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# Understanding the Role of Trust in Cooperation with Natural Resources Institutions

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UNDERSTANDING THE ROLE OF TRUST IN COOPERATION  
WITH NATURAL RESOURCES INSTITUTIONS

by

Joseph Allan Hamm

A DISSERTATION

Presented to the Faculty of  
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UNDERSTANDING THE ROLE OF TRUST IN COOPERATION  
WITH NATURAL RESOURCES INSTITUTIONS

Joseph Allan Hamm, Ph.D.

University of Nebraska, 2014

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This dissertation investigates the role of trust in predicting cooperation with a natural resources management institution. It begins with an exploration of the legal landscape against which the relationship between land owners and natural resources management institutions is contextualized, presents a review of the often ostensibly disparate trust literature and a framework for its integration, and proposes and tests a model of trust and cooperation in the natural resources context. The results provide mixed support for the model as proposed but confirm the importance of trust in this context and suggest implications for policy, especially the potential importance of increasing institution- specific trust via efforts that focus, in particular, upon increasing the trustor's willingness to accept vulnerability.

## DEDICATION

To everyone that I would not be here without, especially my mother who gave me the tools and my grandfather who made me believe it was possible.

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## OVERVIEW

Natural resources governance is a complicated endeavor in today's world. While much of this complication arises from biological, chemical, and ecological issues, the nature of modern natural resources governance is such that without the cooperation of the broader public (or at least specific stakeholders) effective governance is essentially impossible. This dissertation investigates the role of one potentially important driver of the cooperation necessary for effective natural resources governance, namely trust. To that end, this dissertation presents three chapters that advance the scientific understanding of the role of trust in cooperation with natural resources management institutions.

Chapter One provides legal contexts for the evaluation by addressing the issue of cooperation with natural resources governance from a legal perspective. The chapter begins with a discussion of the role of natural resources institutions in the United States with a focus on the major challenge to their effective function, namely private property, and argues that the sometimes opposing interests of land owners and these institutions create the potential for conflict. The chapter then reviews the case law in which natural resources actions have been formally challenged on privately owned land and shows that in the three states with the highest percentages of privately owned land, private land owner challenges to agency action are rarely successful. The chapter concludes with a discussion of the importance of a specific basis of trust in these challenges, namely, procedural fairness.

Chapter Two takes a step back and addresses the fundamental and persisting question of the nature of trust by proposing a framework of trust that has the potential to incorporate a great deal of the existing relevant scholarship. Specifically, it argues that

attitudinal trust, as a willingness to accept vulnerability in dealings with another, is a major driver of intention to act trustingly and trusting behavior. Additionally, the framework argues that attitudinal trust is itself driven by various bases of that trust; constructs that share an ability to reduce either vulnerability itself or increase its subjective acceptability. The chapter then reviews the three major bodies of trust literature in light of the proposed framework and shows that the scholarship on trust from the organizational, risk management, and government literatures are largely consistent with the framework as proposed.

Chapter Three provides an empirical test of several hypotheses embedded in the framework proposed in Chapter Two within a model of trust and voluntary cooperation in the context of natural resources governance. The chapter uses two studies with Nebraska land owners to test 1) the separability of the constructs, and 2) the influence of trust on cooperation. The chapter also presents and tests the sophistication moderation hypothesis (Hamm et al., 2013a) that argues the effects of the bases of trust on cooperation will themselves be moderated by the sophistication (i.e., knowledge and experience) of the trustor such that with less sophistication, more general constructs will be most predictive. With additional sophistication, however, more institution-specific constructs are expected to increase in predictive ability. The results provide some, albeit complicated, support for the hypotheses. In particular they suggest that 1) the constructs are separable but especially highly correlated, 2) trust does have a small, but significant, independent influence on cooperation intention and cooperation behavior, and 3) it is trust in the institution requesting cooperation and not trust in other related institutions or others

generally that is most predictive. Finally, the chapter fails to provide strong support for the sophistication hypothesis.

Thus, the dissertation finds that although natural resources institutions in the United States are particularly well positioned to address natural resources issues, their ability to effectively manage natural resources may be facilitated beyond the brute force of the law by ensuring high levels of trust in them. Further, the dissertation finds that within the conceptual morass of cross-domain trust scholarship, there is evidence of a framework that is able to provide some degree of clarity for the construct. Finally, the dissertation finds some support for a proposed model but identifies potential issues within it such as the similarity of responses to the various bases of trust and possible limits of the sophistication moderation hypothesis.

## CHAPTER ONE: STATE NATURAL RESOURCE AUTHORITY AND LAND OWNER CONFLICTS AND THE POTENTIAL ROLE OF TRUST

Natural resource problems are among the most important facing the world today. From mass extinctions decreasing biodiversity world-wide (Singh, 2002) to impending water crises in the western United States (Barnett, Pierce, Hidalgo, Bonfils, Santer, Das, Bala, Wood, Nozawa, Mirin, Cayan & Dettinger, 2008) and across the globe (Jury & Vaux, 2005), one needs do little more than open a newspaper to find any number of similar examples of natural resources in peril. In the United States, a number of institutions are involved in addressing these problems. Typically, state and federal legislative bodies enact statutory responses to these problems that give jurisdiction to natural resource institutions (e.g., the U.S. Departments of the Interior and Agriculture and state natural resource authorities) whose actions are then reviewable by relevant courts. Historically, federal legislative bodies in particular have played a major part in addressing these environmental problems, especially in the 1970's and 1980's, as most of the major environmental laws in place today were passed or amended during this period (Stewart, 2001-2002). Since then, however, legislatures have played a much smaller role, in large part because they have had a considerably more difficult time garnering the necessary cross-partisan support for such initiatives, leading some to refer to this period of environmental regulation as one of "political gridlock" (Stewart, 2001-2002, p. 24; see also Zellmer, 2013). Regarding the courts, although their supervisory role in environmental regulation was significantly expanded by Congress in 1946 through the Administrative Procedure Act (Administrative Procedures Act, 1946, §557) and again in

the 1970's through the novel inclusion of citizen suit provisions in the major environmental statutes themselves (e.g., Clean Water Act, 1972, §1365; Clean Air Act, 1963, §7604), their role since has remained relatively unchanged. Specifically, the courts, and especially tort law, are the primary avenue for addressing individual damages from past environmental harm in this country (Menell, 1991), but it is precisely this reactive stance that limits their role in proactive environmental regulation.

Natural resource institutions stand as the United States' primary answer to proactively meeting the environmental challenges of today's world. These agencies are typically empowered by legislative initiatives to regulate natural resources while the courts take a supervisory role, typically only evaluating the past actions of these state authorities when formally challenged by affected parties, typically via the Administrative Procedures Act (1946, §557) or statutory citizen suit provisions (e.g., Clean Water Act, 1972, §505). Natural resources authorities exist at both the state and federal level. Although federal natural resources institutions like the U.S. Departments of Agriculture and the Interior and the U.S. Fish and Wildlife Service maintain significant control over natural resource management, especially on federal land and through federal legislation like the Endangered Species Act, the majority of day-to-day, natural resource management falls to state authorities (Fischman, 2005; see also *Kleppe v. New Mexico*, 1976). These institutions are tasked with developing and implementing comprehensive management schemes in their jurisdictions for which they usually enjoy considerable discretionary latitude because of ambiguous statutory charges and a general stance of deference in the federal and state courts (*Chevron U.S.A. Inc., v. Natural Resources Defense Council Inc.*, 1984; *Skidmore v. Swift*, 1944).

Natural resources management is the critically important but notably complicated responsibility of these state natural resources authorities. The subsequent review discusses one important such complication, namely conflicts between state authorities and land owners. In particular, it reviews the formal resolutions of these conflicts (i.e., case law) and suggests that these cases are overwhelmingly decided in favor of the state authority, in large part because of the explicit deference afforded these institutions by the courts. This chapter then takes up an important potential implication of this institutionalized deference, namely the possibility of the perception of unfairness in the resolution of these conflicts, and applies the relevant social science literature to these conflicts to identify the aspects critical to fostering this basis of trust in this context.

### **Land Owner/Natural Resource Institution Conflicts**

The effectiveness of natural resource institutions is limited by a fundamental value in the United States, namely, the right to private property (U.S. Const. Amend. V). Nationally, the majority of U.S. land is privately owned (Natural Resources Council of Maine, n.d.), and many argue that this privately owned land is especially environmentally critical for two major reasons: 1) because privately owned land is often attractive for purchase for the same reasons that make it environmentally important, and 2) because environmental management schemes must be geographically comprehensive to be effective (Clark & Downes, 1996). For example, endangered species protection is one area of natural resources management that is often especially reliant on private land action (Koch, 2002; Underwood, Ober, Miller & Munn, 2012; Zellmer & Johnson, 2002). These threatened and endangered fauna do not respect property lines and frequently cross into and out of private property. Habitat protection efforts that only involve public land

are frequently limited to small, fragmented sections of some (especially mid-western) states' land area and, because a great deal of resource intense land (lake-front property, nutrient rich soil, etc.) is likely to be privately owned, may well fail to help these species where they are most in need (Koch, 2002). Natural resources management efforts that do not involve privately owned land are therefore, at best, less effective and, at worst, entirely undermined.

Thus, there is certainly a compelling interest in allowing natural resource institutions some level of jurisdiction over private property but in many ways, this flies in the face of many land owners' understandings of private property. Although the concept is somewhat ambiguously defined by the courts (e.g., *U.S. v. General Motors Corporation*, 1945), much of the public accepts an understanding of property ownership that argues for total control of the property in question (Zellmer & Harder, 2008). Undoubtedly, this notion of total control of private property is less than accurate in most contexts as most property is subject to some kind of regulation (Singer, 2006). Accordingly, this idea has been only somewhat influential in the development of American property law. Where it is much more important, however, is in understanding property owners' *expectations*, as they often expect total control of their land.

This situation is further complicated by the often fundamentally competing interests of land owners and state natural resource authorities. Hardin's notion of the tragedy of the commons is particularly useful for explicating this conflict (Hardin, 1968). Common pool resources are those for which it is difficult or unethical to exclude individuals but of which there is a limited supply and one individual's use decreases the resource available to others (Ostrom, Burger, Field, Norgaard & Policansky, 1999).

Implicit in Hardin's discussion of the commons is the belief that land owners' interests in these common pool resources often lie in their immediate use. Conversely, however, natural resource institutions' interests typically lie in their sustained use or even outright conservation. Although both groups do have some level of interest in the other's position (i.e., land owners need the long-term protection of the resource in order to continue to use it, and natural resource institutions need the immediate use of the resource to generate funds), the fundamental misalliance of these interests often creates conflicts between the interests of land owners and natural resource institutions. It is, therefore, not uncommon for these mismatches of interests to create situations in which land owners are encouraged or compelled to act in ways contrary to their interests and so may feel denied their rights of property ownership, potentially motivating them to resist compliance or even to challenge the institution.

Because the effective management of natural resources requires the navigation of these conflicts with land owners, understanding how these conflicts have been resolved is critical. Informal (i.e., out of court) resolutions are common in this area of law and likely even more common than more formal (i.e., in court) resolutions. Problematically, however, these informal processes often only consider the private concerns of the parties involved, may include a variety of issues that could not be raised more publicly, and are rarely well-documented. Formal court decisions, however, represent a documented, officially sanctioned process for resolving disputes that set precedents for future cases and even have some influence over future informal resolutions. The following subsections review the case law resolving these land owner/state authority conflicts in three U.S. states. Cases were identified via a Westlaw search of cases in which state



natural resource authorities and land owners had opposing interests – thereby identifying cases in which these conflicts were formally addressed. The states (Kansas, Iowa, and Nebraska) were chosen because they have the highest percentage of privately owned land in the United States (all more than 95%). In these states, natural resources management efforts that implicate large portions of land must involve, or at least implicate, privately owned land. Thus, these states were chosen because they are likely to have these state authority/land owner conflicts. Note, however, that despite the focus on states with a majority of privately owned land, only a small number of cases were identified that met the criteria (land owner/state authority conflicts over action on privately owned land). Although the primary focus falls to the cases that meet these criteria, where relevant, this review will occasionally note other major cases which fall technically outside of the scope of this review (e.g., challenges to these state authorities brought by other institutions in the interests of their land owners) but which are informative to its overall purpose of exploring the formal resolution of these land owner/natural resource institution conflicts. These cases will be clearly identified in the text.

