidence each group had in agricultural insurers’ abilities to design and implement safety programs, including themselves, they seem to be a promising first target.

Second, the research team learned that most participants from all three groups believed there to be a shortage of high-quality agricultural insurance agents and bankers when compared to decades past. “High quality” was often characterized as “understanding farming,” i.e., appreciative of the vagaries of income and amount of risk involved. This was often further contextualized with explanations that most older agricultural bankers and insurers were once

farmers themselves and had sought the profession after retiring from farming, giving them native knowledge and status in the profession. It was believed that with the shrinking amount of farmers and the prolific migration of young people away from farming, this line of farm-reared and seasoned professionals is dwindling. This was part and parcel to the third unanticipated result: research participants in all three professions believe there is a shortage of young, eager people interested to replace them in the future.

The second and third unanticipated results have both positive and negative implications for safety interventions looking to leverage agricultural bankers' and insurance agents' relationships with farmers. As the number of perceived high-quality agricultural bankers and insurance agents continues to stagnate or dwindle, their status in the eyes of farmers may do the same. The farmers' beliefs that these professionals can understand both farming and their profession may erode and any possibility of increasing safety's role in their relationship may do so as well. As young and beginning agricultural insurance agents and bankers do enter the field, they will likely not have a farm background and will need mentorship in all things agriculture, which presents an additional avenue of intervention. Agricultural health and safety experts should be keen on developing materials for and collaborating with those mentors, making health and safety integral to how future agents and bankers calculate and finance risk.

Generally, imagining the agricultural community around farmers through the lens of the SEM (spheres of influence) appears to be a fruitful direction. Moreover, applying what can be learned about these personal relationships can flush out more cues to action as suggested in the HBM. Applying agricultural health and safety knowledge through preexisting, imbedded relationships and cues to action therein, however, will require further research. Given the variability across agricultural communities, local knowledge will prove essential in determining which agents of change and cues to action are worth attempting.

Limitations

As a pilot project, the research team was very satisfied with the quality and quantity of data. The primary limitations given the size and scope of this project were the limited sample sizes and the amount of time necessary to accumulate the data. While 10 dairy farmers is not be representative of all central Wisconsin dairy farmers, it is interesting to note however, that participating agricultural bankers and insurance agents commonly believed that 10–11 in each profession represented at least half of central Wisconsin's population. Future studies should investigate the veracity of this claim. If true, these professionals represent a much more manageable intervention population than farmers themselves. These limitations are typical of a primarily qualitative approach based on one-on-one interactions across a large geographic region. Reaching more farmers with this approach would take a large amount of resources or advancement in the technology to capture similar kinds of data. Digital pile-sorting programs are emerging and could enable this wider catch. In terms of agricultural bankers and agricultural insurance agents, while small samples are likely representative of entire regions, statistical analysis can be difficult. Again, digital modes of pile sorting might resolve this. However, differences in states' and regions' agricultural production and

insurance or banking systems may be a deterrent to consolidating these professions across wider regions.

Conclusion

Pile sorting combined with semistructured interview methods proved useful for researchers and enjoyable for research participants, albeit time consuming. Data revealed a good deal of consensus about the roles and relationships other members of the agricultural community can play in influencing farmers' decision-making about health and safety in their operations. Specifically, agricultural bankers and insurance agents have direct investments in the farmers' well-being and success. These financial ties could be leveraged toward safer behavior. Insurance agents were more confident in their ability to design and implement farm safety programs. Both bankers and farmers reinforced this finding. Bankers were thought to be less critical to design or implementation and feared federal and state laws concerning loan-giving would hinder their ability to create incentives.

Farmers have many possible points of leverage given the number of people connected to their success in daily life. Simply put, they are small businesses to which many people have connections. This creates opportunities for influence. Moreover, farmers, rural communities, and small towns may condense traditionally institutional level relationships down to the interpersonal, i.e., it is more likely that they know the head loan officer or lead loss control agent personally. This may mean that entire professions could be mobilized to promote agricultural health and safety. Continued research is necessary to identify those networks of professionals and provide them with agricultural health and safety knowledge they can meaningfully disseminate.

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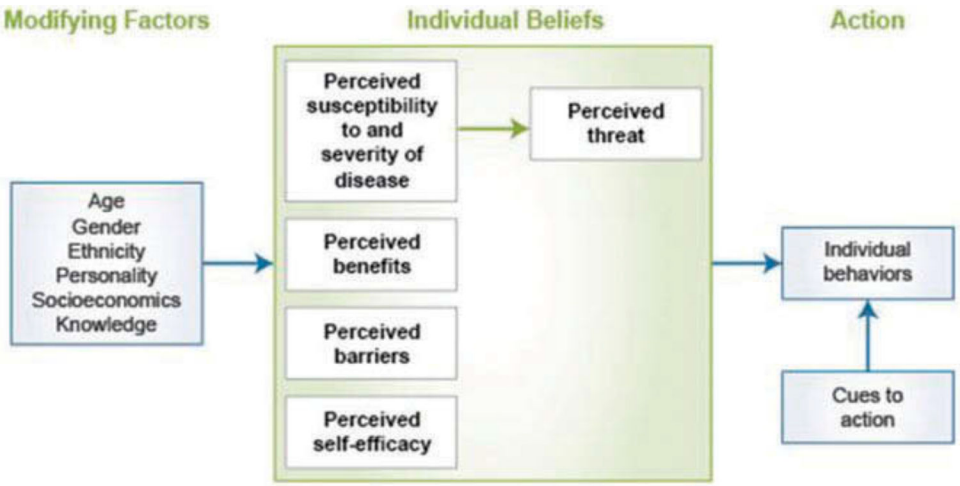

Figure 1.
Health Belief Model (HBM).

