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Evaluating The Swedish Approach to Motivating Improved Work Safety Conditions on Farms: Insights from Fear Appeals and the Extended Parallel Processing Model

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ABSTRACT

Farm work safety intervention programs based on educating and informing have been criticized for not demonstrably improving work safety. We argue that these criticisms are misplaced and that the problem with educating and informing lies not necessarily in the tool, but rather in its implementation. We arrive at this conclusion by systematically investigating eight of the largest farm work safety interventions in Sweden. In particular, we describe how they use fear and other emotional appeals in their communications in an attempt to motivate improved work safety. We then analyze their implementation using the extended parallel processing model (EPPM). We show that, although threat of injury and death is used in the majority of these interventions to motivate individuals, the threat is inconsistent with the behaviors targeted. Other shortcomings and implications for implementing wide-scale farm work safety interventions are discussed.

KEYWORDS

Agriculture; extended parallel processing model; farmers; fear appeals; marketing communication; occupational injuries; safety intervention program

Introduction

Despite substantial combined efforts to improve farm safety in Sweden,[1–11] there is mounting evidence that the overall situation has not improved.-[12] The numbers of deaths and injuries have remained stable since 2007 when controlling for the number of farmers and reporting methods.[12,13] Similar results have been reported in other countries,[14-16] raising questions about whether safety interventions, in particular those based on educating and informing, are effective.[17,18] Previous research has shown that safety interventions result in temporary changes in knowledge, attitudes, and behavior regarding safety, but not sustained behavioral change.[19] For example, a meta-study by Rautiainen et al.[14] found no evidence that education interventions improve safety conditions, and concluded that financial incentives and regulations may be more effective.[14]

Using financial and regulatory means to influence safety behavior does not appear to be a viable option in many countries, for political, social, or economic reasons.[20–22] Moreover, studies that draw conclusions about interventions based solely on changes in aggregate safety incidences risk overestimating their influence, while discounting their effectiveness. On a national level, it is problematic to assume that 'one-off' safety interventions targeting specific sectors or behaviors could influence the work safety practices or injury rates of unreached or excluded farmers. Aggregate change at the national level is a function of all the interventions that take place within a country and should be studied at that level of analysis. Moreover, aggregate data do not show whether or which individual actions worked. Even if they did, such data would still not show *why* some actions were ineffective and whether the problem was in the intervention tool (e.g., education) or its implementation. There is evidence that most farm safety interventions are implemented based on a-theoretical grounds,[23] suggesting that the problem lies in the implementation, rather than in the tool itself.[3,4,15,24] Instead of education being ineffective, as suggested by some, it may be improperly implemented or may require supplemental programs6 such as information campaigns

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that remind and trigger individuals to perform a certain behavior.[18]

Interventions using fear to educate, inform, and motivate desirable health behaviors have attracted substantial academic and practitioner interest,[25–31] including in the context of farm safety.[23,24,32–34] For example, the Health and Safety Authority in Ireland used fear to urge farmers to stop taking risks, with the message 'My farm accident didn't kill me, unlike the 22 people who died on Irish farms last year'.[35] In Sweden, the program Safe Farmers' Common Sense, the largest safety intervention ever in Sweden, was fronted by a farmer who had lost his leg, as a telling example of what can happen on the farm.[6] A number of previous studies have investigated campaigns and interventions aimed at reducing occupational injuries through fear,[36–39] but their focus has not been on identifying the range of fear appeals employed in practice. Thus, we know very little about how farm work safety interventions try to stimulate fear using threats other than personal death and injury. The literature suggests that high-level threats, such as death and injury, are more persuasive than low-level threats.[40] At the same time, threats can only arouse fear if they are relevant.[41] Consequently, campaigns that use low-level threat messages may not evoke fear, while those using high-level threat messages may not be relevant to all farmers.

When fear is aroused, it can be leveraged to motivate individuals to adopt safe work behaviors, but there is a risk that the opposite will happen. The extended parallel processing model (EPPM) holds that the outcome depends on interactions with other, possibly more salient factors, such as self-efficacy toward and the perceived effectiveness of fear-reducing strategies.[34] When, e.g., fear-arousing safety information is communicated to farmers, without relevant fear-reducing strategies or involving strategies that are perceived as unmanageable or too costly, maladaptive behaviors are predicted by EPPM. Because previous research on work safety interventions employing EPPM has focused on specific fear appeals such as tractor rollovers,[42] researchers have not concerned themselves with interventions 'in the wild' that may communicate irrelevant or unmanageable fear-reducing strategies.

Fear is one of many human emotions driving behavior. Pleasure, hope, and acceptance are other powerful emotions known to influence behavior.[43–49] Considering that many farmers are already aware of the threats they face, other tools are most likely needed to encourage voluntary changes in safety practises.[50] Other emotions targeted as part of farm work safety interventions have not been fully explored in the literature. The range of emotions targeted may play an important role in understanding the effectiveness of work safety interventions, and in identifying opportunities for improving them.

Similarly to Cismaru and others,[29,32,49] we consider EPPM to be a useful tool for evaluating interventions that use fear to motivate changes in behavior. Combined with a national-level analysis (based on Sweden and its eight largest work safety interventions) and identification of other means to motivate farmers, we are able to gain insights into interventions and their possible influence on aggregate behavior. The purpose of this study is to obtain a deeper understanding of how work safety interventions are communicated on a national level so that we can generate insight into why safety behaviors are adopted, ignored, or avoided on aggregate.

Conceptual framework

The extended parallel processing model (EPPM)

For decades, scholars have known that fear is capable of influencing a wide range of behaviors[51-54] including breast cancer prevention,[55] condom usage,[26] drug cessation,[56] and climate change precautions.[28] Fear is based on an individual's assessment of threat severity and its likelihood of occurrence (i.e., perceived vulnerability). When a threat arouses fear in an individual, they tend to search for ways of removing the threat—thereby also removing their fear. Thus, practitioners have targeted unhealthy behavior such as smoking with 'fear appeals' by highlighting associated threats (e.g., cancer) and strategies for removing the threat (e.g., cessation). As research on fear appeals has matured (in particular with the introduction of protection motivation theory),[53] it has become apparent that response cost, self-efficacy, and response efficacy moderate the likelihood of an individual responding to appeals, e.g., to quit

smoking.[54] For health campaigns, this means that conceiving ways of increasing self-efficacy and response efficacy in target individuals, while reducing perceptions of cost, are important for success.

While early models were successful in explaining the adoption of healthy behaviors by individuals exposed to fear appeals, they struggled to explain why some fearful individuals resisted change[57,58] EPPM filled this gap by introducing a dual processing model of fear appeals (see Figure 1).[23,28] This states that fear will either motivate individuals to adopt behaviors that protect them from perceived threats (i.e., protection motivation)[58] or it will lead them to manage their fear (otherwise known as defensive motivation). Defensive motivation occurs when individuals are fearful of a threat, but associate low efficacy with responses or their own self-efficacy in reducing the threat. Since fear is an uncomfortable emotion, individuals who are not able to reduce the threat will attempt to remove the feeling of fear through defensive avoidance and reactance.[59,60] This can manifest itself in maladaptive behaviors such as individuals ignoring or avoiding information or, worse, increasing their risky behaviors to exert their individual freedom.[60]

In the field of work safety, several formative studies have tried to understand triggers of existing fears and responses that reduce them. Smith et al.[38] found that brochures could be used to increase intention among farmers to use ear protectors in order to avert hearing loss, despite farmers having strong pre-existing beliefs about the threat and efficacy perceptions. EPPM has also been used to establish existing beliefs about fear, efficacy, and intentions. For example, Witte et al.[42] found that farmers know that equipment accidents pose severe and dangerous risks, yet they also feel immune to the dangers. Dials[61] investigated arthritis and asked farmers to discuss consequences, treatments, and their preferred channel for information. The farmers in that study were convinced that treatments for arthritis management are available, but they were unsure where to find information on the subject. They tended to look to personal contacts for information, but also wanted information to be available from media sources such as the Internet. Formative studies such as these have been used to develop specific, theory-driven work safety interventions.