### **Kansas**

Kansas is the U.S. state with the highest percentage of privately owned land (Natural Resources Council of Maine, n.d.). As less than one percent of its total land area is under public ownership (480mi<sup>2</sup>), virtually the entire state is privately owned (Natural Resources Council of Maine, n.d.). Although a number of institutions are implicated in the management of its natural resources, two institutions have been especially involved in legal conflicts with land owners; namely, the Kansas Department of Agriculture and the Kansas Department of Wildlife, Parks, and Recreation. The Kansas Department of

Agriculture finds its authority interspersed throughout Article 5 of the 74<sup>th</sup> chapter of the Compiled Statutes of the State of Kansas (Kan. Statutes Annotated ch. 74, Art. 5). The Kansas Department of Wildlife, Parks, and Recreation's authority also lies in the Kansas statutes which invest the secretary with the power to "adopt...such rules and regulations as necessary to implement, administer, and enforce the provisions of the wildlife, parks and tourism laws of the state" (Kan. Statutes Annotated, §32-807(a)). Although parks and tourism are usually outside of the scope of privately owned land, the Department's authority over wildlife often implicates private land.

A number of conflicts between these institutions and land owners have been addressed in the courts. Kansas courts find their authority to review these conflicts in a state statute which permits judicial review of final agency action for any person to whom the action is directed, who is a party in the proceedings, subject to a challenged rule, or eligible under another provision of law (Kan. Statutes Annotated §§77-601, 77-607, 77-611). The courts have interpreted this statute as permitting them to review final agency action without deference on questions of law (*Denning v. KPERS*, 2008), but in practice, it is not unusual for the courts to explicitly defer to the agencies, especially when the agency's superior expertise in technical matters is relevant (*Frank v. Kansas Department of Agriculture, Division of Water Resources*, 2008).

The majority of the cases identified challenged the actions of the Kansas Department of Agriculture's Division of Water Resources, which consolidates the authority of the previous Kansas Water Commission and the State Irrigation Commissioner (Kan. Statutes Annotated, §§74-506c, §74-506b). Overall, the Division has a great deal of latitude regarding water regulation in Kansas and has typically

received deference from Kansas courts. For example, in *Frank*, the Department determined that a land owner was in violation of a permit allowing him to create a ground water pit. The Department determined that the pit had obstructed a stream in violation of a Kansas regulation (Kan. Administrative Regulations, 5-40-1(k)(3)). The regulation itself was somewhat ambiguous, but the chief engineer had interpreted it such that it created a presumption of a stream in any area in which the land owner could not prove that one had not existed since 1929, when the law was passed. Petitioner Frank's appeal centered primarily on the reasonableness of this interpretation. The court, after noting that less deference is granted to agencies when facts are undisputed (*Denning v. KPRES*, 2008; *Graham v. Dokter Trucking Group*, 2007; *Foos v. Terminix*, 2004; *Marbury v. Madison*, 1803), determined that, because the facts were disputed here, the agency's reasonable interpretation deserved deference, especially in light of the agency's relevant expertise.

Despite this presumption of deference, however, some land owner challenges have been successful. In *Wheatland*, an Electric Cooperative appealed a Division of Water Resources decision limiting the water the Cooperative could use under its existing water right (*Wheatland Electric Co-op. Inc. v. Polansky*, 2011). At the request of the Cooperative, the Division amended its water right but in so doing, limited the Cooperative's consumptive use and initiated proceedings to declare a partial abandonment of the original water right due to non-use. The Kansas Court of Appeals held that the Division was within its rights in decreasing the Cooperative's consumptive use, but it remanded the case because the Division's partial water right theory was in violation of Kansas law (Kan. Statutes Annotated 2009 Supp., 82a-718(a)), which

requires a total non-use determination for abandonment. In a second such case, land owners challenged a permit granted by the Division of Water Resources to the city of Wichita, Kansas that would allegedly impact the land owners' senior water rights (*Cochran v. State Department of Agriculture, Division of Water Resources*, 2011). The Division argued that the relevant Kansas regulations provided standing for challenging permit decisions only to the permit applicant, but the district court found a basis for a broader notion of standing. On appeal, the state supreme court, after explicitly noting that it no longer granted deference to an agency's interpretation of statute (*Cochran v. State Department of Agriculture, Division of Water Resources*, 2011), upheld the lower court's construction of standing. Although both of these cases were technically losses for the state authorities, it is important to note that the determinations were something less than substantive victories. Both rulings merely sent the land owners back into district court with directions to reevaluate the case. In *Wheatland*, the court was simply required to reevaluate the case under a different legal theory (*Wheatland Electric Co-op. Inc. v. Polansky*, 2011), and in *Cochran* the court was simply required to acknowledge that the land owner had the requisite standing for judicial review (*Cochran v. State Department of Agriculture, Division of Water Resources*, 2011). It seems, then, that the majority of the reviewed cases in Kansas are decided in favor of the natural resource authority, but even when cases are decided in favor of the land owner, the final resolution of the conflict is no more likely to be in favor of land owners than the outright wins for the agencies. Thus, in Kansas, it appears that agencies are typically successful in the final resolution if not also in court.

## Iowa

With only 1.04% (370mi<sup>2</sup>) of its land area publicly owned, Iowa has the second highest percentage of privately owned land in the United States (Natural Resources Council of Maine, n.d.). As in Kansas, several institutions are implicated in the management of the state's natural resources, but the Iowa Department of Natural Resources "has the primary responsibility for state parks and forests, protecting the environment, and managing fish, wildlife and land and water resources in this state."(Iowa Code Annotated, §455A.2)

Unsurprisingly, a number of conflicts between land owners and the Department have made their way into court. All of the cases reviewed involved conflicts over land use, and most of the cases involved challenges to Department actions pursuant to land owners' illegal waste handling. For example, in *State v. Shelley*, an Iowa court of appeals heard a challenge to an order requiring the land owners to cease disposal of metal and wood that the land owners had placed to reduce erosion on their property (*State, Iowa Department of Natural Resources v. Shelley*, 1993). The land owners were ordered by the DNR to cease disposal, remove the waste, and pay \$1000 penalty for violation of a state solid waste disposal code (Iowa Code Annotated, §455B.301(20)). At this point in the process, the land owners were entitled to challenge the decision directly with the agency but failed to do so and continued to fail to comply. The case was subsequently brought to the district court by the DNR and the court issued a compliance order to the land owner. The court of appeals found that because the land owners were able to challenge the decision directly with the agency before it became a final agency action, they were precluded from challenging it in court.

Like this case, the majority of the cases reviewed were decided in favor of the natural resources authority, suggesting some level of deference to these agencies in Iowa courts as well. In fact, one of the opinions (*Organic Technologies Corporation v. State ex rel Iowa Department of Natural Resources*, 2000) directly discussed this deference, citing a statute in the Iowa Code (Iowa Code Annotated, §17A.19) which states that a court may not interfere with agency findings when “there is a conflict in the evidence or when reasonable minds might disagree about the inference to be drawn from the evidence” (*Organic Technologies Corporation v. State ex rel. Iowa Department of Natural Resources*, 2000, p. 815). Despite this deference, however, Iowa courts do seem somewhat willing to find in favor of land owners in less ambiguous situations, at least in the context of tort claims for damages. In one such case, the Department was sued for damage to a land owner’s property caused by a water control structure and improper drainage on Department land (*Schmitz v. Department of Natural Resources, Fish, and Wildlife Division*, 2003). In this tort context, the court was willing to find for the land owner in regards to the improper drainage but limited the damages to the previous two years for failure to file a timely claim. It also rejected negligence claims for failing to exercise due care over a control structure for lack of sufficient evidence to meet the land owner’s burden of proof.

As in Kansas, the state natural resources authorities in Iowa are often victorious in land owner challenges, whether substantively or via procedural outcomes as in *State v. Shelly*; however, at least one such case was resolved in the land owner’s favor, albeit less than a complete victory (*Schmitz v. Department of Natural Resources, Fish, and Wildlife Division*, 2003). Notwithstanding this slightly pro-land owner stance, the courts in Iowa

do typically decide cases for the state authority, even overlooking problems in the application of their policies to find in their favor (e.g., *State ex rel. Iowa Department of Natural Resources v. Shelley*, 1993). Thus it seems that Iowa courts also take a largely deferential stance toward its state natural resource authorities, placing the “burden of demonstrating the required prejudice and the invalidity of the agency action on the party asserting invalidity” (Iowa Code Annotated, §17A.19(8)(a); *see also*, Iowa Code Annotated, §17A.19(10)).

### **Nebraska**

The final state reviewed was Nebraska, 1.6% of whose land area (785.76mi<sup>2</sup>) is federally or state owned (Natural Resources Council of Maine, n.d.). The Nebraska Department of Natural Resources consolidates the powers of the previous Department of Water Resources and the Nebraska Natural Resources Commission (Neb. Revised Statutes, §61-205) and so stands as the premier natural resources institution in the state. Notably, the Department maintains complete authority over the state’s surface water rights as used for “irrigation, power, or other useful purposes except as... limited by statute” (Neb. Revised Statutes, §61-206).

As in Kansas and Iowa, the regulatory actions of the NDNR have also been challenged by land owners in court and also, like in those other states, the courts have typically found in favor of the Department. Applying the criteria discussed above (land owner challenges to natural resource institution actions), four cases were identified involving the NDNR. In the first, the land owner challenged the Department’s determination of a boundary of a wildlife refuge (*Scofield v. Nebraska Department of Natural Resources*, 2008). One of the boundaries was identified by the NDNR as a canal,

but the land owners argued that it was a private irrigation ditch and therefore either not an appropriate boundary or a taking that required just compensation. The Nebraska Supreme Court explicitly stated that the state's agencies enjoy a presumption of validity in their determinations and that the burden falls to the challenger (*Scofield v. Nebraska Department of Natural Resources*, 2008; see also, *Jacobson v. Solid Waste Agency of Northwest Nebraska*, 2002). Although the court agreed with the district court and found that NDNR had acted appropriately by setting the boundary in the end, the court remanded the case because the district court had incorrectly held that the land owner failed to state a claim for relief that the use of their creek as a boundary was a taking that required just compensation. In a second case, the land owner alleged that the Department had been negligent in failing to appropriately regulate ground water pumping that adversely affected surface water use (*Spear T. Ranch v. Nebraska Department of Natural Resources*, 2005). The state supreme court again deferred to the agency's interpretation of the state's water resource statutes, and agreed with the NDNR that it had no duty to regulate ground water, which is traditionally regulated by the state Natural Resources Districts (*Central Nebraska Public Power and Irrigation District v. North Platte Natural Resources District*, 2010), undermining the land owner's claim.

In contrast to the first two cases, the last two cases resulted in decisions explicitly for the property owner. The first involved a land owner challenge to a Department action limiting junior water users in favor of a senior water user, arguing that the senior user had forfeited some of its rights and that the Department's action was precluded under the futile call doctrine (*In re 2007 Administrations of Appropriations of Waters of the Niobrara River*, 2012). While the challenge was pending in court, the Department



recorded higher water levels and so reversed the closing notices but later, after measuring another low discharge, reinstated them. The land owners appealed the closing notices in the Boyd County Court and, though the closing notices were declared invalid, were awarded a 20 year condemnation award that granted them preference over the senior water user. Subsequently, in evaluating the challenge over the alleged water rights forfeiture, the state supreme court held, in part, that the validity of the senior water user's rights could be evaluated even in the face of a condemnation award and remanded the case to the Department to determine whether the senior water user's appropriations had been partially or entirely forfeited. The last case involving the Department and land owners centered on a disputed tax levied by the Department (*Garey v. Nebraska Department of Natural Resources*, 2009). Although the case itself is somewhat beyond the scope of this paper in that it was not a land owner dispute about a private land management action, it is worthy of note that the state supreme court did find in favor of the land owners, finding that the tax was illegal under the state constitution (Neb. Const. art. VIII, §1A).

Although the Department is the primary natural resource institution in the state of Nebraska, the regulation of some important natural resources is relegated to the state's 23 Natural Resource Districts (*Central Nebraska Public Power and Irrigation District v. North Platte Natural Resources District*, 2010). These NRD's were set up in Nebraska to govern actions relating to...

