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Toward a theory of farmer conservation attitudes: Dual interests and willingness to take action to protect water quality

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ABSTRACT

Water quality in the Midwestern United States is threatened as a result of agricultural runoff. Based on self-reported data from a survey of farmers in Indiana, we aim to provide a better understanding of how awareness of water quality problems, farm-as-business attitudes, and stewardship attitudes are related to each other and willingness to improve water quality. More specifically, we propose and test a structural equation model grounded in dual-interests theory to examine if and to what extent the relationships between awareness and farm-as-business attitudes are mediated by stewardship attitudes. We found evidence to support our model, particularly the importance of stewardship versus economic attitudes. Emphasizing economic incentives to increase adoption of conservation practices may need to be reconsidered given the growing evidence that pro-social variables influence conservation decisions. We draw attention to similarities and differences in applied environmental management and environmental psychology research, calling for greater integration across these approaches.

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1. Introduction

Agriculture is the leading source of water quality impairments in numerous rivers and streams in the Midwestern United States. Sediment, excess nutrients, pesticides, and bacteria from crop and livestock production are the main nonpoint sources (NPS) of water pollution (EPA, n.d.). In recent decades, farmers have made considerable efforts to voluntarily reduce pollutant loadings and improve water quality by controlling runoff and more efficiently managing the use of agrochemical inputs (Osteen, Gottlieb, & Vasavada, 2012). Accordingly, many research endeavors have been undertaken to understand motivations for farmers' behaviors and willingness to engage in conservation (e.g., Ervin & Ervin, 1982; D'Souza, Cyphers, & Phipps, 1993; Prokopy, Floress, Klotthor-Weinkauf, & Baumgart-Getz, 2008; Blackstock, Ingram, Burton, Brown, & Slee, 2010; Baumgart-Getz, Prokopy, & Floress, 2012), though the focus has been on economic factors rather than psychosocial constructs (Chouinard et al., 2006; Gosling & Williams, 2010). This is particularly true in applied management contexts: as Chouinard et al. (2006) note, "… most studies about social factors … appear as studies of attitudes in the more sociological literature or as ad hoc variables in empirical adoption studies (p 9)".

Applied management research using economic self-interest, ad hoc attitudinal variables, and farmers' willingness to adopt a behavior or support a policy are often used to develop tools like watershed plans and farmer assistance programs intended to change behavior, while studies testing psychosocial theories of pro-environmental behavior are not as immediately incorporated into management practice. However, integrating pro-social and self-interest factors into models of environmental decision making is reflected across disciplinary boundaries. Bamberg and Möser (2007), for instance, integrated elements of both the norm activation model (NAM, Schwartz, 1977) that incorporates moral norms and the more rational-action driven theory of planned behavior

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(TPB, Ajzen, 1991) into a meta-analytic model of environmental behavior. They found support for their integrated model, including that intention was a key predictor of behavior and awareness of environmental problems impacted intent and behavior, though its impact was mediated by moral norms and feelings of guilt. De Groot and Steg (2009) also investigated the relationship between awareness and intent, finding support for a model where the relationship between awareness and intention is mediated by ascription of responsibility and personal norms.

While reflected for several decades in theories like the NAM, environmental management research has only more recently focused on developing and testing models that recognize "dual interests" and differentiate between self-interest and other (pro-social)-interests (e.g., Sheeder & Lynne, 2011; Reimer, Thompson, & Prokopy, 2012; Thompson et al., 2015) – what Chouinard et al. (2006) term "multi-motive/multi-utility" approaches (p5). Sheeder & Lynne (2011) found strong experimental support for including both self-interest and other-interest in models predicting conservation decisions, and these constructs have been further developed as attitudinal constructs by others outside of laboratory settings (e.g., Reimer et al., 2012; Thompson et al., 2015). Some research has shown that if self-interest (i.e., profitability) isn't negatively impacted, farmers may adopt conservation practices (Brodt, Klonsky, & Tourte, 2006; Chouinard et al., 2006).