Precursors to EPPM, namely protection motivation theory (PMT), have also been used to evaluate existing intervention campaigns and guide decisions regarding campaign design, implementation, and evaluation.[30] Using PMT, Cismaru et al.[28] evaluated 11 climate change campaigns designed to influence 'climate-friendly' behavior and found that 10 of the 11 were a-theoretical and lacked consistency.[30] More recently, Cismaru recommends using EPPM when evaluating intervention campaigns.[58,62]

Expanding on EPPM: the use of other emotions and triggers

We know that 'emotions are mental states of readiness that arise from appraisals of events or

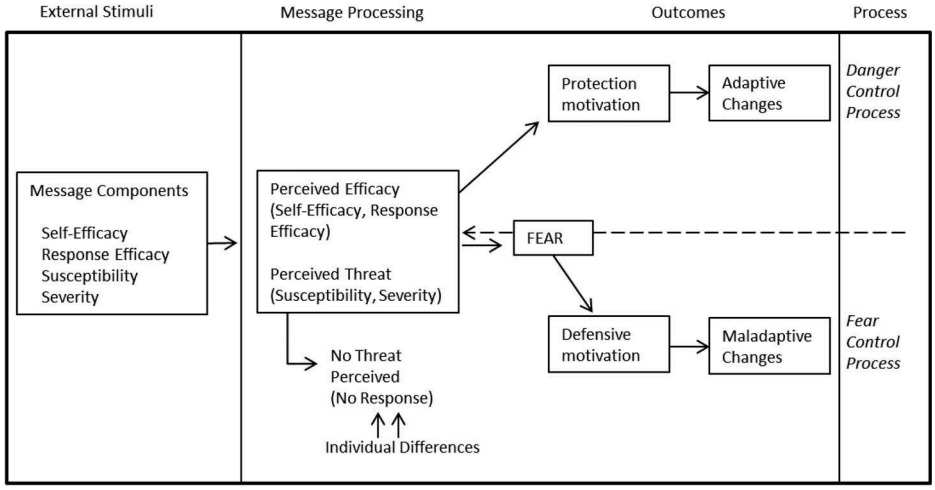

Figure 1. Components of the extended parallel process model (EPPM).[23]

one's own thoughts...that have implications for action and goal attainment'.[63] Fear, like anger, sadness, or frustration, is a negatively valenced emotion that generates cognitive discomfort. The typical coping mechanism that follows negative emotions is avoidance (or reduction or elimination) of the source. Yet fear and other negative emotions may not be the most appropriate (and certainly not the only) persuasion tools for motivating health behaviors. Muthusamy et al.[50] claim that the use of fear appeals to persuade individuals with high levels of pre-existing fear is ill-advised and ineffective, while Lennon et al.[64] argue that fear appeals may even cause individuals to behave in the opposite way to that intended by the message. For these reasons, positively valenced emotions, such as happiness and pleasure, are an important complement, as they can stimulate helping or altruistic actions.[63,65] Information campaigns using positive emotions to direct safe work behavior may also influence individuals to help others (e.g., encouraging co-workers to wear a seatbelt; farmers voluntarily using less pesticides so they feel good about themselves when workers are in the field picking vegetables).

Emotion is a mental state of readiness, but this mental state requires triggers. Empirical research on EPPM typically uses information (e.g., from brochures and advertisements) to stimulate or arouse fear in laboratory settings. However, Rimal's[66] risk perception attitude (RPA) model states that what triggers emotions such as fear is not only the message but also the risk perceptions of the individual. These risk perceptions may not only be colored by recent information but are also formed from prior experiences.[27,67] Consequently, when using EPPM to evaluate interventions that occur overtime and via multiple channels using multiple techniques, it is important not to overlook triggers.

The 'triggers' used to stimulate emotions in laboratory research are often exogenous to empirical work on EPPM. When evaluating existing interventions and how they influence behavior, these triggers become a primary source of interest. The Fogg model asserts that, for a target behavior to occur, an individual must be sufficiently motivated, have the ability to perform the behavior, and be triggered to perform the behavior.[49] The motivators include fear and other negative and positive valenced emotions, as discussed above. In the Fogg model, ability is a combination of EPPM's self-efficacy and response efficacy and triggers relate to the 'exogenous' aspects in laboratory research, which Fogg [4,49] describes as facilitators, sparks, and signals that stimulate the behavior. In the context of farm safety interventions, a farmer may experience fear of tractor injury, recognize and have the ability to reduce this fear by wearing a seatbelt, yet fail to do so because a timely trigger is lacking.

Method

Our first objective in this study was to identify the largest safety information and education programs/campaigns in Sweden and examine how they were implemented. Starting with an extensive online search and previous experience working with government work safety initiatives, a total of eight campaigns were selected for the analysis. These eight programs employed a wide range of traditional marketing channels, such as information folders, press releases, and personal selling through farm visits and consulting, to communicate the need for better work safety on farms. They targeted a range of behaviors and attitudes geared towards a safe working environment, personal safety, and the safety of close relatives.

Our selection criteria for programs were as follows: national in scope, run by publicly funded organization, current, and focusing on the major risk factors for a safe working environment in agriculture and forestry.[13,68,70] We also included one campaign that is no longer running (Safe Farmers' Common Sense), because it was the most ambitious work safety campaign ever run in Sweden in terms of total expenditure and collaboration across actors.[6,11] A similar campaign in terms of total expenditure run by the Swedish Work Environment Authority during 2009–2011, involving 3,000 farm visits to provide advice on injury prevention, was excluded due to lack of information and documentation.

Our online search identified programs and campaigns for work safety researchers, advisors on work safety, inspectors, and companies selling safe machine and product innovations. These were excluded from our sample as their intended scope (and presumed influence) was too narrow.

Similarly, we excluded initiatives that may have reached farmers, but targeted a wider audience. One example of this was a campaign targeting safety when handling horses. Actors who do not work directly for farmers (e.g., the Swedish Municipal Workers' Union) were also excluded.

Each campaign was analyzed and described following a similar approach to Cismaru et al.[28,69,71] Using EPPM as a framework, we coded and identified the following aspects of each campaign:

- Objective(s) and targeted behavior(s)
- The threats used and (if any) behaviors targeted, including how threat severity and threat susceptibility were framed
- How self-efficacy was framed or targeted?
- How response efficacy was framed or targeted?

In addition to using EPPM, we captured two additional aspects of the campaigns:

- Other possible sources of motivation apart from fear, such as sadness, anger, pleasure, and happiness.
- The 'triggers', or a description of when and where information eliciting behavioral action is available.

The coding and descriptives were evaluated by all three authors and any differences in viewpoints were discussed until agreement was reached. Unlike Cismaru et al.[28], we did not investigate whether extant campaigns conform to a specific model in order to guide future communications and campaigns. Rather, we used EPPM inductively to evaluate each campaign and build understanding and theory. Consequently, the outcome of this analysis is our empirical description of how work safety interventions are implemented and predictions of their effectiveness using our conceptual framework.