- (1) erosion prevention and control,
- (2) prevention of damages from flood water and sediment,
- (3) flood prevention and control,
- (4) soil conservation,
- (5) water supply for any beneficial uses,
- (6) development,

management, utilization, and conservation of ground water and surface water, (7) pollution control, (8) solid waste disposal and sanitary drainage, (9) drainage improvement and channel rectification, (10) development and management of fish and wildlife habitat, (11) development and management of recreational and park facilities, and (12) forestry and range management (Neb. Revised Statute, §2-3229).

Although the NRD's are technically afforded the same deference as any other state agency (*Wagoner v. Central Platte Natural Resources District*, 1995; see also, *Haven Home Inc. v. Department of Public Welfare*, 1984; *In re Application of United Telephone Company*, 1988; *In re Application of Jantzen*, 1994), in practice, they are victorious much less often. In the three identified cases (*Krauter v Lower Big Blue Natural Resources District*, 1977; *Bamford v. Upper Republican Natural Resources District*, 1994; *Wagoner v. Central Platte Natural Resources District*, 1995), the NRDs were essentially defeated twice. In the first case, the land owner challenged an order from the Central Platte River Natural Resources District to cease and desist all ground water withdrawals until he came in compliance with their order to submit soil samples (*Wagoner v. Central Platte Natural Resources District*, 1995). The district court affirmed the order, finding it within the jurisdiction of the NRD, but the Nebraska Supreme Court reversed, holding that the NRD lacked the jurisdiction to compel the soil samples (*Wagoner v. Central Platte Natural Resources District*, 1995).

In the second case, the land owner challenged a Natural Resources District's action in condemning his land through eminent domain. The district court found no need to condemn the entire land parcel and required the NRD to acquire an easement for the

needed land. The Nebraska Supreme Court upheld the district court, arguing that the NRD had overstepped its power by not sufficiently explaining its rationale for condemning the entire property (*Krauter v. Lower Big Blue Natural Resources District*, 1977).

The final institution in Nebraska with jurisdiction over natural resources is the Nebraska Game and Parks Commission, which maintains authority over “state parks, game and fish, recreation grounds, and all things pertaining thereto” (Neb. Revised Statutes, §37-301). The Commission has been challenged only twice by land owners in cases which fit the criteria being examined here, once on the grounds of a statute forbidding boating on a private lake (*Kuester v. State*, 1974) and once for the exercise of eminent domain for the purpose of including the property in a state park (*Duerfeldt v. State Game and Parks Commission*, 1969), and was upheld in both cases. Although deference was not explicitly discussed in either case, the deference afforded other Nebraska agencies is just as relevant to the Commission and in practice the courts were willing to interpret ambiguities in line with the agency.

In addition to these cases, three other cases that technically fall outside of the criteria of this review were identified and merit discussion here. Although the purpose of this review is primarily to discuss direct land owner/state authority conflicts, some guidance can be garnered by investigating cases in which natural resources authorities have challenged each other in court in the interests of the land owners they regulate. In the first two cases, an irrigation district challenged the Department of Natural Resources (*Frenchman-Cambridge Irrigation District v. Department of Natural Resources*, 2011) and a natural resources district (*Central Nebraska Public Power and Irrigation District v.*

*North Platte Natural Resources District*, 2010). In both cases, the irrigation district sought judicial review for a contested allocation and, in both cases, the state supreme court held that the irrigation district was precluded from review for lack of standing. The court held that, although irrigation districts have members who are directly impacted by the allocations, the districts themselves do not have the requisite standing for judicial review against the NDNR or NRDs. In the third case, the Middle Niobrara Natural Resources District challenged the Department of Natural Resources directly, arguing that the Department had erred in declaring a river basin fully-appropriated – a determination that precludes additional allocations (*Middle Niobrara Natural Resources District v. Department of Natural Resources*, 2011). In its analysis, the state supreme court reviewed the Department’s determination and, after holding that the NRD had the requisite standing, held that the Department’s rationale was inappropriate because the Department had failed to follow regulations requiring it to use the best available scientific data (Neb. Revised Statute, §46-713). The court therefore reversed, holding that the Department’s determination was arbitrary and capricious and, therefore, invalid.

Thus, as in Iowa and Kansas, Nebraska courts seem notably deferential to state natural resources authorities. Nebraska courts find their authority to review agency action in the state Administrative Procedures Act (Neb. Revised Statutes, §84-917(1)), and in these reviews, the courts typically defer to state agencies unless their decisions are found to be “plainly erroneous” (*Sunrise Country Manor v. Nebraska Department of Social Services*, 1994, p. 735). Of the cases reviewed, many explicitly discuss this presumption of validity in these institutions’ regulations, placing the burden squarely on the regulated land owner in legal challenges. Interestingly, however, this deference does not seem to

translate into a greater probability of victory for the state's Natural Resource Districts. The cynical explanation of this lies simply in their reduced resources. These local NRD's are much smaller than either of the state-wide authorities and potentially less able to support in-house legal resources. Whatever the reason, though, it does seem clear that land owner challenges are much more likely to succeed against these institutions.

### **Summary**

Overall, the courts in these three states seem to be notably deferential to state authorities. Although these institutions are certainly not free to do as they will with private property, it does seem that when these institutions act, the courts are often willing to support their actions. Rationally, this deference is not terribly surprising. Neither legislatures nor courts are well-suited for addressing the technical details involved in natural resources regulation. Legislatures typically explicitly delegate their regulation powers to state natural resources authorities, and the courts typically follow suit, deferring especially when technical expertise is relevant. In practice then, property interests seem to be consistently trumped by states' interest when there is statutory and factual support for the agency's decision.

### **The Importance of Fairness-Based Trust**

Although the courts' deference to state authority would seem to be an all-out win for natural resource institutions, it is not without its concerns. The legal system in this country prides itself on fairness and, in fact, draws a good deal of its legitimacy from it (Tyler, 2006a). By deferring to natural resources authorities, however, the courts run the risk of appearing biased and unwilling to allow land owners any real influence in the ultimate decision, potentially bringing the fairness of this conflict resolution process into

question. That is, these negative outcomes may create a presumption that the underlying procedures are themselves unfair. It is certainly unlikely that courts would truly disregard the land owners' arguments and the state institutions' propensity to win is likely much more the result of their superior expertise in both natural resource science and legal maneuvering. Regardless, the perception of fairness is often predictive of behavior independent of the effect of objective (distributive) fairness (Tyler, 2006b). Thus, objective fairness is likely to be insufficient without subjectively perceived fairness.

Research investigating this basis of trust has a long history in social science. Since the 1970's, researchers have actively published on the topic (e.g., Thibaut & Walker, 1975) and have consistently found that people react much more positively when procedures used by the authority are perceived as fair (e.g., De Cremer & Tyler, 2007). This effect has been identified in regulatory contexts such as taxation (e.g., Murphy, Tyler, & Curtis, 2009), law enforcement (e.g., Tyler, 2004), and natural resource management (e.g., Syme, Nancarrow, & McCreddin, 1999). The positive effects of procedural fairness are argued to occur because they legitimize the decision (Tyler, 2006a) and have been shown to be so robust that they persist even in the face of unfair outcomes that are either observed (Hegtvedt, Johnson, Ganem, Waldron & Brody, 2009) or personally experienced by the individual (Hegtvedt, Clay-Warner, & Johnson, 2003).

Applied to these conflicts, the argument is that land owners' experience of fair procedures in resolving their conflicts informs them that they are valued within the process which, in turn, encourages their acceptance of the decision (Tyler, Casper, & Fisher, 1989). Although a number of components of procedural fairness have been championed by various researchers in the literature, they tend to center around ideals of

meaningful participation in the process. In particular, researchers have identified important influences of perceptions of voice in the process and influence on the decision. Applied to land owner/state institution conflicts, these perceptions may signal to the land owner that the decision reached is a *good* one even if it is not in the land owners' favor.

Scholars have consistently found associations between perceptions of fair treatment and pro-institutional reactions; however, there is considerable evidence suggesting that the importance of perceptions of fairness may go beyond experiences of fairness to *expectations* of fairness. Researchers in the organizational field in particular have investigated a construct called anticipatory injustice – the expectation of injustice in a future interaction with an authority – which, in the organizational literature, is usually a future or current employer. Much like the research on fairness experiences, fairness expectations have been shown to be important for willingness to approach the authority, the perceiver's own self efficacy, and, critically, the perception of fairness in future experiences such that those who most strongly expect fairness are most likely to perceive it (Bell, Ryan, Wiechmann, 2004; Bell, Wieschmann, & Ryan, 2006; Rodell & Colquitt, 2009).

Another relevant vein of research regards when fairness perceptions themselves are important. A growing body of research has begun to investigate the situations in which fairness is most influential. In a leading publication on the subject, Kees van den Bos and E. Allan Lind (2002) applied the uncertainty management perspective to fairness evaluations and outlined several studies that suggest that a primary utility in fairness perceptions lies in their ability to address the uncertainty inherent in interactions with

others. The authors argued that fairness perceptions are most important when the trustworthiness of the actor is unknown.

In summary, the research outlined above makes three specific arguments that are important for understanding and increasing perceptions of fairness in the context of these land owner/state authority conflicts. First, it argues that the reason for the importance of perceived procedural fairness lies in its ability to signal that the individual is valued in the process. Second, it argues that voice in the process and the ability to influence the decision are critical components of perceived procedural fairness. Third, the research argues that these perceptions of procedural fairness will be most important in the face of uncertainty about the decision maker. The following subsections discuss each of these considerations in light of these land owner/state authority conflicts in turn.

### **Procedural Fairness and Group Value**

As presented above, Tyler and colleagues have argued that the reason that perceptions of procedural fairness influence pro-institutional reactions is because they signal to the person interacting with the authority (in this case the land owner) that he or she is a valued part of the process (e.g., Tyler, 1989). The need for personal value in these land owner/state authority conflicts is no less important than in the context of the criminal justice system; the domain in which the majority of this research has been conducted. Much like defendants in the criminal justice system, land owners are entering a forum that is likely unfamiliar to them and in which significant liberties are at risk. In this situation, it is easy to understand how a perception that this system is motivated to act against or simply ignore the land owner is likely to encourage land owners to disengage from or even subvert the process. It is, therefore, important that land owners perceive that



they are indeed valued and that, even if their interests are not served by the ultimate determination, they remain an important part of the process.

The case law reviewed above, however, paints a somewhat bleak picture for this perception of value in the process. All else being equal, each of the values of this process (e.g., land productivity, conservation) should carry the day as often. Undoubtedly, the fact that land owners are rarely victorious in these challenges is far from proof that they are not valued in the process, but it is easy to see how it, at the very least, *could* create that impression that the courts' other values are more important, especially in situations where these defeats were especially salient (e.g., if the perceiver was a party in such a defeat, or if the perceiver lived in an area in which a number of these defeats occurred). Rectifying this situation by requiring that land owners be successful more often is laughable and, in many ways, misses the entire purpose of judicial review; namely, to identify the *right* resolution of the conflict (though this review makes no argument as to how "right" is or should be defined). Thus it is important that these perceptions of value be encouraged in other ways, and creating an expectation of procedural fairness is one such method.

### **Components of Procedural Fairness**

Assuming, then, that procedural fairness evaluations are important, the next question regards how they can best be encouraged. One common approach to this question in the social sciences is the investigation of the components or factors that drive these assessments. Using statistical modeling techniques, which seek to identify constructs that account for independent variance in other constructs (in this case, usually regression), social scientists have identified a plethora of potential components of

procedural fairness but, to date, there does not appear to be a clearly accepted answer to the name or even number of these components. Instead, the state of this literature is such that it still suffers from a number of nomenclatural (e.g., different names for essentially the same thing) and statistical (e.g., unaccounted for measurement error) concerns. What is clear, however, is that the far majority of these components center around a handful of concepts that, even on their face, are relevant to the perception of fairness. Specifically, these components usually implicate perceptions of having voice in the process and the ability to influence the decision.

