



A socio-cognitive strategy to address farmers' tolerance of high risk work: Disrupting the effects of apprenticeship of observation



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ABSTRACT

Introduction: Why do generations of farmers tolerate the high-risk work of agricultural work and resist safe farm practices? This study presents an analysis inspired by empirical data from studies conducted from 1993 to 2012 on the differing effects of farm safety interventions between participants who live or work on farms and those who don't, when both were learning to be farm safety advocates. Both groups show statistically significant gains in knowledge and behavioral change proxy measures. However, non-farm participants' gains consistently outstripped their live/work farm counterparts. **Method:** Drawing on socio-cultural perspectives, a grounded theory qualitative analysis focused on identifying useful constructs to understand the farmers' resistance to adopt safety practices. **Findings:** Understanding apprenticeships of observation and its relation to experiential learning over time can expose sources of deeply anchored beliefs and how they operate insidiously to promote familiar, albeit unsafe farming practices. The challenge for intervention-prevention programs becomes how to disrupt what has been learned during these apprenticeships of observation and to address what has been obscured during this powerful socialization process. **Practical applications:** Implications focus on the design and implementation of farm safety prevention and education programs. First, farm safety advocates and prevention researchers need to attend to demographics and explicitly explore the prior experiences and background of safety program participants. Second, farm youth in particular need to explore, explicitly, their own apprenticeships of observations, preferably through the use of new social media and or digital forms of expression, resulting in a story repair process. Third, careful study of the organization of work and farm experiences and practices need to provide the foundations for intervention programs. Finally, it is crucial that farm safety programs understand apprenticeships of observation are generational and ongoing over time, and interventions prevention programs need to be 'in it' for the long haul.

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1. Introduction

Why do generations of farmers tolerate the high-risk work of agriculture and resist safe farm practices? This study presents a conceptual analysis inspired by empirical data from studies conducted from 1993–2012 on the differing effects of farm safety interventions between participants who live or work on farms and those who don't, when participating in farm prevention programs. Both groups showed statistically significant gains in knowledge and on behavioral change proxy measures. However, non-farm participants' gains consistently outstripped their live/work farm counterparts. Drawing on transdisciplinary socio-cultural perspectives, we propose a useful construct to understand the resistance of farmers to adopt safety measures and best practices – the role of farmers' participation in *an apprenticeship*

of observation and extrapolate salient implications for farm safety prevention and education efforts.

1.1. Farmer's high tolerance of risk

Farmers' exposure to high risk of occupational injury is accompanied by a high tolerance for such risks and resistance to changing work practices that have been shown to significantly decrease or eliminate exposure to hazard, such as the installation of *rollover protection systems* (ROPS) on tractors (Sorensen et al., 2011; Swenson, 2004). ROPS and seat belts are known to be 98% effective in preventing tractor operator deaths from overturns and ejections from the tractor seat (Myers & Pana-Cryan, 2003). Yet, high percentages of the nation's farm tractors lack ROPS and tractor related injury and fatalities have persisted for decades in the U.S. farming population. For example, a 2006 study surveyed a random (8%) sample of 6,063 Kentucky farms stratified across the state's six agricultural districts as well as by farm size, commodity, and production. The empirical estimate was that for every 100-operator

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fatalities from overturns of non-ROPS tractors, there are 446 non-fatal injuries. Of these 446 non-fatal injuries, 367 require medical treatment at a clinic or hospital emergency department. Of these 367 emergency medical care cases, 267 require hospital admission. Of those admitted 58 suffered a permanent disability (Cole, Myers & Westneat, 2006). More recently, the National Agricultural Statistics Service (2013) documented the persistence of this pattern, reporting that annually 110 deaths occur from tractor overturns and another 52 deaths occur when operators fall from moving tractors or run over second riders or bystanders. Tractor related fatalities account for fully one-third (33%) of agricultural-related deaths. There is evidence of resistance to change in farming practices beyond tractor ROPS usage. Data from the National Children's Farm Medicine Center has documented resistance to age-appropriate work for example (CAIS, 2012).

1.2. Patterns of evidence from prevention/education studies 1995–2009

The focus of this conceptual essay is to explore why our data consistently show that those most exposed to farm hazards seem to resist adoption of safe farm practices? The research team had long engaged in transdisciplinary approaches. Cultural, cognitive and behavioral aspects of farm safety intervention in these various projects were addressed using theory and best practices from educational & narrative psychology, economic risk, cost & decision analysis, education and safety behavior change models (Cole, 2002; Cole et al., 2004; Mazur et al., 2010; Myers et al., 2008).

Thus, in exploring these persistent findings regarding the tendency of those with the most *experience* on farms to tolerate risk and resist adoption of farm safety practices we sought perspectives from other lines of scholarship that focused on *human action and experience*. Experience is a powerful motivator of human action. Building upon earlier work by John Dewey (1933) and Kurt Lewin (Lewin & Grabbe, 1945), American educational theorist David A. Kolb asserts "learning is the process whereby knowledge is created through the transformation of experience" (Kolb & Fry, 1975, p. 38). Kolb represented his theory as a cyclical model of learning, consisting of four stages shown in Fig. 1.