Results and analyses

Work safety interventions in Sweden: targeted behaviors

The predictions made by EPPM depend on the behaviors targeted. Assuming there is sufficient fear, adaptive, pro-safety behaviors depend on beliefs that the promoted behaviors reduce the source of danger (response efficacy) and that the individual has the ability (self-efficacy) to carry out the behavior. Consequently, identifying the behaviors promoted by each actor was a crucial first step in understanding farm safety behavior in this study.

All organizations covered by our study shared the common goal of improving safety conditions in the agricultural sector and *targeted farm owners exclusively* with their messages. There were some differences pertaining to which aspects of safety were targeted, who was expected to benefit, and the means used by the organizations to achieve their goal (Table 1). For example, the Safe Farmers' Common Sense program adopted a holistic approach to safety and wanted to see farmers working systematically with safety to prevent injury. Vulnerable groups such as children and the elderly were highlighted in its information, but the farmer was the target of behavioral change. The Swedish Work Environment Agency focused on existing laws and used inspections to ensure farmers were informed and in compliance. Again, the farmer was targeted for behavioral change, even if this change is also expected to benefit employees. The Safe Forest program focused specifically on safe operation of forestry equipment and used legal arguments to encourage farmers to become licensed. The targets of change were those working in forestry, who fit the legal requirements (e.g., those licensed to operate heavy machinery) and not others, such as children.

Regarding the immediate behavioral change targeted, we found more similarities than differences. Each organization emphasized a slightly different aspect of safety which it was interested in improving, yet they all appeared to require the individual to perform an action (behavior) indirectly related to improving safety.

- ***Safe Farmers' Common Sense*** *required farmers to register for a course or schedule a meeting with an advisor, to learn about systematic safety routines.*
- ***SLA's Small-scale Health and Safety Supervision*** *required individuals to join the*

organization before providing safety information or services.
- ***The Swedish Work Environment Authority*** *required individuals to comply with existing regulations and, to do this, individuals were expected to self-educate.*
- ***Health and Safety Consulting for Farmers*** *wanted individuals to permit farm visits or telephone calls, so that advice on a safe working environment could be provided.*
- ***Safe Farm*** *wanted individuals to take safety courses to obtain information about risks and to use checklists. They also offered safety products on their webshop to help reduce the risk of injuries.*
- ***Safe Forest*** *wanted farmers to take safety courses and take a test so they can become licensed*
- ***Sigill*** *wanted farmers to become certified in safe working conditions, following a protracted certification process.*
- ***Prevent*** *offered a variety of support and wanted farmers to access training, checklists, inspirational articles, fact books, and websites.*

In sum, the immediate behavioral changes targeted by the largest work safety organizations seem limited to acquiring knowledge about risks. Even if these behaviors lead to actions like wearing seatbelts or using ear protectors when necessary, they are mediated by the need to first acquire more information. Furthermore, because only farmers are targeted with behavioral change, there is a missed opportunity to directly influence vulnerable individuals such as children, the elderly, or hired farm workers.

Threats, fear appeals, and targeted behaviors

Fear arousal is generated in individuals by threats that are perceived to be severe and likely to occur. According to EPPM, individuals seek to reduce the threat when efficacious options are available (response efficacy and self-efficacy) and seek to reduce the feeling of discomfort when they are not. It follows therefore that to arouse fear and motivate action, the threat must be severe and/or likely to occur.[1]

All but one of the organizations studied (Sigill) used threats to explain the need for safer working environments. Two distinct types of threats were used, pertaining to physical injuries and to financial penalties. In the former, threats were communicated as, e.g., 'Farming is one of the most dangerous workplaces for children and adolescents' and 'Every year thousands of injuries occur in Swedish agriculture. Many of them could have been avoided with simple preventive measures'. The latter included messages such as 'To reduce the number of accidents and occupational diseases, there are rules that make the work safer…you may be obliged to pay a fine if you do not follow them'.

As regards communication of threats that relate to physical injuries, our results showed a clear pattern of avoiding specific and salient threats. It was very difficult to find examples that went beyond 'Farming is dangerous' or 'Thousands of injuries occur every year' and directly mentioned, e.g., *why* farming is dangerous and *what* causes the preponderance of injuries. Whether or not the general threats and vague messages used elicited a sense of severity is an empirical question that cannot be answered in this study, but we surmised that severity perceptions were not heightened by the messages. Similarly, we doubt that these messages serve to increase perceptions of susceptibility, as farmers are generally aware of safety threats in their work. Conversely, the threats related to financial penalties were backed with mandatory or random inspections. Here we expected perceived susceptibility to financial penalties to be high, whereas the severity was relatively low. Financial penalties are arguably perceived as less severe than physical penalties.

The literature refers to threats combined with solutions as fear appeals. For a threat to be effective, it not only needs to be relevant and likely to occur, but must also be accompanied by appeals to perform a behavior that *reduces the threat*. Of the threats communicated by each organization studied here, some, but not all, included an appeal. For example, the Small-scale Health and Safety Supervision program (provided by SLA) stated that employers may be subject to fines by the Work Environment Authority during inspections unless a systematic work environment assessment is performed in the workplace. It also stated that: 'As a member, you will receive advice and support in your systematic work environment

[assessment]'. As discussed in the previous section, the appeal to certain behaviors was inconsistent with the threats used. For example, farmers may already perceive farming as dangerous and know that they are highly likely to be among the thousands of casualties, so an appeal to follow rules may not be a credible solution to their fear.

Efficacy and targeted behaviors

The final aspects described in Table 1 concern response and self-efficacy. Response efficacy concerns the belief that a certain action will reduce the source of fear (i.e., the threat). Self-efficacy is about increasing the belief in an individual that they have the ability to perform a certain action.

The general impression gained from our results was that there is a wealth of information evaluating the effectiveness of safe work practices (e.g., facts on injuries, persuasive arguments relating to different responses) and numerous opportunities to boost self-efficacy in the form of courses and consultancy. On the surface, therefore, it appears as though response efficacy and self-efficacy should be high in Sweden. However, EPPM states that individuals will only engage in the necessary cognitive processing related to self-efficacy and response efficacy if fear is aroused. Hence, there appears to be an inconsistency between the immediate behaviors targeted and the common approach in Sweden to increasing efficacy. If the organizations targeted specific behaviors, such as wearing ear protectors or using a seat belt, the wealth of information available and possibly the opportunity to receive education would be more likely to increase efficacy. Yet the behaviors targeted mostly involve getting individuals to process information and accept training. To be consistent, the type of information available should be geared more towards explaining why receiving educational support or more information is a viable way to reduce fear. In short, the means used for boosting self-efficacy and response efficacy seem inconsistent with the immediate behavioral changes desired by Swedish organizations.

Discussion

Adaptive, maladaptive, and no behavioral change

Fear is a powerful emotion that influences behavior. However, its promise as a tool for influencing desirable behaviors depends on a number of factors. In the present study, we systematically identified these factors in the eight largest campaigns or organizations working with safety in Swedish agriculture. This allowed us to evaluate the 'aggregate' Swedish approach to influencing work safety.