In the context of these conflicts, land owners have good reason for perceiving both the presence and absence of voice in the resolution process. Most obviously, land owners typically have a right to voice in challenges to agency action. Most state and federal statutes allow judicial review for persons with standing (usually roughly defined as suffering some injury from the action). These judicial reviews present an opportunity for the aggrieved land owner to be heard in a formal setting with an at least ostensibly neutral decision maker. While this would seem to mean that this component is sufficiently met, further evaluation reveals a somewhat more nuanced situation. The primary issue in relying on these legal challenges as the formal opportunity for land owners to be heard lies in the fact that, in reality, only a small minority of these potential challenges ever make it into a courtroom. Some of these conflicts are never even brought to the attention of the state authority, necessarily precluding any formal mechanism for voice. Importantly, these situations challenge the definition of a *conflict* (in that the state authority is unaware of the conflict's existence), but they are no less important to land owners who grudgingly accept the direction of the state authority for lack of sufficient

motivation, knowledge, or resources to challenge it. Of the conflicts that do rise to the attention of the state authorities, though, most will include some mechanism for being heard. Although they vary from institution to institution, most of these state authorities have some process for hearing concerns of interested parties. Unfortunately, however, like the judicial reviews upon which many of these mechanisms were modeled, many of these mechanisms are at least at risk of being overcrowded. The existence of these opportunities for voice, therefore, requires some mechanism for denying the opportunity to some. While this rationale is entirely accessible for most people, it is important that effort be expended to ensure that it is perceived as fair.

A second component of procedural fairness perceptions is the ability to influence the process. In many ways, this component has considerable overlap with the previous one in that voice in the process often signals to the individual that she had some influence on the ultimate decision, even if it was not outcome determinative. Importantly, however, where this component is distinct from voice is that it is often influenced retrospectively. It is entirely conceivable that an individual may feel that he was afforded the opportunity for voice during the process but, upon evaluating the resulting decision, he may feel that his participation was never given the opportunity to actually influence the decision. Given the small minority of cases in which land owners are successful in judicial reviews, it is likely that many of these land owners may feel that their participation was less than influential, and potentially, entirely disregarded by the institution. One major opportunity to rectify this perception is transparency, by which the state authorities and courts present their rationale and explicitly show how the land owners' participation was considered in reaching the decision. Typically this is done by publishing opinions, but it

is important to remember that these opinions may well be opaque to land owners. The legalese and technical jargon that often plague these documents may effectively preclude land owners from understanding them and therefore, understanding how their participation influenced the decision.

### **Fairness in Light of Uncertainty**

A final concern regarding procedural fairness in these conflicts arises from the research investigating the situations in which procedural fairness evaluations are most important. Researchers have consistently shown that procedural fairness evaluations are more strongly connected to positive reactions to authorities when the participant is more uncertain (i.e., unknowledgeable or inexperienced) regarding the authority or the situation generally (Van Den Bos & Lind, 2002; see also, Herian, Hamm, Tomkins, & PytlikZillig, 2012). Applied to these conflicts, this argues that individuals who are more uncertain about the courts, state authorities, the process, and/or the decision itself are likely to be most influenced by procedural fairness. While there are certainly a number of land owners who have a great deal of knowledge and experience regarding these institutions and the resolution of these conflicts, there can be no doubt that there are many who remain particularly uncertain, as most of the public is relatively uninformed about policy issues in general (Delli Carpini & Keeter, 1990) and the courts and state authorities are no exception. In particular, the process of challenging state authorities both in court and in the state authority's internal review process is likely to be beyond the scope of most land owners' experience if not knowledge. Additionally, these court decisions themselves are often difficult to truly understand with many courts ruling only on the issues they have to and leaving many of the details to future courts or state

authorities for interpretation. Thus, these state authority/land owner conflicts may be situations in which the perception of fairness is of especially critical import.

### **Conclusion**

State institutions are critical to addressing the natural resources challenges of the modern world. In the United States, the high percentage of privately owned land necessarily dictates that these institutions be afforded some level of jurisdiction over private property. Although this jurisdiction is important for the management of natural resources in general, the natural orientation of natural resource institutions to sustained use and of land owners to immediate use often puts these interests in conflict. Given the importance of navigating these conflicts for effective natural resources management, an understanding of how best to resolve these conflicts is critical. Although only a small number of cases were identified that fit the scope of this paper, they suggest that state institutions are frequently successful in these formal resolutions. The majority of the cases reviewed were resolved in favor of the natural resources authority and in many of the cases, especially in Kansas and Nebraska, the courts explicitly avowed some level of institutionalized deference to the agency. While this deference is reasonable in this context, especially because of the comparatively greater expertise of the authorities, this deference creates the potential for concerns about the fairness of the process.

The relevant research suggests that for most individuals, perceptions of fairness will be a major driver of their reactions to the institution, such that those who perceive the process to be fairer are more likely to comply and cooperate with the institution. Applying this literature creates three specific concerns in the resolution of these conflicts:

- 1) These conflicts create a situation in which land owners are likely to question their

place as a valued part of the decision-making process, a perception that has been shown to be influenced by experiences and, potentially, expectations of procedural fairness. 2) The perception of procedural fairness is likely to be strongly influenced by perceptions that the land owner has had voice in the process and that his participation has had the ability to influence the final decision. 3) Because these conflicts both create and are resolved in situations about which many land owners are likely to be uncertain, procedural fairness concerns are likely to be of especially critical import. In conclusion, then, the effective management of natural resources in this country will be considerably more likely in the face of public perceptions of procedural fairness. As such, state natural resources authorities would be well-served in efforts intended to increase these perceptions.

## CHAPTER TWO: AN ORGANIZING FRAMEWORK OF TRUST IN THE INSTITUTIONAL CONTEXT

From individual interactions (e.g., Rotter, 1971) to the effective functioning of societies (e.g., Fukuyama, 1995; Putnam, 2007; Warren, 1999), trust is an important part of virtually every human interaction. This importance has spawned a broad body of research such that scholars from almost every social science discipline and many of the natural sciences have written extensively on the topic. These scholars have approached trust from a number of theoretical perspectives applying various definitions and methodologies creating a noteworthy lack of consistent conceptualization or operationalization of the construct in the relevant literature. In fact, in a recent review of empirical literature from a single area of trust scholarship – environmental risk management – Earle (2010) identified 150 measures of trust in 132 studies. The trust conceptualizations (called “forms” in his paper) were broadly categorized following a well-cited argument in the trust literature (Rosseau, Sitkin, Burt, & Camerer, 1998) that identifies two major types of trust, namely, relational trust (which Earle terms “trust”) and calculative trust (which is termed “confidence”). Within these two major types, the forms were further divided as a function of their dimensionality. For example, Cobb and Macoubrie (2004) utilized a single item operationalization of trust which simply asked “How much do you trust business leaders within the nanotechnology industry to minimize the potential risks to humans?” Contrastingly, de Jonge, van Trijp, Renes, and Frewer (2007) utilized a multidimensional operationalization of confidence that included

four items measuring optimism (e.g., “I am confident that food products are safe”) and another three which measured pessimism (e.g., “I worry about the safety of food”).

Similarly, in a review of organizational trust research, McEvily and Tortoriello (2011) found 129 different measures of trust in 171 studies. In fact, they find only 22 measures that have been used more than once and of those 22, only five were used more than five times (Cook & Wall, 1980; McAllister, 1995; Roberts & O’Reilly, 1974); and of those five, two measures came from the same publication (Mayer & Davis, 1999). This lack of consistency in the measurement of trust confounds a comprehensive understanding of the construct because it significantly complicates the comparability of the constructs measured and, therefore, the generalizability of their results. Thus, it may be that all similarly worded “trust” items do, in fact, tap the same underlying construct, but it may also be that they measure distinct constructs that, even more troublingly, may be differentially correlated with relevant outcomes in specific situations.

Lamenting this “verbal and conceptual morass” (Barber, 1983, p. 1), and especially its role in preventing the unified advancement of a comprehensive social science of trust, has become a centerpiece of many of the major reviews of the literature. In his review of the generalized trust literature across domains, Nannestad (2008, p. 416) argues, “the results [of trust studies] do not normally tell much – if anything – about the merits of one theoretical concept of trust versus the merits of another, as empirical studies are seldom designed to distinguish between different concepts of trust and their implications.” Balliet and Van Lange (2012) make a similar point in their meta-analytic review of trust and cooperation in social dilemmas, pointing out that despite the considerable emphasis on trust in the social and natural sciences, numerous



conceptualizations persist. In the organizational context, McKnight and Chervany (1996) review the, then, existing definitions of trust and argue that, despite some common thematic elements, trust is still not well-understood, while Kramer (1999), in “assessing the state of this rapidly growing [organizational trust] literature” (p. 569), argues that “a concise and universally accepted definition of trust has remained elusive” (p. 571). More recently, Colquitt, Scott, and LePine’s (2007) meta-analytic review of trust echoes this point, arguing that the “multidisciplinary perspective [of trust research]... has created confusion about the definition and conceptualization of the trust construct” (p. 909).

Other scholars, however, have been much more positive regarding the state of the literature. In an oft-cited cross-domain review of trust, Rousseau, Sitkin, Burt, and Camerer (1998) argue that, “despite the common concern regarding our very different disciplinary lenses (i.e., ‘blindings’), we observe considerable overlap and synthesis in contemporary scholarship on trust” (p. 402). In fact, in each of the three major areas of trust literature (organizations, risk management, and government), at least one recent review has made some argument as to an increasing consensus regarding aspects of trust in their respective domains (e.g., Earle, 2010 [risk management]; Levi & Stoker, 2000 [government]; McEvily & Tortorello, 2011 [organizations]). Specifically, the trust literature appears to be increasingly converging on an acceptance of trust as a willingness to accept vulnerability in dealings with others (McEvily & Tortorello, 2011). The nature of free will within our species dictates that at any given moment, any person may act in another’s favor or not. The extent of this vulnerability, obviously, will depend on the specific interaction but, without question, there is some level of uncertainty (and therefore vulnerability) inherent in every human interaction. Even long-standing, social

interactions characterized by trust (e.g., marriages) can be marred at any times by the negative actions of one or both parties. In fact, some researchers have referred to this as the “fundamental social dilemma,” such that in every interaction, individuals must decide whether to accept this vulnerability or reject the interaction (Lind, 2001, p. 61). Trust, then, is the willingness to accept this vulnerability in dealings with an “other” (e.g., Hetherington, 2005; Mayer, Davis & Schoorman, 1995; Moellering, 2013; Rousseau, Sitkin, Burt & Camerer, 1998; Warren, 1999).

### **Proposed Framework of Trust**

The proposed framework of trust borrows especially heavily from two existing trust models. The first was proposed by McKnight and Chervany (1996), who, after evaluating the 60 most frequently cited or conceptually distinct trust definitions from the management, communication, sociology, economics, political science, and psychological trust literatures, concluded that trust is, in fact, a collection of discrete but interrelated constructs. Following the lead of the Theory of Planned Behavior (Fishbein & Ajzen, 1975), the authors hypothesize that the attitudinal constructs (dispositional trust, trusting beliefs and system trust) lead to an intention to trust which then leads to engaging in trusting behavior. From McKnight and Chervany’s model, the proposed framework borrows its overall structure, especially its postulation that attitudinal trust leads to an intention to act trustingly which subsequently leads to trusting behavior (see Figure 1). The three constructs differ in manifestation (as an attitude, intention or behavior), but share an emphasis on accepting the vulnerability that arises from the uncertainty that is inherent in all human interaction because of human agency. Although there are certainly other drivers of intention to trust and trusting behavior (e.g., ability to act, perception of

risk, etc.), the proposed framework hypothesizes that each construct will share important predictive variance with its subsequent construct.<sup>1</sup>

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INSERT FIGURE 1 HERE

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The second model from which the proposed model borrows heavily was proposed by Mayer and colleagues (1995). The model posits that trust is driven by the trustor's evaluation that the target is worthy of that trust because it has sufficient technical ability, benevolent intentions, and integrity (Mayer, Davis, & Schoorman, 1995). Although not without challengers in the literature, the central argument, that trust is driven by evaluations of the trust target, is widely accepted by trust researchers (e.g., Earle, Siegrist, & Gutscher, 2008; Hardin, 2013; Levi & Stoker, 2000). From this model, the proposed framework borrows its notion of the bases of attitudinal trust. Specifically, it hypothesizes that a willingness to accept vulnerability – the essence of trust – is based upon relevant evaluations. The proposed framework therefore suggests that the bases of, or reasons for, a trusting attitude will include constructs like the trustor's propensity to trust across situations (dispositional trust); factors within a system that encourage the trustor's trust (system trust); Mayer and colleagues' (1995) ability, benevolence, and integrity constructs; and other relevant evaluations. Thus, within the proposed framework, these bases are limited only by the fact that they must be concepts which lend themselves to either the lessening (but not removal) of vulnerability or increasing its

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<sup>1</sup> Note that the recursivity of this framework is, at this point, an open question; however, it stands to reason, and is not inconsistent with existing literature, that the trusting behaviors may themselves impact the attitude as suggested, for example, by Mayer, Davis, and Schoorman (1995).

acceptability within the trustor.<sup>2</sup> For example, a belief that the target shares the values of the trustor would be an appropriate basis within this framework, because this belief should lead the trustor to believe that the target is guided by similar principles and is, therefore, likely to come to a similar conclusion. Race, however, would not be a basis of trust within this framework, as simply being of a specific racial descent has no influence on actual vulnerability or its perception. Importantly, however, the *experience* of being a member of a majority race may, for example, influence the perception that the target shares one's values, which as mentioned above, is an appropriate basis within the framework.