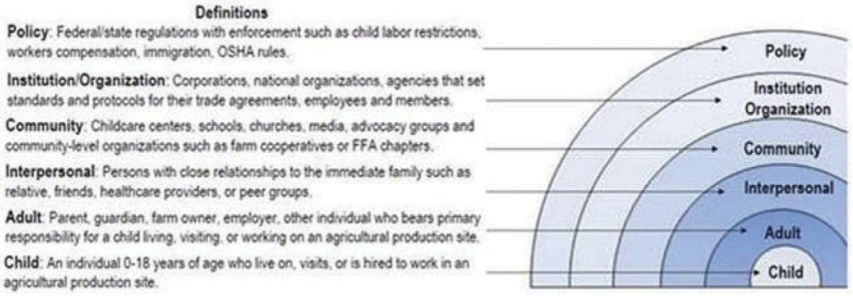

Figure 2.
Socioecological model (SEM), modified for agriculture.

Figure 3.
Individuals and groups written on individual index cards in pile-sort instrument.

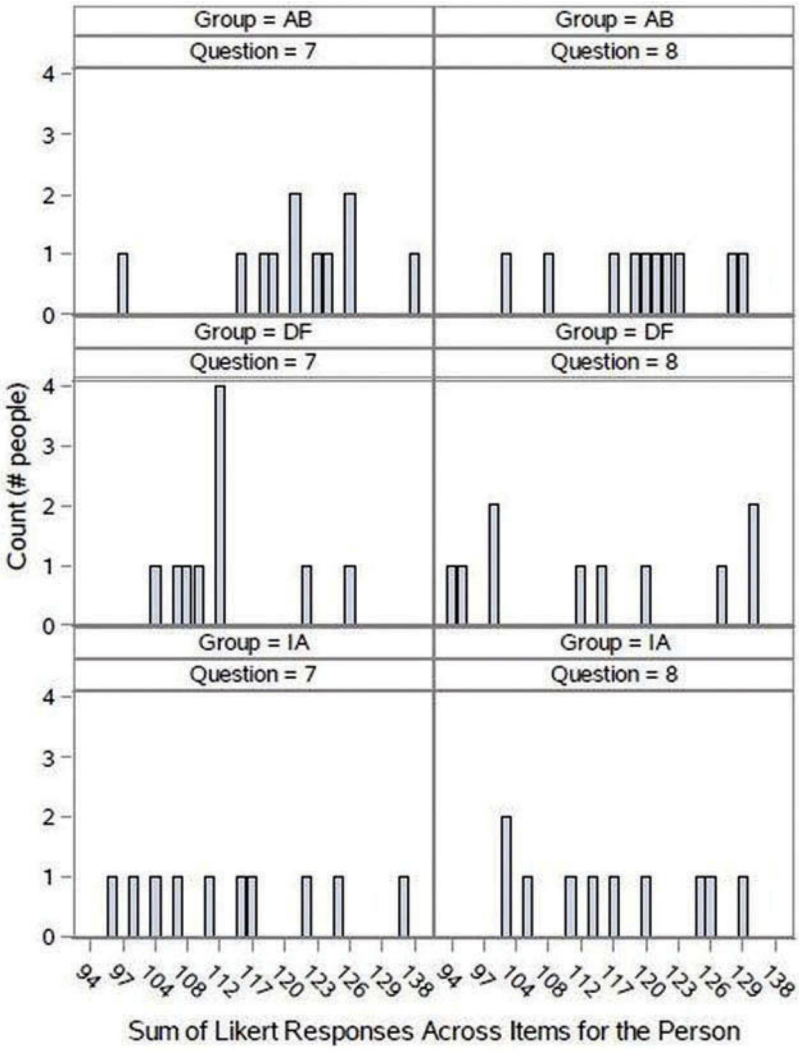

Figure 4.

Number of respondents in each participant group by the sum of Likert responses across all items or cards for designing a program (Question 7) and implementing a program (Question 8).

Table 1.

Design of a safety program, modes of cards by three groups of participants ranking themselves and each other.

Who should help design a farm safety program?		
	Pile-sort cards	
	Agricultural bankers	Insurance agents
Participants		
Dairy farmers	3	3
Agricultural bankers	4	4
Agricultural insurers	4	5

Table 2.

Implementation of a safety program, modes of cards by three groups of participants ranking themselves and each other.

Who should help implement a farm safety program?		
	Pile-sort cards	
	Agricultural bankers	Insurance agents
Participants		
Dairy farmers	3	4
Agricultural bankers	4	4
Agricultural insurers	5	5