We are doubtful that the combined efforts behind safety interventions by the eight organizations have succeeded in arousing general levels of fear. The threats we identified were vague, and therefore may not have increased perceptions of the severity of current farm safety threats. For this reason, it is also difficult to imagine farmers perceiving themselves as more vulnerable to occupational injuries. If our interpretation of the data is accurate, EPPM suggests that, on aggregate, no actions to improve work safety will occur as a result of fear appeals.

Even if intervention programs in Sweden have succeeded in arousing fear among Swedish farmers, our data point to a potentially larger problem: The behaviors targeted do not directly reduce the threats (death and injury) which cause fear. Rather, work safety intervention programs in Sweden advocate greater knowledge acquisition and education. To reduce the causes of fear, farmers must therefore spend cognitive energy researching and understanding solutions, or they must participate in, e.g., time-consuming courses and inspections. It is known that ability or self-efficacy is partly a function of the energy required to follow a specific course of action.[42] Thus, when the requirements on the individual increase, their self-efficacy decreases. Likewise, because the threats communicated are related to death and injury and the recommended behavioral actions are related to solutions that only indirectly reduce the threats, we argue that response efficacy is also low. Fear coupled with low self-efficacy and low response efficacy predictably leads to maladaptive behaviors. This includes ignoring, avoiding, or even rejecting messages from work safety programs[72]

Table 1. Work safety intervention programs, goals and key EPPM findings

	Campaign/ Program/ Organizer/ Webadress	Overall goal and Behavioural Objective	Campaign tools and Triggers	Core Motivators and Target Group	Severity	Susceptibility	Response Efficacy	Self-Efficacy
1	**Safe Farmers' Common Sense/Säkert Bondförnuft (LRF)** An EU-subsidized work safety campaign administered by the Federation of Swedish Farmers (LRF) and implemented in collaboration with the Institute of Agricultural and Environmental Technology (JTI) and the Swedish Agricultural University (SLU) during the period 2009-2013. www.sakertbondfornuft.se	The campaign is designed to convince farmers to take proactive actions to prevent injuries. The objective is to learn the basics of systematic work environment efforts "so that you can continue to do it regularly with employees or family member".	Press releases, reporting, television, radio, regional coordinators, farm shows and advisory services on the farm. Uses coordinators and advisors as influencers. Website provides comprehensive list information, links and facts, includes sections for particularly vulnerable groups such as children and elderly in agriculture, but also separate risk areas, e.g. machinery, animal handling, tree felling and buildings.	Highlighting fear and that everyone is vulnerable on the farm.	Accidents and deaths on farms lead to high costs both for the farmer and for society, individual suffering and loss of productivity. "Farming especially is one of our most dangerous workplaces while growing up for children and adolescents". E.g. most of the accidents with children occur in tractors and other machines ".	Messages in the documents and fact sheets provide insights into the consequences and guidelines to improve systematic work environment efforts on the farm. An extra focus is on certain risk groups such as children and elderly people, which includes certain risk areas such as work with machinery, animals, buildings and woods/forests.	Presents a number of solutions and activities that might help the farmer in injury prevention actions on the farm. The farmer is assisted with many methods such as a safety inspection on the farm, help in getting started with systematic work environment efforts. Contains suggestions and facts to make everyday life on the farm safer. Examples "by planning work, preventive service, complete protection, locking up gear or checking the handbrake on the tractor to prevent accidents on the farm".	Provides information, methods and free advice and recommendations on how the farmer can work to reduce the risks for family and employees on the farm. An action plan helps the farmer to fix any shortcomings and create a crisis plan. If the farmer does not want any advisor on the farm, he/she can attend a course. Several selective activities and methods: a) The course Three Meetings for Safe Farmers' Common Sense, b) Individual visits by advisors, and c) farm walks (Greater general information activity).

(*Continued*)

Table 1. (Continued).

	Campaign/ Program/ Organizer/ Webadress	Overall goal and Behavioural Objective	Campaign tools and Triggers	Core Motivators and Target Group	Severity	Susceptibility	Response Efficacy	Self-Efficacy
2	**Small-scale health and safety supervision /Arbetsmiljöutvecklare (SLA)** A service that is provided by SLA, an employer organization that among other services offers its members support, training and work environment development services. www.sla-arbetsgivarna.org/	Designed to support employers so that they comply with the Work Environment Act in order to create a healthy and safe work environment on the farm.	Members can access a list of comprehensive occupational health and safety advice via the web, such as systematic work, emergency guidance, first aid, law enforcement and prosecution, chemical workplace safety, how the employer, together with his staff, should investigate, risk assess and take action. The membership includes a free 2-hour visit by a small-scale health and safety supervisor for a review of the systematic work environment measures. The website provides limited support material for non SLA members.	Highlights pleasure, subsidies but also responsibilities of employers.	The website caters to the employer who wants to know and learn more e.g. about systematic work environment work. "The material can be used to get started with the systematic work environment efforts, get answers to concrete questions or as a practical guide to working environment measures in everyday life". However, the website does not describe responsibilities inspections and fines until the user continues searching further in the messages. The employer may be subject to sanctions from the Work Environment Authority during inspections unless a systematic work environment procedure is performed at the workplace.	Offers support, training and education "As a member, you will receive advice and support in your systematic work environment work. We also provide training, help with government contacts, and to respond to inspection reports". Takes into account, for example, what applies to the employment of minors and what work tasks are prohibited.	There are attachments, templates and forms available on the website, as well as the opportunity for advice on their farm. "Work environment developers are experts in practical work environment work as well as laws and regulations". "Here you will receive advice and support in your systematic work environment work".	A variety of methods are presented. The membership includes a free 2-hour visit from a workplace developer "We also offer training, help with government contacts, and respond to inspection messages". "At the farm visit, a review of the systematic work environment work will be carried out, which means that together with the farmer, we will review the farm's risks. The work environment developer reviews risky work and advises on appropriate improvement measures. Any additional services with measurement, investigation, work injury reporting may occur".

(*Continued*)

Table 1. (Continued).

	Campaign/ Program/ Organizer/ Webadress	Overall goal and Behavioural Objective	Campaign tools and Triggers	Core Motivators and Target Group	Severity	Susceptibility	Response Efficacy	Self-Efficacy
3	**Swedish Work Environment Authority (AV)** Provides rules and legislations that will make the work environment better and the work safer on the farm. Inspecting workplaces. www.av.se/roduktion-industri-och-logistik/jordbruk-och-skogsbruk/	Obejctive to ensure that employers comply with health and safety rules and laws ."Our goal is to reduce the risks of ill health and accidents in working life, and to improve the work environment from a holistic perspective".	Safety inspections also disseminate information on occupational health and safety regulations. "Central are the experts within, for example, the chemical, psychosocial, ergonomic or technical areas". Visits are pre-notified, but may also be unannounced. The tool is also to give legal sanctions.	Primarily refers to employers, highlights fear, responsibillity, inspections and fines.	Impacts and severity of serious injuries and occupational fatal accidents must decrease. "In agriculture and forestry, the number of fatal accidents is higher than in most other industries". To reduce the number of accidents and occupational diseases there are rules that will make the work safer". States that if the authority's rules are not followed, sanctions fees apply. There may be unannounced inspections. "For some of the stipulations in our provisions, you can be obliged to pay a sanction fee if you do not follow them". "It is the employer who has the primary responsibility for the work environment at your job".	"When we are out inspecting different workplaces, we look at the work environment and check that laws and regulations within work environment are followed. If we find shortcomings, the employer needs to fix them".	Provides lots of information on workplace responsibilities "On this page we have gathered basic information about what the rules mean and how to work to achieve a better and safer working environment". "Gives support to those who are responsible for the work environment in a workplace, are affected by the Work Environment Act or other legislation that the Swedish Work Environment Authority supervises".	The information that is in force regarding legislation and how to create a good working environment is well stated on the website and information material. The rules on systematic work environment work, SAM, consist of twelve sections that require the organization of work environment efforts and the activities that need to be carried out. However, no personal service is provided if the farmer need individual support.