Although this means that the list of potential bases of attitudinal trust is expansive, these bases are likely to vary somewhat reliably as a function of the situation. For example, bases that require some level of knowledge (e.g., I trust because I *know* the target is generally "good") cannot be strong drivers of trusting attitudes when the trustor's knowledge is low. Similarly, bases that require some level of experience (e.g., I trust because the target has treated me well in the past) must yield to other bases when the trustor has no relevant experience. Conversely, some bases are likely to become more important in some situations. For example, when faced with a technical situation, beliefs regarding the target's technical competency are likely to be more important drivers of trusting attitudes.

Attitudinal trust is, therefore, something of a meta-construct in that it is a fairly global evaluation that is determined, to some degree, by any number of potential bases. It is important to note, though, that it remains unclear from the literature whether this meta-

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<sup>2</sup> It is unclear from the literature at this point whether these bases of trust make individuals less vulnerable by increasing their certainty about the interaction or if it simply eases their concerns about a persisting vulnerability (see Earle, 2010).

construct is itself directly measurable (e.g., with single-item measures like “do you trust X”) or if responses to these questions are simply another of the differentially predictive bases of the willingness to accept vulnerability. Stated differently, it is not clear from the literature whether responses to questions like “do you trust X” directly tap a willingness to be vulnerable itself or if the responses are a more global evaluation of the target upon which a willingness to be vulnerable is subsequently based. To avoid this potential confusion, the following review will use “trust” to refer to the broader willingness to be vulnerable and the names of the bases of that trust when referring to them specifically.

### **Scope of Review**

Although this framework of trust is meant to be applicable to all human interactions, a comprehensive review of the entire trust-related literature would be unwieldy. Instead, the review will focus on literature that empirically addresses individual, target-specific<sup>3</sup> trust from the perspective of three, relatively well-developed, bodies of literature that have progressed more or less independently of each other (organizations, risk, and government<sup>4</sup>). This literature, although somewhat disparate, tells a very consistent story when viewed through the lens of the proposed framework.

Although the most important bases of trust, operationalizations of attitudinal trust, and specific trust intentions and behaviors vary as a function of the domain, the overall structure of the proposed framework is widely supported in the trust literature across domains.

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<sup>3</sup> By “target-specific” it is meant that the trust evaluation is specific to the target. This is in contrast to constructs like social capital, moral trust, and dispositional trust which instead refer to either a target non-specific perception of or predisposition within the trustor.

<sup>4</sup> Note that because of their place within government, the literature regarding trust in the courts will be reviewed with trust in government but as a distinct subsection because of the courts’ important differences from the rest of the institutions of government.

Note that the bodies of literature identified in this review are not exhaustive. Attitudinal trust has been discussed in a number of other literatures and domains that are more or less distinct from the three identified above – for example, natural resources management (e.g., Leahy & Anderson, 2008), technology acceptance (e.g., Grabner-Krauter & Kaluscha, 2003), and fashion (e.g., Cademan, Frendberg, & Savic, 2012). Behavioral trust, in particular, has also been the subject of extensive research within game theoretic frameworks that are particularly common in behavioral economics (see Ashraf, Bohnet, & Piankov, 2006). These important literatures are neglected in this review, however, for two major reasons. First, regarding attitudinal trust and its bases, the three bodies of literature identified here are arguably the most developed to date. Scholars have discussed the relevance of trust since the 1960's in the organizational (e.g., Shepard, 1967) and government literatures (Stokes, 1962) and, although the seminal publication in risk-management was only in the 1990's (Slovic, 1993), the literature has exploded with work since then. Importantly, the considerable emphasis on trust from behavioral economics is not addressed here because it has paid relatively little attention to the attitudinal aspects of trust (Lewicki, Tomlinson, & Gillispie, 2006) which are the primary focus of this review. The majority of this work has instead focused only on trust as a behavior (or, occasionally, an intended behavior) and has sought primarily to increase or decrease behavioral cooperation between players in a game theoretic paradigm. Second, most of the other bodies of research either fit within these three perspectives (i.e., applying the same conceptualizations and constructs) or are offshoots of them (i.e., they bring these or slightly modified versions of these conceptualizations and constructs into new areas). For example, as discussed in Chapter Three, trust in natural resources

regulation frequently applies conceptualizations of trust from the risk management literature (e.g., salient values similarity and the Trust, Confidence, and Cooperation model). In fact, a noteworthy portion of the trust in natural resources management literature is conducted by well-known risk management researchers (e.g., Cvetkovich and Siegrist). As a result, discussion of these important areas is not necessary for a comprehensive understanding of how the presented framework applies to trust research. Note, however, that these other literatures are generally not inconsistent with the framework as presented.

### **Trust in Organizations**

Trust in organizations is arguably the largest and most developed major body of trust research within the scope of this review. Organizations, as collections of individuals with a common goal, have long captured the interest of researchers and practitioners who work to increase their ability to achieve their goal for which trust has been commonly recognized as important (Bigley & Pearce, 1998; McEvily, Perron, & Zaheer, 2003). In contrast to the other literatures reviewed, the organizational literature benefits greatly from an increasingly ubiquitous understanding of what trust is (McEvily & Tortoriello, 2011). In particular, two heavily overlapping definitions of trust are often considered to be the most cited in this literature, collectively eliciting roughly 2000 citations according to the Web of Science (McEvily & Tortoriello, 2011). The first argues that trust is “the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party” (Mayer, Davis, & Schoorman, 1995, p. 712). The second definition was proposed by Rosseau, Sitkin, Burt

and Camerer, who, after reviewing the definitions of trust from across literatures – including the one proposed by Mayer and colleagues (1995) – argue that most scholarly writing accepts a definition similar to the one that they propose: “trust is a psychological state comprising the intention to accept vulnerability based upon the positive expectations of the intentions or behaviors of the other” (1998, p. 395). Thus, organizational trust is typically premised upon the personal vulnerability of individuals to the actions of others that is inherent in interactions within an organization because of the potential that others may exploit the cooperation of the trustor (Lind, 2001). It is, therefore, theoretically important in this literature because it allows individuals within organizations to reduce or accept this vulnerability and work together efficiently.

Because of the close interaction of individuals in organizational settings, the majority of research in this area investigates trust between familiar individuals proximately located within a single organization, for example, an employee’s trust in her “supervisor” (Colquitt & Rodell, 2011, p. 1191). Laboratory studies have also sought to simulate this familiarity by having participants work directly with confederates (e.g., Lind, Kanfer, & Earley, 1990). In these studies, the vulnerability of the trustor is apparent in that proximate individuals have the most potential for the exploitation of cooperation (e.g., an immediate supervisor who exploits his employees’ hard work for personal recognition). Some scholarship, however, has investigated trust between geographically distant individuals who may have considerably less familiarity. For example, Mortensen and Neeley’s evaluation of the role of reflected knowledge asked employees to discuss their trust in collaborators from “the distant office with which they most often interacted” (2012, p. 8). This interest in trust between geographically distant individuals is especially



common in the context of the internet (e.g., van Slyke, Belanger, & Communale, 2009), where individuals within and across organizations interact without ever being in close proximity. Additionally, although the majority of the research in the organizational context addresses trust in an individual, some does discuss trust in an organization as a whole (e.g., public perceptions of corporations). In the case of geographically distant or organizational targets, the vulnerability may be somewhat less apparent; nonetheless, this notion of trust as a willingness to accept vulnerability remains applicable in both cases as the exploitation of vulnerability is still possible. Indeed, the greater distance or differential status of the individual and organization may even facilitate exploitation.

### **Bases of Trust**

There are a number of proposed bases for organizational trust. One of the most commonly discussed in this literature is trustworthiness, a context specific evaluation of the characteristics of the target that make it worthy of being trusted (i.e., less likely to exploit the vulnerability of the trustor; Mayer, Davis, & Schoorman, 1995). Although a number of dimensions of trustworthiness have been proposed in the organizational literature, the identification of common themes in these dimensions has led researchers to propose that there are at least three important dimensions; ability, benevolence, and integrity (Mayer, Davis, Schoorman, 1995). When considered in light of this notion of trust as a willingness to be vulnerable in dealings with another, ability is the belief that the target has the technical competence to accomplish the positive expectations of the trustor. Benevolence and integrity are beliefs that the target is motivated to accomplish these expectations but differ in that, for benevolence, the motivation is external (care for the trustor) while, for integrity, it is the target's own internal principles that motivate his

or her behavior. These dimensions have frequently been applied in research and have been shown to be important predictors of a willingness to be vulnerable in organizational settings. In fact, Colquitt, Scott, and LePine (2007) conducted a meta-analysis of 132 independent samples in which the influence of these components of trustworthiness on trust was tested, and they found an overall effect for all three constructs on a willingness to accept vulnerability, such that ability has the strongest independent relationship followed by benevolence and integrity.

Another important basis of trust in the organizational literature is that of organizational justice. Interest in organizational justice spiked in the 1960's and 1970's resulting in a great deal of research on the topic and a number of relevant theories (Greenberg, 1987). Although this research is somewhat disparate, it shares a common root in attempting to explain how individuals evaluate decisions to which they are subject (Colquitt, 2001). While there has been disagreement as to the dimensionality of organizational justice over the years (e.g., Cropanzano & Ambrose, 2001; Greenberg, 1993; Sweeney & McFarlin, 1993), most of the current discussion applies a dimensionality similar to that identified by Colquitt (2001). After evaluating the relevant literature, he identified what he argued to be four distinct dimensions of organizational justice: interpersonal, informational, distributive, and procedural fairness. The first and second dimensions find their roots in research on interactional justice that argues that appropriate treatment by decision makers is important for trustors' concepts of justice (e.g., Bies & Moag, 1986). Within this broader notion of interactional justice, researchers have found support for two separate sub-dimensions: interpersonal justice (characterized by notions like propriety and respect) and informational justice (characterized by notions

like truthfulness and justification). The third dimension, procedural fairness, follows the propositions of Thibaut & Walker (1975), who argue that individuals care deeply about the fairness of the procedures used by an authority in coming to a decision relevant to them. Thus, this construct is characterized by notions like outcome control and impartiality. The final dimension of organizational justice is distributive justice. Because he argues that most of the relevant literature has focused on increasing productivity, Colquitt's (2001) conceptualization of distributive justice follows the work of Deutsch (1975), who argues that the perceived fairness of the outcomes of decisions also has an important influence on evaluators' concept of justice. It is, therefore, conceptualized in this study – and much, but not all, of the literature – by applying equity theory (an evaluation of appropriateness of the ratio of the effort applied and the benefit received; e.g., Adams, 1965). These four dimensions of organizational justice are important bases of a willingness to accept vulnerability in dealings with another because by showing that the target respects the trustor (interpersonal justice), is forthcoming about relevant information (informational justice), and/or is fair in both process (procedural fairness) and outcomes (distributive justice), they suggest that the trustor's vulnerability is unlikely to be exploited.