While Kolb's theory has been applied for designing learning experiences, instructional design and for understanding learner roles in the education process, critiques have historically focused on Kolb's lack of articulation of the complexities of the *reflective observation process* and

its crucial role in shaping the experiences that evolve from it (Boud et al., 1985).

The reflective observation process focuses on *reflective watching* as a way to understand the shaping of behaviors through experiential observation (i.e., watching). If we consider the concepts shown in the right half of the diagram in Fig. 1, we may characterize living and working (growing up) on a farm as the central situated experience of farm children and youth. On a daily basis, from the youngest ages and for many years they have the concrete and affective experience of observing farm work as a part of ordinary lived experience. Moreover, the daily-lived experience of farming involves ongoing problem solving and reasoning, as farmers make reasoned decisions about what to do, who should do it, and how the day's work should be accomplished. There are three methods of reasoning: deductive, inductive and *abductive*. Considering the lens of observing/watching as a developing part of our theoretical grounding we explored theories from other disciplines, abductively, that may have observed these same phenomena: resistance to change and entrenched decision-making in practices through periods of extended experiential learning through *reflective watching*?

1.3. Defining an apprenticeship of observation

Lortie's (1975) seminal sociological work in understanding the persistence of improper workplace practice, despite the knowledge of, and training in, best practice has much to inform our understanding of farmers' tolerance for risk, based on their lifelong experience observing farm practices. Lortie was researching why it was so difficult to train teachers in best practices. A problem widely reported in the teacher education literature, and demonstrated profoundly in schools everywhere. Lortie's theory suggests that beginning teachers' socialization into teaching starts when they are students beginning usually at age 6, observing on a *daily* basis, and serves to perpetuate traditions at the expense of reflective and informed change. In effect the long term and daily schooling *experience* provides a powerful *apprenticeship of observation* that is not in evidence for other practice professions (e.g., law, nursing)

2. Method

For this analysis we examined patterns of evidence from a four-year NIOSH Study (Author, 2005–2009), a previous two-year NIOSH study (PFIRY, 2007–2009), and a Community Partners data set from 2002 (Kentucky ROPS Project). Common data measures among these projects were: (1) demographic data for the prevalence of exposure to and injuries from four agricultural-related hazards: tractor overturns, crush injuries, closed head trauma, and hearing loss; (2) behavioral intentions to work safely as measured by a stages of change measure validated in a prior 3-year study (Cole et al., 2004) and (3) knowledge measures specific to the funded projects. Empirical data from the above referenced studies conducted on the differing effects of farm safety interventions between participants who live or work on farms and those who don't, when both were learning to be farm safety advocates. Both groups (on farm and not on farm) showed statistically significant improvements on knowledge and behavioral change measures. However, non-farm participants' gains consistently outstripped their live/work farm counterparts. These findings are elaborated in the Methods section below.

The study design for this analytic, conceptual essay employed a social exploratory research framework (Schutt, 2012) with an intentional grounded theory approach. Grounded theory is interpretive with the purpose of developing emergent theory from the data rather than from a predisposed hypothesis. Importantly, grounded theory is theory development from data that are systematically gathered and analyzed (Strauss & Corbin, 1994). The procedures for the study involved

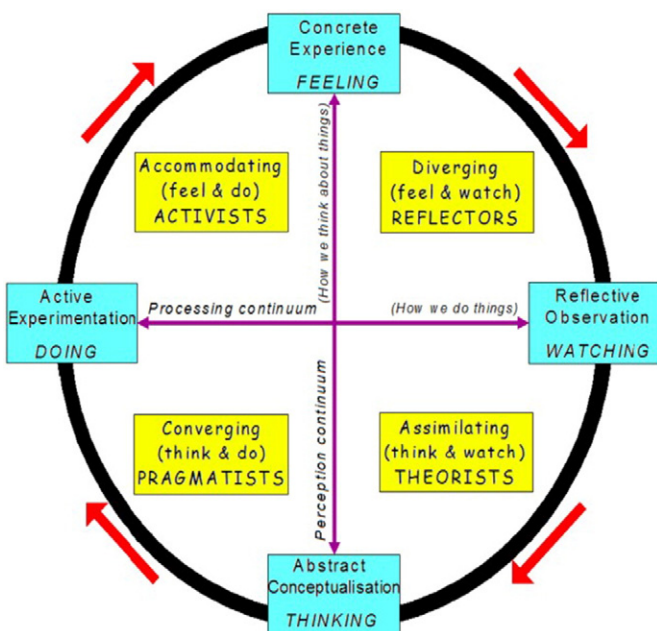


Fig. 1. Kolb's four stage experiential learning cycle.

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