(*Continued*)

Table 1. (Continued).

	Campaign/ Program/ Organizer/ Webadress	Overall goal and Behavioural Objective	Campaign tools and Triggers	Core Motivators and Target Group	Severity	Susceptibility	Response Efficacy	Self-Efficacy
4	**Health and Safety Consulting for Farmers (Säker Arbetsmiljö Sverige)** An economic association with farm safety advisors in cooperation with SLA and LRF. www.sakerarbetsmiljo.se	Objective is to improve the safe working environment. Targeted behaviour is to get farmers to call them for advice and support within a variety of work safety environment aspects.	Informs via the webside about various obligations in the work environment area that should be important to a farmer / employer to reduce the risks at work."Here you can get answers to questions about the working environment through daily telephone calls and arrange courses on the subject". Farm visits or by telephone (even as at hotline).	Includes pleasure, hope and fear (the next step provides a level of severity, although it is not high in the beginning of the website).	States that agriculture involves many risky tasks. "You can reduce the risk of an accident on your farm by regularly checking the safety". Encourages farmers to contact the association in order to buy their advisory service or their courses and other services. However, the website does not describe these until the user continues searching further in the messages.	Makes you feel that everyone is vulnerable, that safety is a issue that concerns the whole farm family. It can be expensive and risky not knowing what rules apply. "Swedish Work Environment Authority has for a number of years introduced a large amount of sanction fees for those companies that do not follow current regulations ".	The message gives the farmer access to specialists and competences that they might not have otherwise. Outlines a variety of work environment issues, as requested by the farmer. Clarifies individuals' legal responsibility. Individual responsibility for the farmer is underlined.	The consulting service offers a variety of work environment measures for the farmer. Promotes a variety of work environment areas. "We'll help you review your home blindness".

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Table 1. (Continued).

	Campaign/ Program/ Organizer/ Webadress	Overall goal and Behavioural Objective	Campaign tools and Triggers	Core Motivators and Target Group	Severity	Susceptibility	Response Efficacy	Self-Efficacy
5	**Safe Farm/Säker Gård (LF)**. This concept is provided by a Swedish Insurance Company (Länsförsäkringar). www.lansforsakringar.se/goinge-kristianstad/lantbruk/forsakring/verksamhetsforsakringar/saker-gard-och-saker-hastverksamhet/	Aims to certify farms as "safe" through inspections. Insurance agent and farmer create a "Safe Farm Checklist"; follow up actions through inspections.	Website describes the concept, promotes health and safety education "courses on safe farms informing about the risks on farms" safety inspections and checklists, as well as a webshop . "In our webshop you can buy good safety products to help you avoid or reduce the risk of accidents".	Subsidies, acceptance, pleasure and fear in the sense that much economic values in buildings, animals and people is lost in the event of an injury or fire. The target group is farm owners.	Impact and severity of economic value losses in buildings, animals and people in the event of an injury or fire. "Every year thousands of injuries to Swedish agriculture occur. Many of them could have been avoided with simple preventive measures".	States that injuries and fires may cause great economic and personal losses. "In a fire, property and, at worst, life can be lost. Often a fire or other accident also causes major production losses". You can avoid injuries and worries by following our advice and tips. To become a "safe farm", the farmer must go for a safety course and meet certain practical requirements. "Electricity fittings and fittings should be safe and secure, there must be earth fault breakers in all the buildings of the farm and there must be fire extinguishers and fire hoses in easily accessible places. There must also be the right equipment in machinery and tractors" .	It is not communicated what it means for the individual farm without discussions with the insurance company. "The first thing you do is attend the education. Contact us and we'll tell you more".	The farmer gets help with safety inspection, checklists and other support, but not before they have undergone training. Website provides limited access to support material. However, the documentation from the training course "Safe Farm - Safe Farmer" covers several aspects of health and safety in agriculture. "Checklist for Your Farm Safety" - A Guide to Information and Suggestions for risk prevention provides support in finding the risky and dangerous places on the farm. In the webshop, various prevention products such as firefighting equipment, smoke detectors, fire extinguishers and escape ladders can be purchased at a cost.

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Table 1. (Continued).

	Campaign/ Program/ Organizer/ Webadress	Overall goal and Behavioural Objective	Campaign tools and Triggers	Core Motivators and Target Group	Severity	Susceptibility	Response Efficacy	Self-Efficacy
6	**Safe Forest /Säker Skog (LRF, Skogsägarna)** an economic association owned by LRF and four forestry associations. http://sakerskog.se/om-oss/	Raises awareness of risky work in forest activities and increases the safety of those who work with brush cutters, chainsaws and quad bikes. Encourages forestry workers to undertake education "to get a "driver's licence", in order to legally use forestry tools.	Website promotes education and training in handling of chainsaws, brush cutters and quad bikes. It also issues permits to use these equipments.	Likely contributes to fear and fines to farmers in forestry operations, e.g. if not attending the courses, if not following new roles or using new and using proper protective equipment.	Number and severity of serious accidents and fatalities need to decrease when working in the forestry. Individual responsibility. "The number of accidents, especially serious ones and fatalities, needs to decrease and our work is extremely important in this".	Highlights the regulations and safety rules. The worker in the forest is exposed and vulnerably "Safe forest operations aim at increasing safety for those who work with brush cutter, chainsaws and quad bikes."	Lots of practical information about how to work safely in forestry, e.g. when felling trees, tips on working methods and equipment and legislations. Promotes education and training.	The website provides lots of pictures and texts illustrating working techniques and instructions to participate in education and training. Different levels of education are offered adapted to the needs of the users.
7	**Sigill Certification of Working Conditions/ Arbetsvillkor (Sigill Kvalitets system AB)** Develops and manages the IP – standard, which is the leading independent food and agriculture certification scheme in Sweden. http://sigill.se/IP-Certifiering/ARBETSVILLKOR/	Aims to promote good working conditions through encouraging compliance with Sigill certification. Behaviour targeted is Sigill certification adoption through compliance with set standards, labour laws and periodic external audits.	Website to give the farmer as a producer support on how to certify working conditions. "This certification also offers support and clear guidance to fulfil the requirements of an employer, regardless of whether they are employees or hired temporary staff". Farmers that complete the working conditions module fulfil the requirements of an employer, regardless of whether they are employees or hired temporary staff. "With a certification under IP working conditions, labor laws and regulations are met. "	"It's about voluntariness and belonging to the best". Taking the module is reasonably expected to increase sales of the farmers/producers products.	"The certificate is a receipt that legislation and industry guidelines for a good working environment, good working conditions and social responsibility are followed in the company". However, the aim is to create generally good working conditions in order to meet consumer and food chain demands and it presents as an added value to other types of certification. The website does not mention severity until the user continues searching further in the sites/messages.	The certification is voluntary "IP Working Conditions is a certification for companies that want quality assurance of their good work, working conditions, work environment and social responsibility". Through the certification the farmer as an employer can be sure that they meet the legal criteria for a good working environment, good working conditions and social responsibility	The farmer who wants to make sure they have good working conditions can be certified "The certificate has high credibility as a verified sales of services and products to both international companies and public procurement".	Working conditions provide support and guidance to farmers who want quality assurance of their work with working conditions, work environment and social responsibility. The support covers a variety of aspects such as management and organization, systematic work environment, legal aspects of workers and housing for temporary employees. However, the website provides limited access to support material and there is no motivating factors for the employer to sign up to the module apart from their own interest.