In addition to these major bases (trustworthiness and organizational justice), there are a number of bases that are much less commonly cited in the organizational literature. One in particular, however, has been the subject of increasing scholarship and is therefore worthy of note; namely, anticipatory injustice. The seminal publication argues that anticipatory injustice is the trustor's expectation that the target will act unjustly toward the trustor (e.g., by exploiting the trustor's vulnerability; Shapiro & Kirkman, 2001). The

authors argue that these expectancies should be important in a number of organizationally relevant situations, especially those in which the trustor is forced to make a judgment about future cooperation (e.g., in a hiring interview), and their propositions have been largely supported (Bell, Ryan, & Wiechmann, 2004; Bell, Wiechmann, & Ryan, 2006; Ritter, Fischbein, & Lord, 2005).

### **Intention to Trust and Behavioral Trust**

As suggested above, the organizational trust literature is chiefly concerned with the effective function of organizations. Thus, the majority of the trusting intentions and behaviors discussed in this literature revolve around increasing the efficiency of the organization through increases in specific constructs like cooperation (e.g., DeCremer & Tyler, 2007; La Porta, Lopez-de-Silanes, Schleifer, & Vishny, 1997) and compliance (e.g., Colquitt, 2001; Hegtvedt & Johnson, 2009; Murphy & Tyler, 2008). Because of this emphasis, a significant body of organizational research has investigated organizational citizenship behavior (OCB), a multi-dimensional construct intended to quantify the behaviors of employees who go beyond their required tasks for the good of their organization. Although OCB has been conceptualized as having as few as two dimensions (e.g., altruism and compliance; Smith, Organ, & Near, 1983), most scholarship seems to argue for approximately five (e.g., conscientiousness, sportsmanship, altruism, courtesy, and civic virtue; Podsakoff & MacKenzie, 1993). These behaviors simultaneously make individuals most likely to contribute to the success of the organization (Organ & Ryan, 1995) but also place them at greatest risk for exploitation. The organizational literature has, therefore, frequently pointed to the importance of attitudinal trust in increasing OCB (Colquitt, Scott, & LePine, 2007; Van

den Bos & Lind, 2002), but the strength or even existence of a relationship between trust and a specific OCB dimension often depends on the base(s) of trust that are measured. Of the bases of trust in this context, the relationship between organizational justice and OCB is probably the best supported in the literature. For example, Moorman, Niehoff, and Organ (1993) find direct relationships between procedural fairness and courtesy, sportsmanship, and conscientiousness in addition to indirect effects via affective and continuance commitment and work satisfaction. In a more recent study conducted in India, Gupta and Singh (2013) also found that although all of Colquitt's (2001) organizational justice dimensions were associated with most of the OCB dimensions, only empowerment justice (a dimension specific to Indian contexts) was associated with compliance behavior, and its relationship was marginal ( $p < .10$ ).

### **Summary**

Organizational trust is one major area of trust research. Within this domain, trust is usually thought of as a willingness to accept personal vulnerability to the actions of others in the context of an organization. The majority of this literature operationalizes attitudinal trust as held in reference to an individual with whom the trustor has direct contact, but work has also investigated trust in geographically distant others and organizations themselves. A number of bases of this willingness to accept vulnerability exist, but three important ones are trustworthiness (characteristics of the trusted that make them worthy of trust), organizational justice (evaluations of the fairness of interactions), and anticipatory injustice (expectations of unfairness in interactions). The outcomes of attitudinal trust in the organizational literature usually relate to the increased efficacy of

organizations, and particular attention has been paid to associations with organizational citizenship behaviors (OCB).

### **Trust and Risk Management**

The second major body of trust literature within the scope of this review is that of trust in risk management. Risk, as the “chance of injury, damage or loss,” is often a particularly evasive concept for much of the public (Slovic, 1999, p. 690) and the subjective risk perceptions of the public are often much different than the objective, calculative evaluations of the probability of specific harms by experts (Amin, Jahi, Nor, Osman, & Mahadi, 2007). Lacking the ability and/or motivation to thoughtfully evaluate risks, public perceptions of them are often strongly influenced by non-technical factors like sex, worldviews, and trust in the entity responsible for managing the risk (Slovic, 1999). Fundamentally, then, within this body of literature, trust is thought of as a heuristic method by which individuals deal with the complexity involved in evaluating their vulnerability to the managed risk (Slovic, 2010). Trust in this scholarship is, therefore, similar to the organizational literature in that both seek to decrease or assuage the personal vulnerability inherent in human agency (in this case the agency of the risk managers who may or may not adequately manage the risk). Importantly, however, because of the relatively more distal relationships of many trustors and risk managers, much of this literature focuses less on individual trust in specific others and more on trust in often ill-defined groups. For example, Siegrist and Cvetkovich asked their participants to respond to their perceptions of the “authorities regulating the following items” (2000, p. 715). Similarly, Allum asked the public to report their evaluations of “scientists working on G[enetically]M[odified] foods” (2007, p. 939). Although this lack of

specificity flies in the face of arguments by researchers in other contexts who believe that trust can only be experienced between specific individuals (e.g., Hardin, 1999), there is little question that trustors are vulnerable to the actions of risk managers like natural resources authorities and regulatory institutions in managing risks like electromagnetic fields, genetically modified foods, and forest fires regardless of whether the target is perceived as a specific individual or ill-defined group.

### **Bases of Trust**

Risk researchers have proposed a number of potential bases for trust in risk management, notably including salient values similarity, confidence, care for the trustor/public and technical competence. Salient values similarity is one of the most developed of these bases and has been primarily investigated as a counter-point to confidence in the Trust, Confidence, and Cooperation (TCC) model. Salient values similarity is an evaluation within the trustor that he or she shares important (salient) values with the trusted institution (Winter & Cvetkovich, 2008). Thus, it is an evaluation of the motivations of the trusted entity but is distinct from an expectation about how the entity itself will act in the future, which they term confidence (Siegrist, 2010). The TCC model, therefore, follows a common division in research on impression formation – that of morality and performance information (e.g., Skowronski & Carlston, 1989), such that salient values similarity is driven by evaluations of morality information (e.g., the benevolence, integrity, care, and fairness of the entity), while confidence is driven by evaluations of performance information (e.g., the entity's ability, competence, and the rules or regulations by which its future conduct is prescribed; Earle, Siegrist, & Gutscher, 2007). In the TCC model, the authors argue that salient values similarity (which they

refer to simply as trust) and confidence are two independent attitudinal trust pathways that provide the trustor with important information relevant to accepting his or her vulnerability to the target's agency in the management of the risk. This information, in turn, increases behavioral trust which they operationalize as cooperation (Earle, Siegrist, & Gutscher, 2007). In a notably comprehensive test of this model, Siegrist, Earle and Gutscher (2003) surveyed 1313 Swiss citizens regarding their trust and confidence in managers of the risk from mobile phone radiation and largely supported the relationships hypothesized by the model.

The second set of bases of attitudinal trust arises from literature regarding the "dimensions of trust." Following work from outside the risk management literature (e.g., Barber, 1983), risk researchers have proposed a number of potential "dimensions" of trust (e.g., Kaspersen, Golding, & Tuler, 1992; Renn & Levine, 1991), notably including competence and care. Much like benevolence from the organizational literature, care refers to the belief of the trustor that the trusted entity has some level of "care or concern for other people" (Allum, 2007) and is therefore likely to appropriately manage the risk for which they are responsible. Also, complementary to the organizational literature, competence (akin to ability in organizations) is the belief that the trusted entity has the necessary knowledge and experience to adequately manage the risk (Peters, Covello, & McCallum, 1997). As in the organizational context, competence and care influence a willingness to accept vulnerability by suggesting that the trust target is both capable of and motivated towards accomplishing their positive expectations.

A final, increasingly common basis of trust in this literature is fairness (e.g., Besley, 2010; Lauber & Knuth, 1997; Lawrence, 1995). As in the organizational



literature, fairness is hypothesized to provide important information to the trustor about the target which influences the willingness to accept his or her vulnerability to the management actions of the target. Importantly, though, very little of this research has developed within this literature and instead, most risk researchers directly apply Tyler and colleagues' work regarding procedural fairness (discussed further in the next section).

### **Intention to Trust and Behavioral Trust**

Intention to and behavioral trust in the risk management literature revolve primarily around reactions to risk, in particular, the acceptance of the risk itself and risk management action. Regarding risk acceptance, researchers have consistently found support for an association between trust and its bases and increased public acceptance of risks like electromagnetic fields (Siegrist, Earle, & Gutscher, 2003), algal blooms (Huang, Sun, Ban, & Bi, 2010), and high-speed railways (Marincioni & Appiotti, 2009). Despite this generally supported association, however, some research seems to suggest that the relationship may be somewhat complicated. For example, Siegrist (2000) finds support for a model that suggests that trust in risk managers indirectly influences acceptance of risk by decreasing the perceived risk and increasing its perceived benefit. Additionally, although Poortinga and Pidgeon (2006) find an association between trust and the acceptability of risk from genetically modified foods, they fail to find a significant association with an intention to purchase or eat it. Nevertheless, the far majority of research seems to argue that risk acceptability is influenced by trust in the risk management entity, regardless of the mechanism or its association with actual behavior.

Trust has also been consistently shown to be important for public acceptance of management actions like the management of endangered species (e.g., Cvetkovich & Winter, 2003) and fire risk (e.g., Vaske, Bright, & Absher, 2007). For example, Winter and Cvetkovich (2008) find that trust (specifically, salient values similarity) maintains an important predictive influence on approval of fire risk management techniques like controlled burns and restrictions of use, even when controlling for knowledge about fire management and issue concern. In addition to this passive acceptance of management action, trust has also been associated with more active voluntary action. Earle and Siegrist find an association between attitudinal trust and responses to items like “I would support the efforts of the decision makers in any way I can” (2008, p. 1403). Notably, however, some research indicates that the relationship between trust and active participation may be curvilinear, as in work by Yandle, Hajj, and Raciborski (2011), who find an inverted “U” shaped distribution of participation and trust. The authors argue that with too much or too little trust, individuals may disengage and that only with moderate levels of trust can participation be expected.

### **Summary**

Trust in risk management is a second important area of trust scholarship. Within this literature, attitudinal trust is usually thought of as a heuristic method for dealing with the complexities in risk evaluation and accepting the vulnerability involved in allowing another to manage a risk to you (e.g., electromagnetic fields, genetically modified foods, natural resources management, etc.). The bases of this willingness that are most common in this literature are salient values similarity (an evaluation of the important values shared by the trustor and the risk management entity), confidence (an expectation about the

future behavior of the risk management entity), the “dimensions of trust” (evaluations of the care and competence of the risk manager), and fairness (an evaluation of the fairness of the procedures used by the risk manager). Because of the interest in the efficient management of risks, the primary trust behaviors discussed in this literature are the acceptance of risk and evaluations of specific risk management actions, but the relationships between trust and many of these outcomes are somewhat complicated.

### **Trust and Government**

The last major body of scholarship in which trust has been investigated is that of trust in government. As with the other bodies of literature, attitudinal trust in government is theorized to be a willingness to accept vulnerability, but in this context, the vulnerability arises specifically from allowing government to have authority (Hetherington, 2005; Levi & Stoker, 1999; Offe, 1999; Warren, 1999). At a policy level, trusting individuals give up some of their autonomy and allow the government some level of control over their lives. Although government is expected to act in the best interests of its people, it may instead seek to disadvantage or even undermine various groups. Examples of these kinds of extreme government action are replete in history (e.g., Apartheid in South Africa), but they are increasingly uncommon in today’s developed world. Instead, much of the contemporary vulnerability occurs on a process level. In the United States and other democratic countries, government is elected to represent the people. Trusting individuals, therefore, allow government to speak for them and ensure that their interests are represented. As at the policy level, governmental agency allows for the possibility that governments may not honor the interests of their constituency, thereby stifling their voice in the process of government. Indeed, the increasingly polarized nature

of modern politics virtually guarantees that on most noteworthy political issues, a large number of people will disapprove of whatever action governments take (e.g., the Affordable Care Act). As the willingness to accept the vulnerability inherent in its agency, trust in government is, therefore, important because it allows for the effective function of government. As Hetherington argues, “government will, on average, solve fewer problems when political trust is low” (2005, p. 15).