One challenge in bridging the divide between the applied environmental management and psychosocial literatures is the difference in how key concepts – such as attitudes – are operationalized, especially because they are not always distinguishable within any discipline. Gifford and Sussman (2012, p.65) state, "Attitudes can be confused with other constructs, such as values, beliefs (sometimes called the cognitive component of attitudes), opinions, personality dispositions, and personal norms." Fielding, Hornsey, and Swim (2014) observe that while social psychologists discriminate between beliefs and attitudes, they are not always distinguishable in the climate change literature. Thompson et al. (2015) included a number of statements in their environmental attitude scales that relate to the ascription of responsibility and personal norm constructs of the NAM. The survey instrument upon which the current research is based was informed by prominent theories of environmental behavior, but designed to give resource managers and communicators practical results upon which they could design programs. Thus, while differences in the definition of attitudes may exist among and within disciplines, we adopt that which is common in environmental management and succinctly summarized by Thompson et al. (2015): attitudes are evaluations of various environmental, financial, and moral dimensions related to choosing to participate (or not) in conservation.

We aim to empirically contribute to the recent developments related to farmers' conservation attitudes while beginning to answer the calls from prominent researchers in both environmental psychology and environmental management: that of Steg and Vlek (2009) to understand benefits of different approaches to impacting pro-environmental behavior, and that of Prokopy et al. (2008) to integrate theoretical work from appropriate fields into our understanding of farmers' decisions. We call attention to ways in which different theoretical approaches complement each other, and describe ways in which the disciplinary boundaries of both approaches could be bridged to have more impact on a significant source of water pollution.

Building on these foundations, in this research we examine awareness of water quality problems attributable to farming sources, attitudes reflecting other-interest and self-interest, and willingness to adopt behaviors. Specifically, we examine the relationships among: 1) awareness of consequences of agricultural activities, 2) self-interest (farm-as-business attitudes), 3) other-interest (stewardship attitudes), and 4) willingness to take actions to protect water quality.

2. Theoretical and applied foundations of the proposed model

Comprised of affective, cognitive, and conative components (Ajzen, 1988; Breckler, 1984), attitudes are important – though not always significant – constructs related to environmental behaviors (Gifford & Sussman, 2012). Pro-environmental attitudes have been said to arise from associated values (Stern, 2000) and can be behavior-specific (e.g., the TPB, Ajzen, 1991). Both behavior-specific and more general measures of environmental attitudes have been examined with regard to behavior, and it has been well-established that they are not, alone, sufficient for prediction (Gifford & Sussman, 2012).

A commonly used approach in environmental management-related social science studies to examining attitudes and behavior is the cognitive hierarchy (Fulton, Manfredo, & Lipscomb, 1996), whereby attitudes are defined simply as one's "… tendency to respond favorably or unfavorably toward the object in question," (Vaske & Donnelly, 1999, p. 527). In this approach, attitudes are preceded by an individual's value orientations (Homer & Kahle, 1988), and influence behavioral intent and behaviors (Fulton et al., 1996). Vaske and Donnelly (1999), for example, found that intentions to vote in a manner protective of wildlands were influenced by preservation attitudes, which were preceded by biocentric or anthropocentric value orientations. As values are relatively unchanging and not context-specific, they have been criticized by natural resources social scientists as being confused with attitudes (Vaske, 2008).

Despite these definitional differences, one conative component of attitudes – the willingness to engage in a behavior – has been studied in both literatures. Within agricultural producer populations, willingness is often assessed when developing new interventions, particularly measures related to an individual's willingness to pay for benefits and accept charges, programs, and policies. Willingness and intent to engage in a behavior are recognized to be antecedents of behavior. Some discussion of whether they are different constructs has taken place, but Ajzen (2011) conceptualizes them as components of the same construct. Bamberg and Möser's (2007) meta-analysis of environmental behavior studies found that intention explains about 27% of the variation in environmental behaviors across included studies. The type of behavior matters when considering the role of willingness in actual behavior decisions. For lower cost behaviors, such as supporting policies, willingness may be a stronger predictor. Behaviors that are higher cost and require significant changes are impacted more strongly by institutional, structural change than individual attitudes (Heberlein, 2012). We describe below factors found to be important in predicting willingness and behavior, while recognizing there is a distinction between the two.

2.1. Self- and other-interest

Theories intended to predict environmental behavior that incorporate pro-social, other-interest concepts include the NAM (Schwartz, 1977) and the value-belief-norm theory (VBN), which is partially based upon concepts from the NAM (Stern, 2000). In these two theories, personal norms related to a behavior, awareness of consequences of one's behaviors, and ascription of responsibility for acting in an other-interested manner lead to behaviors. Considered a more "rational action" approach, the TPB, on the other hand, proposes individual evaluations of behaviors based upon behavior-specific attitudes, perceived behavioral control, and