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Table 1. (Continued).

	Campaign/ Program/ Organizer/ Webadress	Overall goal and Behavioural Objective	Campaign tools and Triggers	Core Motivators and Target Group	Severity	Susceptibility	Response Efficacy	Self-Efficacy
8	**Prevent** An noprofit organization that convey knowledge that helps farmers and other companies to improve the working environment. Prevent owned by the labor market partners. www.prevent.se/bransch/lantbruk-och-skogsbruk/	Promotes the impact of work environment on health. Encourages farmers to gather information and conduct risk assessment.	Website, survey, web-based training, checklists, guidebooks, links, systematic work environment measures. "To facilitate workplace safety, there are a variety of tools. Prevent offers training, checklists, inspirational articles, fact books and websites".	The employers may have an increased expectation of testing their working environment skills, the feeling of being able to cope or failing the different steps makes sense for further steps in safety working.	Impacts and severity "There are a large number of occupational injuries and multiple deaths per year in agriculture and forestry. Most accidents occur when working with machines, such as tractors, tree felling and working with animals".	Focus on the individual and how to handle the risk in farming as an employer. "The employer must regularly investigate and risk assess workplace conditions". Farmers can use the checklists or other resources directly on the website for free. "At Prevent there are a number of free checklists that target those working in different parts of the farming industry. Use the checklists to detect risks and determine what actions need to be taken and who is responsible for each action".	The employer is assisted with several tools such as checklists, guidebooks, links. The checklists links to different production targets "Here are checklists to help you identify the risks at work".	The material that is specific for each farming sector offers a variety of tools for the farmer. "To facilitate workplace safety, there are a variety of tools. Prevent offers training, checklists, inspirational articles, fact books and websites." Easy to access and to work with and educationally useful and requires no guidance, for example, in the form of an advisor.

Overall, it is our belief that fear as a tool to motivate safe work behavior in Sweden has not been effectively implemented. Despite this, it is the most common emotional motivation tool used. In fact, it was the primary tool used by all but one of the eight organizations studied here. Sigill was the only organization that did not use fear. Instead, it used the promise of greater profits as the motivation to adopt Sigill certification. EPPM is not typically used to predict how behaviors unfold when fear is out of the equation. However, self-efficacy is widely understood to be a strong moderator between intentions and behaviors. The promise of increased profits, if believable, may outweigh the barrier posed by low self-efficacy in becoming certified. Other emotions and motivators may also serve the purpose of directing safe working behavior, but such examples were largely absent in the initiatives studied here.

Conclusions

The purpose of this study was to obtain a deeper understanding of how work safety interventions are communicated on a national level, in order to generate insights into why safety behaviors are adopted, ignored, or avoided on aggregate.

Lundqvist [3] reminds us that public health theoretical models must be adhered to and coordinated when developing work safety interventions. Although the EPPM has been used extensively in previous studies, they have tended to focus on ad hoc, unrelated, and narrowly defined interventions.-[20,21,73] We believe our study is the first to evaluate intervention campaigns with EPPM on a national level. This enabled us to gather insights other studies have missed, such as how 'Sweden' coordinates her efforts to communicate work safety interventions. On the whole we found:

- Work safety intervention campaigns use threats that are inconsistent with targeted behaviors.
- Organizations targeting safe behaviors needlessly increase response costs for farmers.
- Attempts to increase self-efficacy are not targeted in communications.
- Other emotions besides fear are rarely used to motivate farmers.
- Farm owners are targeted with work safety communications, but not family members, workers and other influential or vulnerable stakeholders.

These observations, when viewed together through the lens of EPPM, suggest that fear appeals are widely misused in Swedish farm safety interventions. Since fear appeals are the primary (and for the most part only) motivational tool used to influence safe farm work behaviors in Sweden, the implications are troubling. Instead of encouraging farmers to adopt safer behaviors, intervention programs may be promoting maladaptive behaviors such as avoiding safety information altogether.

Maladaptive behaviors may explain the conflicting data in Sweden and more general questions about the effectiveness of work safety education. For example, a number of Swedish studies have reported that educational interventions in terms of work safety adoption are effective (see, e.g.,[2,4,74,75]), but aggregate data for Sweden show only minor or no changes to behavior and injuries.[12] A simple explanation for this apparent contradiction is that the respondents in these studies are not representative of the average farmer, while the aggregate data actually represent the average farmer. The data may thus indicate that educational interventions, at least in Sweden, are effective in achieving their goals once motivation to participate has been aroused. However, this has some rather unexpected implications. If the bottleneck to successful interventions is skepticism or reluctance to attend seminars, allow visits by experts, or access other education, the question is how to motivate farmers. An obvious starting point could be to align motivational appeals with education while removing any measure that increases their costs (e.g., cognitive effort, time, and money) when accessing education (i.e., lower their response cost).

Real world interventions use multiple fear appeals and target multiple behaviors within and across campaigns. This makes identifying and analyzing patterns challenging. Using EPPM, we found it useful to begin by identifying the specific behaviors each individual campaign targeted, followed by abstracting all the information to represent higher level concepts in EPPM. This was also the greatest limitation of the study because, due to the complexity of actions, we were forced to raise our level of analysis above minor

variations in the data. Thus, outlier activities, smaller initiatives not included in the dataset, and other micro-level factors may have exerted more influence on the aggregate level than we accounted for. However, we discussed these issues in our research group and avoided using only examples that fit our narrative.

While we are hesitant to generalize the findings in this study beyond Sweden, the insights gained have important implications. Moreover, as Mook[73] argues, statistical generalizability is not always the intention of research and theoretical generalizability can have an important role to play. If the Swedish approach is indicative of how other nations implement work safety interventions, the challenge is not in finding more effective tools to influence work safety, but rather in ensuring that the tools available are implemented wisely. In the context of information and education campaigns, this means moving beyond theoretically grounded use of fear appeals.[23] A good starting point would be to experiment with other emotions that can be used to motivate behavioral change, such as joy, happiness, or sadness. Expanding on this, stakeholders other than the owner-farmer could be targeted, such as dependents or employees. Moreover, emotions such as fear and happiness represent only part of the cognitive processing that determines behavior, so more concerted efforts are needed to increase response efficacy and self-efficacy in the behaviors targeted, while reducing the costs involved in preventive work.