Unlike most other bodies of trust scholarship, trust in government benefits from widely accepted measures of the construct. Beginning in the 1960s, Stokes (1962) introduced four questions to the American National Election Study (ANES) that have become the mainstays of the field.<sup>5</sup> These four questions ask respondents how much of the time they feel they can trust the government in Washington, how much tax money they feel is wasted, whether government officials are out for themselves, and how much of the government is crooked. Although slightly different items have been used in other surveys both in the U.S. (e.g., the General Social Survey) and abroad (e.g., the European Social Survey), most are very similar to these four and have produced a great deal of at least ostensibly comparable results. In fact, it is often the evaluation of the data from these surveys that has led researchers to believe that trust in government has dropped in the recent past (Levi & Stoker, 2000; see also Hetherington & Globetti, 2002; Lipset & Schneider, 1987; Rudolph & Evans, 2005). Scholars have noted these troubling declines in established democracies (Rothstein, 2009), and the United States does not seem to be immune (Chanley, Rudolph, & Rahn, 2000). Ever since the especially precipitous decline in the Vietnam War/Johnson/Nixon years (Nye, 2010), scholars have embarked on a

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<sup>5</sup> Note however, that these questions were originally intended to measure general evaluations of government and not “trust” specifically. This has provided much of the impetus for those who question whether they truly tap trust at all (see Levi & Stoker, 2000).

concerted effort to explain the decreases in trust in government in the United States, but a number of important concerns remain. Chief among them is the question of whether the declines in trust represent specific distrust in the current administration of government or are a more diffuse evaluation of the political process as a whole (see Chanley, Rudolph, & Rahn, 2000). That is to say, despite the ubiquity of the items, there remains considerable discussion of what these trust items are actually measuring, especially regarding these specific and diffuse concerns (see Citrin, 1974; Hetherington, 1998; Levi & Stoker, 2000; Miller, 1974a; Miller, 1974b; Mishler & Rose, 2001).

### **Bases of Trust**

Like the other bodies of literature, researchers have discussed a number of potential bases of attitudinal trust in government. There is little question that attitudinal trust in government is a complex process (Chanley, Rudolph, & Rahn, 2000) fed by “many streams” (Hibbing & Theiss-Morse, 2001a, p. 12), leading to some speculation that there are no consistent bases across situations (Boukaert & de Walle, 2003). Impartiality or trustworthiness of government officials, absence or reduction of risk through certainty or transparency, participation, and belief in the political process have all been discussed as potential sources of trust in government (Boukaert & de Walle, 2003), but without question, the most commonly discussed basis in the literature is satisfaction (Hetherington, 2005; Hibbing & Theiss-Morse, 2001a; Miller, 1974a). Although often pursued in its own right and not as a basis of trust, the argument is that constituencies use their perception of the performance of their government to determine whether the government actually values their interests (Hetherington, 2005) and thus the probability that it will exploit their vulnerability. Thus, much like confidence in the risk management

literature, individuals draw upon their satisfaction with the previous behavior of government to form expectations of its future behavior. The focus on satisfaction in the political trust literature arises primarily from the nearly ubiquitous use of the ANES questions to measure political trust. Research has frequently shown that major drops in responses to these questions follow public dissatisfaction with major political mishaps like Watergate and Vietnam in the 1960's and Iran-Contra in the 1980's (Hetherington, 2005; but see Hetherington, 1998, who argues for a reversed causality such that political trust leads to satisfaction). Likely because one of the ANES questions directly references Washington, satisfaction with the incumbent federal government, and more specifically its economic policies, is often most connected to political trust (Levi & Stoker, 2000). Note, however, that research has suggested the potential for priming effects from recent information such that this is not always the case, and responses may instead reference whatever institution of government is most salient to the respondent at that moment (e.g., responses may follow satisfaction with the U.S. Supreme Court after a landmark case; Hetherington, 2005). Although this ambiguity in target is especially problematic in light of evidence that Americans often feel very differently about various government institutions (e.g., Hibbing & Theiss-Morse, 1995), it is clear that satisfaction plays a major role in constituents' perception of and reactions to their government and, because of its role in establishing expectations, their willingness to accept the vulnerability inherent in its agency.

A second important basis in this literature is legitimacy. Although variously defined, legitimacy is usually thought of as a right to make rules as held by an authority (Lake, 2009) and, therefore, the government's right to its constituency's acceptance of

vulnerability. Referred to as the “central issue in social and political theory” (Beetham, 1991, p. 41), it is this right to rule that permits government to effect social order without resorting to a resource intensive instrumental approach (Horne, 2009) and insulates them from overthrow or collapse (Gilley, 2006). In spite of this importance, however, scholarly understanding of legitimacy is somewhat limited, especially because it is frequently inconsistently operationalized across studies. Unlike attitudinal trust in government, there are no widely accepted measures of legitimacy, and scholars even disagree on critical questions of the scope of the construct itself. For example, Tyler and colleagues often equate legitimacy with a felt obligation to obey the law (roughly authoritarianism as directed to a specific institution) and frequently measure it as such (e.g., Tyler, 1997). Other researchers have argued that legitimacy is necessarily much more than simple obedience or felt obligation to obey (Hechter, 2009), and some have gone so far as to argue it can only be measured in light of an “objective precondition” of disagreement with the policy in question making legitimacy roughly the attitudinal equivalent of objectionable policy acceptance (Gibson, Caldeira, & Spence, 2002, p. 366). Also, although legitimacy is usually thought of as an internal attitude, there is an argument to be made that in the case of strong, pervasive feelings of legitimacy or illegitimacy in groups, it might be better measured as a social norm because the social context may be more relevant than the internalized attitudes (Horne, 2009).

A third, but much smaller, basis in this literature is encapsulated interests. Advanced primarily by Hardin (e.g., 2002; 2013; see also Offe, 1999), the conceptual argument posits that trust is based on an evaluation within the trustor that the target has so sufficiently internalized the interests of the trustor as to “encapsulate” them. This

internalization creates a perceived motivation within the target to act in the interests of the trustor and provides a basis for the trustor's acceptance of vulnerability (Cook, Hardin & Levi, 2005). This basis of trust is theorized to be especially reliant on knowledge of the target, so much so that it has led to arguments that most of the public *cannot* actually trust government "except by mistaken inference" (Hardin, 1999, p. 23). It is, therefore, often this basis of trust that is implicated when scholars argue that government cannot be trusted (e.g., Hardin, 2013; Hardin, 1999; cf. Mollering, 2013). Although an important question in this literature, it is important to note that a lack of knowledge and experience with government in no way insulates these less sophisticated individuals from vulnerability to its actions. Indeed, there is an argument to be made that less knowledgeable and/or experienced individuals are actually more vulnerable to their government for lack of knowledge about the issues or how to effectively participate in the political process. Thus, regardless of the trustor's level of experience or knowledge, trust remains relevant in this context, though it will likely be driven by other, less knowledge- or experience-reliant bases for low sophisticates.

### **Intention to Trust and Behavioral Trust**

Much like the organizational and risk management literatures, intentional and behavioral aspects of trust in government tend to center around notions of enhancing its ability to function effectively. As argued by Warren, "a society that fosters robust relations of trust is probably also a society that can afford fewer regulations and greater freedoms, deal with more contingencies, tap the energy and ingenuity of its citizens, limit the inefficiencies of rule-based means of coordination, and provide a greater sense of existential security and satisfaction" (1999, p.2). A great deal of research on trust in



government, therefore, focuses on relationships with constructs like support (Levi, 1997; Rudolph & Evans, 2005) and approval (e.g., Chaney, Rudolph, & Rahn, 2000; Hetherington, 1998; Hibbing & Theiss-Morse, 2001b) and often finds support for positive relationships between these constructs and trust and/or its bases. Although these more passive constructs are important for governments, they often require the more active acquiescence of the public (Chanley, Rudolph, & Rahn, 2000). Research in this body of literature has, therefore, also sought to understand the connection between trust and more active responses to government-like participation (Levi & Stoker, 2000) and compliance (Levi, Sacks, & Tyler, 2009). Importantly, however, a major recurring theme in this literature is the frequent failure to identify associations between behavior and trust or the identification of weak relationships. For example, research frequently fails to identify a lack of association between trust and political participation (e.g., Miller, 1980; Rosenstone & Hansen, 1993). This lack of association comports in many ways with the spirit of governance in the United States, as much of the founding of this country was predicated on a level of distrust of government. Indeed, some researchers have argued that it is, in fact, less trusting individuals who are more politically involved (Citrin, 1974). Providing some guidance for understanding the role of trust, Hetherington (1999) finds a strong relationship between trust and vote choice which he distinguishes from turnout. Thus it seems that political trust itself may not be a strong motivator of political behavior, but when the trustor is otherwise motivated to political participation, trust may play an important role in the option the trustor supports. Stated differently, although high trustors may be no more likely (and potentially even less so) than moderate or low

trustors to engage politically, when an individual does engage, her actions are likely to be determined to some degree by her trust.

### **Courts**

An important and well-studied subset of the trust in government literature is that of trust in the courts. Although institutions of government, the courts are notably distinct from other governmental institutions. Unlike other governmental officials, court officials are often somewhat insulated from the political process (e.g., many are not subject to popular election). Additionally, the courts control “neither the purse nor the sword” (Gibson & Caldeira, 2003, p.2), creating an especially heavy reliance on the positive perceptions of the public (Caldeira, 1986). As Benesh notes, “without some reservoir of good will or some level of support for and confidence in the justice system, people may be less willing to participate in the system as a juror and less likely to bring conflicts into the system for resolution” (2006; p. 697). Also, somewhat unlike other institutions of government, these institutions stand as third party arbitrators in disputes that are often traditional zero-sum games, where two opposing parties square-off with competing interests (e.g., a defendant and plaintiff in civil court). In the majority of these situations, at least one party must “lose” creating a very real, personal vulnerability, especially when the deprivation of life or liberty is on the table. The effective functioning of these institutions is, therefore, heavily predicated upon the amount of acquiescence they are able to command in the face of a non-preferred outcome.

As with other institutions of government, one important basis of attitudinal trust in the courts is legitimacy. In fact, scholars have posited that it is “perhaps the most important political capital that courts possess” (Gibson, 2008, p.59). In this context,

legitimacy is generally thought of as a “normative concept, having something to do with the right – moral and legal – to make decisions” (Gibson, 2008, p.61) and therefore, the trustor’s willingness to accept his or her vulnerability to those decisions. Court legitimacy, however, is rarely discussed without a reference to a second basis of trust, procedural fairness. Procedural fairness (also referred to as process fairness or procedural justice) is the belief that the procedures used by the decision makers are fair (Thibaut & Walker, 1975). Within the court context specifically, it is a belief that the trustor has had his or her “day in court,” in that s/he was an important part of the decision-making process (Tyler, 2006b, p. 663). Although researchers have found support for a number of procedural fairness factors (see Finkel, 2000, for a more general discussion of these factors), the usual story is that in assessing the fairness of legal procedures, the public relies heavily upon having voice and being treated with dignity and respect by a neutral decision-maker who is motivated to find the truth and not simply advance his or her own self-interest (Tyler, 2006a). Although the direction of causality is somewhat contested (see Gibson, 1991; Mondak, 1993), the general belief is that procedural fairness is a, and potentially *the*, major driver of the perceived legitimacy of the courts (Tyler, 1997).

Another common basis of trust in the context of the courts is confidence. As in the risk management literature, confidence provides a basis from which the trustor can determine his or her acceptance of the vulnerability inherent in allowing the courts authority, but its relationship with trust in this context is not well-understood (Cook & Gronke, 2005). Indeed, the majority of the court relevant research that has investigated confidence has tended to roughly equate it with trust, often alternating between terms or referring to a singular “trust/confidence” construct (e.g., Kelleher & Wollak, 2007; Levi,

Sacks, & Tyler, 2009; Miller & Listhaug, 1990). A few researchers have been more intentional about their conceptualizations of confidence in courts and in so doing, have identified a lack of equivalence between the constructs (Gibson, Caldeira, & Spence, 2003). An increasing body of research has sought to deconstruct the variance in confidence evaluations (Benesh & Howell, 2001) and has identified a number of important predictors of confidence including procedural fairness (Benesh, 2006) and perceptions of government generally (Hamm, PytlikZillig, Herian, Tomkins, Bornstein, & Hoffman, 2013). Additionally, a growing body of research has argued that experience with the courts may be an important construct for understanding the most important drivers of confidence for individuals, such that constructs like procedural fairness and perceptions of government generally might be more predictive for individuals with more experience (Benesh, 2006; Hamm, PytlikZillig, Herian, Tomkins, Bornstein, & Hoffman, 2013).