Note

1. More accurately, the combined interaction of severity and vulnerability is what leads to fear. Therefore, fear may be aroused if severity is very high and vulnerability is very low (and vice versa).[23]

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References

1. Springfeldt B Effects of occupational safety rules measures with special regard to injuries. Doctoral dissertation. The Royal Institute of Technology, Department of Work Science, Stockholm. 1993.
2. Lundqvist P. Evaluation of the improvements in working conditions on farms funded by the Swedish Working Life Fund. *J Agric Saf Health*. 1996;2(4):191–196. doi:10.13031/2013.19448.
3. Lundqvist P Ökad säkerhet inom jordbruket genom interventioner och andra strategier – kunskapssammanställning (Improved safety in agriculture through interventions and other strategies – a review) (In Swedish). Report RAP 2012:15, The Swedish Work Environment Authority. Stockholm.
4. Stave C, Törner M, Eklöf M. An intervention method for occupational safety in farming — evaluation of the effect and process. *Appl Ergon*. 2007;38(3):357–368. doi:10.1016/j.apergo.2006.04.025.
5. Alwall Svennefelt C, Lundqvist P Utvärdering av projektet Regionala arbetsmiljöutvecklare 2007–09. (An evaluation of a project on regional extension on safety and health for farmers) (In Swedish). Swedish University of Agricultural Sciences. Alnarp. Report 2010:10.
6. Danielson (Ed.). Säkert Bondförnuft. Slutrapport för projektet 2009–2013. (Safe farmers common sense. A final 515 report for the project 2009–2013) (In Swedish). Swedish Farmers Federation (LRF). Stockholm. 2013.
7. Lindahl C, Lundqvist P, Hagevoort GR, et al. Safety aspects of animal handling in dairy production. *J Agromedicine*. 2013;18:274–283. doi:10.1080/1059924X.2013.796906.
8. Nilsson K Åtgärder för att minska risken för arbetsskador bland äldre lantbrukare. Arbetsvetenskap, Ekonomi och Miljöpsykologi, SLU Alnarp. *Sveriges lantbruksuniversitet* Fakulteten för landskapsplanering, trädgårds- och jordbruksvetenskap Rapport 2013:27. 2013.
9. Nilsson K. Interventions to reduce injuries among older workers in agriculture: a review of evaluated intervention projects. *Journal: Work*. 2016;55:471–480.
10. Lundqvist P, Alwall Svennefelt C. *Occupational Health and Safety Strategy in Swedish Agriculture. Irish Meeting 2011 on Agricultural Occupational Health and Safety*. Vols. 22–24. Dublin; 2011:36.
11. Lundqvist P, Alwall Svennefelt C. Swedish strategies for health and safety in agriculture: a coordinated multi-agency approach. *Journal: Work*. 2014;49:33–37.

12. Pinzke S, Alwall Svennefelt C, Lundqvist P. Occupational injuries in Swedish agriculture: Development and preventive actions. *J Agric Saf Health*. 2018;24(3). https://doi.org/10.13031/jash.12816.
13. Pinzke S, Lundqvist P. Occupational accidents in Swedish agriculture. *Agric Eng Res*. 2007;13:159–165.
14. Rautiainen RH, Lehtola MM, Day LM, et al. Interventions for preventing injuries in the agricultural industry. *Cochrane Database Syst Rev*. 2008;(1): CD006398. http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD006398.pub2/pdf
15. McNamara J, Griffin P, Kinsella J, Phelan J. Health and safety adoption from use of a risk assessmet document on Irish Farms. *J Agro*. 2017;22:384–394.
16. Donham M, Thelin A. *Agricultural Medicine: Rural Occupational and Environmental Health, Safety and Prevention*. 2nd ed. John Wiley & Sons; 2016. ISBN: 978-1-118-64720-2
17. Aherin RA, Murphy DJ, Westaby JD. *Reducing Farm Injuries: Issues and Methods*. St. Joseph, MI: American Society of Agricultural Engineers; 1992.
18. Cole HP. Cognitive-behavioral approaches to farm community safety education: a conceptual analysis. *J Saf Health*. 2002;8(2):145–159. doi:10.13031/2013.8428.
19. DeRoo LA, Rautiainen RH. A systematic review of farm safety interventions. *Am J Prev Med*. 2000;18 (4):51–62. doi:10.1016/S0749-3797(00)00141-0.
20. Hunter E, Röös E. Fear of climate change consequences and predictors of intentions to alter meat consumption. *Food Policy*. 2016;62:151–160. doi:10.1016/j.foodpol.2016.06.004.
21. Owens S, Driffill L. How to change attitudes and behaviours in the context of energy. *Energy Policy*. 2008;36 (12):4412–4418. doi:10.1016/j.enpol.2008.09.031.
22. Edjabou LD, Smed S. The effect of using consumption taxes on foods to promote climate friendly diets – the case of Denmark. *Food Policy*. 2013;39:84–96. doi:10.1016/j.foodpol.2012.12.004.
23. Witte K. Putting the fear back into fear appeals: the extended parallel process model. *Communications Monographs*. 1992;59(4):329–349. doi:10.1080/03637759209376276.
24. Ambe F, Bruening TH, Murphy DJ. Tractor operators' perceptions of farm tractor safety lssues and lmplications to agricultural and extension education. *J Agric Educ*. 1994;35(4):67–73. doi:10.5032/jae.1994.04067.
25. Maddux JE, Rogers RW. Protection motivation and self-efficacy: a revised theory of fear appeals and attitude change. *J Exp Soc Psychol*. 1982;19:469–479. doi:10.1016/0022-1031(83)90023-9.
26. Witte K, Berkowitz JM, Cameron KA, McKeon JK. Preventing the spread of genital warts: using fear appeals to promote self-protective behaviors. *Health Educ Behavior. Sarge J*. 1998. doi:10.1177/109019819802500505.
27. Maloney EK, Lapinski MK, Witte K. Fear appeals and persuasion: a review and update of the extended parallel process model. *Soc Personal Psychol Compass*. 2011;5(4):206–219. doi:10.1111/spco.2011.5.issue-4.
28. Cismaru M, Cismaru R, Ono T, Nelson K. Act on climate change": an application of protection motivation theory. *Soc Mar Q*. 2011; 17(3): doi: 10.1080/15245004.2011.595539.
29. Basil M, Basil D, Deshpande S, Lavack AM. Applying the Extended parallel process model to workplace safety messages. *J Health Commun*. 2013;28:29–39. doi:10.1080/10410236.2012.708632.
30. Popova L. The extended parallel process model *illuminating the gaps in research. Health Education & Behavior. Sage J*. 2012;39(4):455–473.
31. Popova L. Scaring the snus out of smokers: testing effects of fear, threat, and efficacy on smokers' acceptance of novel smokeless tobacco products. *J Health Commun*. 2014;29:924–936. doi:10.1080/10410236.2013.824063.
32. Ambe F, Murphy DJ. Injury prevention programming for aged tractor operators. *J Agric Saf Health*. 1995;1 (2):105–116. doi:10.13031/2013.19458.
33. Whitman SD, Field WE. Assessing senior farmers' perceptions of tractor and machinery-related hazards. *J Agric Saf Health*. 1995;1(3):199–214. doi:10.13031/2013.19464.
34. Lewis L, Watson B, Tay R, White KM. The role of fear appeals in improving driver safety. A review of the effectiveness of fear-arousing (threat) appeals in road safety advertising. *Int J Behav Consultation Ther*. 2007; 3(2): doi: 10.1037/h0100799.
35. McCann. Agencey Network. *The Health and Safety Authority. The Luckey One*. 2012. https://www.adsoftheworld.com/media/print/the_health_and_safety_authority_the_lucky_one.
36. Witte K. A theory of cognition and negative affect: extending Gudykunst and Hammer's theory of uncertainty and anxiety reduction. *Int J Intercultural Relations*. 1993;17:197–215. doi:10.1016/0147-1767(93)90025-410.1016/0147-1767(93)90025-4.
37. Tan-Wilhelm D, Witte K, Liu WY, et al. Impact of a worker notification program: *assessment of attitudinal and behavioral outcomes. View Issue TOC*. 2000;37:205–213.
38. Smith SW, Rosenman KD, Kotowski MR, et al. Using the EPPM to create and evaluate the effectiveness of brochures to increase the use of hearing protection in farmers and landscape workers. *J Appl Commun Res*. 2008;36(2):200–218. doi:10.1080/00909880801922862.
39. Tebeaux E. Safety warnings in tractor operation Manuals, 1920-1980: manuals and warnings don't always work. *J Technical Writing Communication*. 2010;40(1):3–28. doi:10.2190/TW.40.1.b.
40. Witte K, Allen M. A meta-analysis of fear appeals: implications for effective public health campaigns. *Health Educ Behav*. 2000;27:591–615. doi:10.1177/109019810002700506.
41. Higbee KL. Fifteen years of fear arousal: research on threat appeals: 1953–1968. *Psychol Bull*. 1969;72(6):426. doi:10.1037/h0028430.

42. Witte K, Peterson TR, Vallabhan S, et al. Preventing tractor-related injuries and deaths in rural populations: using a persuasive health message framework in formative evaluation research. *Int Q Community Health Educ*. 1992;13(3):219–251. doi:10.2190/UHU7-W9DM-0LGM-0GV3.
43. Bandura A. Self-efficacy: toward a unifying theory of behavioral change. *Psychol Rev*. 1997;84:191–215. doi:10.1037/0033-295X.84.2.191.
44. Schunk DH. Self-efficacy and academic motivation. *Educ Psychol*. 1981;26:207–231. doi:10.1080/00461520.1991.9653133.
45. Kelly HH, Michela JL. Attribution theory and research. *Annu Rev Psychol*. 1980;31:457–501. doi:10.1146/annurev.ps.31.020180.002325.
46. Prochaska JO, Velicer WF. The transtheoretical model of health behavior change. *American J Heal Promotion*. 1997;12(1):38–48. doi:10.4278/0890-1171-12.1.38.
47. Petty R, Cacioppo JT. The elaboration likelihood model of Persuasion. *Adv Exp Soc Psychol*. 1986;19:1–24.
48. Simons-Morton BG, Ouimet MC, Chen R, et al. Peer influence predicts speeding prevalence among teenage drivers. *J Safety Res*. 2012;43:397–403. doi:10.1016/j.jsr.2012.10.002.
49. Fogg BJ A behavior model for persuasive design. In *Proceedings of the 4th international Conference on Persuasive Technology*, ACM. 2009; 40.
50. Muthusamy N, Levine TR, Weber R. Scaring the already scared: some problems with HIV/AIDS fear appeals in Namibia. *J Commun*. 2009;59:317–344. doi:10.1111/jcom.2009.59.issue-2.
51. Hovland C, Janis I, Kelly H. *Communication and Persuasion*. New Haven, CT: Yale University Press; 1953.
52. Leventhal H. Findings and theory in the study of fear communications1. *Adv Exp Soc Psychol*. Academic Press; 1970;5:119–186.
53. Rogers RW. A protection motivation theory of fear appeals and attitude change. *J Psychol*. 1975;91:93–114. doi:10.1080/00223980.1975.9915803.
54. Rogers RW. Cognitive and psychological processes in fear appeals and attitude change: a revised theory of protection motivation. *Social Psychophysiology: A Sourcebook*. 1983;153–176.
55. Helmes AW. Application of the protection motivation theory to genetic testing for breast cancer risk. *Prev Med*. 2002;35:453–462.
56. Hastings G, Stead M, Webb J. Fear appeals in social marketing: strategic and ethical reasons for concern. *Psychology & Marketing*. 2004;21(11):961–986. View issue TOC. Special Issue: Fear Appeals in Social Marketing Campaigns. doi:10.1002/(ISSN)1520-6793.
57. Cameron KA. A practitioner's guide to persuasion: an overview of 15 selected persuasion theories, models and frameworks. *Patient Educ Couns*. 2009;74(3):309–317. doi:10.1016/j.pec.2008.12.003.
58. Cismaru M. Using the extended parallel process model to understand texting while driving and guide communication Campaigns against It. *Sarge J Soc Marketing Q*. 2014;20(1):66–82.
59. Berkowitz L, Cottingham DR. The interest value and relevance of fear arousing communications. *J Abnormal Soc Psychol*. 1960;60:37–43.
60. Brehm JW. *A Theory of Psychological Reactance*. Oxford, England: Academic Press; 1966.
61. Dials MD Understanding the risk and efficacy beliefs underlying farmers' (mis) management of arthritis: Implications for designing and delivering effective health communication (Doctoral dissertation, Purdue University), 2008.
62. Cismaru M. "Keep your eyes up, don't text and drive": a review of anti-texting while driving Campaigns' recommendations. *International Review on Public and Nonprofit Marketing*. 2017;14(1):113–135. doi:10.1007/s12208-016-0166-7.
63. Bagozzi RP, Gopinath M, Nyer PU. The role of emotions in marketing. *Journal of the Academy of Marketing Science*. 1999;27(2):184–206. doi:10.1177/0092070399272005.
64. Lennon R, Rentfro R, O'Leary B. Social marketing and distracted driving behaviors among young adults: the effectiveness of fear appeals. *Acad Marketing Stud J*. 2010;14(2): 95–113. Arden
65. Lazarus RS. Cognition and Motivation in Emotion. *Am Psychological Assoc*. 1991;46(4):352–367. doi:10.1037/0003-066X.46.4.352.
66. Rimal R. Perceived risk and self-efficacy as motivators: understanding individuals' long-term use of health information. *J Commun*. 2001;51(4):633–654. doi:10.1111/j.1460-2466.2001.tb02900.x.
67. Rimal R, Real K. Perceived risk and efficacy beliefs as motivators of change. Use of the risk perception attitude (RPA) framework to understand health behaviors. *Hum Commun Res*. 2003;29(3): 370–399. View issue TOC
68. Swedish Board of Agriculture. Motverka olycksfall i lantbruket. *(In Swedish)* Rapport 2007:8. 2007.
69. Cismaru M, Lavack AM. "Don't suffer in silence" - Applying the integrated model for social marketers to campaigns targeting victims of domestic violence. *Soc Mar Q*. 2010;16(1):97–129. doi:10.1080/15245000903528373.
70. Cismaru M, Lavack AM. Marketing communications and protection motivation theory: examining consumer decision-making. *International Review on Public and Nonprofit Marketing*. 2006;3(2):9–24. doi:10.1007/BF02893617.
71. Cismaru M, Lavack AM, Markewich E. Social marketing campaigns aimed at preventing drunk driving: a review and recommendations. *Int Marketing Rev*. 2009. ISSN: 0265-1335. doi:10.1108/02651330910960799.

72. Bandura A. *Social Foundations of Thought and Action: A Social Cognitive Theory*. Englewood Cliffs, NJ: Prentice-Hall; 1986.
73. Mook DG. In defense of external invalidity. *Am Psychologist*. 1983;38:379–387. doi:10.1037/0003-066X.38.4.379.
74. Jansson BR. Safety education and training of Swedish farmer-loggers. *J Soc OccuppationalMedicine*. 1988;38:113–117.
75. Alwall Svennefelt C, Lundqvist P, Pinzke S, Svennefelt W Lantbrukarperspektiv på ”Säkert Bondförnuft” - Uppföljning av en nationell satsning för att förebygga personskador i lantbruket. *(Farmer perspectives on”Safe Farmers Common Sense” – a follow-up of a national program to prevent occupational injuries in agriculture) (In Swedish)* Report 2016:5. Swedish University of Agricultural Sciences. Alnarp.