Behavioral trust in the courts has also long been a major area of research for both legal and social science scholars. Although referring specifically to the U.S. Supreme Court, Mondak is particularly illustrative of the courts' situation generally when he says, "The Supreme Court is an inherently weak institution. To give impact to its decisions, the Court depends on legislators for funding, the executive for enforcement, and the public for compliance" (1997, p. 1114). Much of the research on citizen perceptions of the courts has sought to understand why, despite this weakness, the courts generally tend to enjoy a great deal of acquiescence from the public. In fact, researchers have argued that the only reason for the interest in perceptions of the courts lies in the fact that they are postulated to be connected to acquiescence behaviors (Gibson, 1991). Although

compliance is unquestionably the most commonly discussed trust behavior regarding the courts (Gibson, 1991; Mondak, 1993; Papachristos, Meares, & Fagan, 2008; Robinson & Bowers, 2011; Tyler, 1997), associations between trust bases and decision acceptance (Gibson & Caldeira, 2003; Mondak, 1994; Tyler, 2006b), outcome favorability (Tyler, 1989), and general support have also been identified (Mondak, 1997).

### **Summary**

Trust in government is the final major area of literature discussed in this review. Trust in government is critical to its effective function because of the importance of accepting the vulnerability at either a policy or a process level. The bases of this trust are myriad, but three important ones in the context of government generally are satisfaction, legitimacy, and encapsulated interests. The outcomes of this trust are also numerous, but an important consideration in this literature is the lack of connection between trust and relevant behavioral outcomes. In particular, trust seems to be a poor motivator of political behavior, but when individuals are otherwise motivated, trust plays a role in the choices made. An important subset of government research regards the courts which, although institutions of government, have a very distinct role in American life. Despite this different role however, trust in these institutions is often based on very similar constructs like perceptions of legitimacy, procedural fairness, and confidence and is typically associated with similar acquiescence constructs like compliance and the acceptance of court decisions.

### **General Discussion**

The preceding reviews the trust scholarship in the three primary bodies of relevant literature. As summarized in Table 1, the review presents the conceptualizations of

attitudinal trust from each literature, the major bases of that attitudinal trust, and intentional/behavioral trusting outcomes with which attitudinal trust has been associated in that literature. Despite superficial differences, these literatures tell a largely consistent story in that each literature shares central aspects of their conceptualizations of trust, identifies varied bases for that trust that share an ability to decrease or assuage vulnerability, and have provided evidence for associations with a number of trust behaviors and intentions.

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INSERT TABLE 1 HERE

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The conceptualizations of trust in the three literatures are presented in the second column of Table 1. Although the targets and specific vulnerabilities vary, the three conceptualizations share a premise in the vulnerability inherent in the uncertainty involved in an “other” with agency over something relevant to the trustor. In the context of organizations, the targets are usually other people within the organization with whom the trustor has personal contact. The relationships are somewhat more removed in the risk management literature in that many individuals do not have direct contact with risk managers like those responsible for managing risks related to nuclear energy, forest fires, genetically modified foods, cellular towers, etc. The relationships in the trust in government literature may be considered even slightly more distal in that even citizens who are very concerned about political issues often have very little direct contact with government officials. Unquestionably, these interactions are possible (especially in light of efforts like Obama’s Open Government Initiative), but they are certainly less common

than in the risk management context where small risk management entities (e.g., park rangers) are often very accessible and even larger entities (e.g., state natural resource authorities) often invite stakeholders' input via public participation efforts. Despite these differences, however, some level of vulnerability is inherent in each of these interactions and trust is one important avenue for decreasing – or acting in spite of – this vulnerability. Within the organizational context, the shared goals of the individuals within the organization do not preclude the potential that by working to achieve a group goal, individuals may experience personal loss because of the exploitative behaviors of others (Lind, 2001). For risk management, the risk that is managed itself provides some level of probability of harm that the entity is tasked with managing (e.g., fire damage, health problems, and personal safety). Finally, government's role in directing individual action for the good of its constituency as a whole requires that individuals defer to its direction and accept that this deference may bring with it some vulnerability to harm from the inappropriate (e.g., fluke jury convictions or corrupt legislation) or even appropriate application of its authority (e.g., personal financial losses from compliance to an objectively good regulation). Thus, in each of these contexts, attitudinal trust is the individual's willingness to accept the vulnerability inherent in the agency of the target.

All three of these literatures also present a number of bases for this trusting attitude. The potential reasons that an individual would espouse this willingness to accept vulnerability are myriad and could certainly include anything from socialization to a seemingly random whim, but for any given situation, there are likely to be a set of bases that are consistently identified as important for most people, most of the time. Within the organizational literature, trustworthiness, organizational justice, and anticipatory injustice

have all been consistently identified as important bases. In the risk management literature, confidence, salient values similarity, the “dimensions of trust,” and fairness are common, while satisfaction, legitimacy, encapsulated interests, procedural fairness and confidence are important in government research. Even on their face, these constructs are similar across the literatures with common emphases on justice, characteristics of the trustor that inspire trust (e.g., ability and care), and expectations about the behavior of the trusted entity. Beneath the surface, all of these bases share an ability to objectively or subjectively reduce some of the vulnerability inherent in dealing with an “other.”

Expectations or experiences of justice signal to the trustor that her interactions with the entity will occur on a level playing field and, although the outcome is not certain, there can be some belief that a fair and equitable outcome is possible or even likely.

Characteristics of the target like benevolence, care and integrity indicate to the trustor that, regardless of the outcome, the entity is motivated to act in his or her best interests.

Competence and ability, on the other hand, indicate that the target is capable of accomplishing its task. Finally, even though the outcome remains unknown, satisfaction with the target’s previous performance and confident expectations of future interactions increase the perception of the probability that the trustor’s vulnerability will not be exploited.

Finally, all three literatures identify important associations between attitudinal trust and behavioral or intentional trust. Within the organizational literature, these outcomes usually center on notions of cooperative behavior that advances the common goal of the organization (e.g., team member cooperation, obedience to authority, citizenship behavior). For risk management, these behaviors are usually ones that



increase managers' ability to work without obstruction (e.g., compliance with regulatory schemes, decreased willingness to protest and increased participation). In the governmental context, the trusting behaviors and intentions are focused on the efficient operation of both government generally and of the administration in particular through the presence of support and the absence of dissent and, even though trust may not be a major motivator of political behavior, it is thought to be an important determinant of political choices. In all three literatures then, trusting behaviors are those that involve accepting some vulnerability and working with, or at least not against, the target.

### **Conclusion**

Trust is a construct of critical importance to researchers in practically every discipline. Because of its role in reducing or assuaging the vulnerability in interacting with others that arises from the uncertainty inherent in their agency, it is applicable to virtually every human interaction. As a result of this global importance, a great deal of trust research exists, but this literature is somewhat fragmented. This review identified the three major divisions (organizations, risk managers, and government) and, through the lens of an integrative framework of trust, shows that this literature, although somewhat disparate, tells a remarkably consistent story. Specifically, "trust" can be understood as driven by a collection of constructs that share an ability to reduce the actual or perceived vulnerability inherent in human interaction (bases of trust) and influence a global attitudinal willingness to accept the vulnerability inherent in human interactions (attitudinal trust) that, in turn, influences an intention to act in ways that accept vulnerability and the actual behaviors themselves (intentional and behavioral trust).

## CHAPTER THREE: TRUST AND VOLUNTARY COOPERATION WITH NATURAL RESOURCES MANAGEMENT

Natural resources management in the United States has undergone a major paradigm shift over the last few decades (Pahl-Wostl, Craps, Dewulf, Mostert, Tabara & Taillieu, 2007; Sabatier, Focht, Lubell, Trachtenberg, Vedlitz & Matlock, 2005). Previously, natural resources management efforts were typified by instrumental, “command and control” approaches whereby natural resources managers, using their ostensibly superior expertise, set priorities and determined actions with little to no input from the broader public. This approach to natural resources management is premised upon the belief that natural resources “can be predicted and controlled” (Pahl-Wostl et al., 2007, p. 1) and that the inevitable consequence of an absence of this top-down regulation is exploitation (Hardin, 1968; Pretty, 2003). Recently, however, this so-called, “engineering” approach has been challenged by a resilience-based approach. Resilience theory, at its most fundamental, essentially posits that socio-ecological systems (SES) exist in one of many possible stable states that are held in balance by a plethora of existing drivers (Holling, 1973). The theory argues that in periods of high resilience, an SES is capable of withstanding perturbations while maintaining its essential function. In periods of low resilience, however, the SES is vulnerable to perturbation and, upon reaching and crossing a critical threshold, will self-reorganize into a new and potentially distinct stable state. This theory, therefore, calls for managers to 1) be wary of potential thresholds in their SESs and 2) work to increase the resilience of their systems to perturbation (Allen, Fontaine, Pope, & Garmestani, 2011). Additionally, unlike most

engineering approaches, resilience approaches typically explicitly acknowledge the uncertainty in natural resources management, leading many to emphasize management options that more explicitly account for this uncertainty, notably including adaptive management, an iterative process through which managers can directly address uncertainty by “learning by doing” (Walters, 1997).

Somewhat in parallel to this movement towards resilience-based adaptive natural resources management strategies, many have called for the more explicit incorporation of the broader public in natural resources management. Following in large part from work by Ostrom (e.g., 1997; Vollan & Ostrom, 2010), this resource co-management approach explicitly acknowledges that numerous stakeholders play important roles in common pool resources management. Their inclusion is important in part because their involvement legitimizes the process (Duram & Brown, 1999), but more importantly, because of the noteworthy increases in knowledge that have been identified (e.g., Berkes, 2009), arguably because collaborative processes are more conducive to social learning (Pahl-Wostl, et al., 2007; Selin, Pierskalla, Smaldone, & Robinson, 2007). Another noteworthy benefit of co-managing ecosystem services is the increase of trust among the co-managers within the SES (Armitage, Plummer, Berkes, Arthur, Charles, Davidson-Hunt, Diduck, Doubleday, Johnson, Marschke, McConney, Pinkerton, & Wollenberg, 2009; Berkes, 2009; Pahl-Wostl, et al., 2007; Pretty, 2003; Selin, et al., 2007), but trust is also important in its own right because it is often a prerequisite of effective ecosystem management (Flitcrift, Dedrick, Smith, Thieman, & Bolte, 2010). Indeed, research has found that a requisite level of trust is critical for participation in the process (Yandle, Hajj, & Raciborski, 2011), but management more generally is also postulated to rely

heavily on trust (Leahy & Anderson, 2008; Liljeblad, Watson & Borrie, 2007), especially because it influences the “perceived efficacy and approval of planned or proposed [management] actions” (Winter & Cvetkovich, 2010, p. 218)

### **Trust in the Natural Resource Management Context**

Trust is, therefore, an important part of natural resources management. Critically, however, the widely accepted importance of trust in this context has no more resulted in a generally accepted definition of the construct or approach to its measurement than it has in the broader trust literature (Kramer, 1999; Nannestad, 2008). Some coherence, however, can be obtained by applying the framework proposed in Chapter Two (see Figure 1) that argues that attitudinal trust, as a willingness to accept vulnerability in interactions with the trust target, drives intention to act trustingly, and that trust behavior is itself driven by various bases which are constructs that lend themselves to lessening, but not removing, the vulnerability itself or increasing its acceptability.

In the natural resources context, much of the vulnerability is economic (e.g., farmers’ vulnerability to reduced yields from an unfavorable water allocation) but there are also important vulnerabilities like the loss of autonomy (e.g., land owners’ vulnerability to regulations limiting how they can use their land) and an even broader vulnerability to natural resource institutions potential to disregard the public’s interests in these resources that are intended to be held in public trust (e.g., the public’s vulnerability to permitting industrial activity on aesthetically or culturally important land). Research has found support for the importance of several potential bases of or reasons for the acceptance of the vulnerabilities in the natural resources management context specifically (e.g., Cvetkovich & Nakayachi, 2007; Earle & Siegrist, 2008; Poortinga & Pidgeon 2006;

Stern 2008; Winter & Cvetkovich, 2008; 2010). Evaluation of the relevant literature reveals six major constructs that provide reasons why the trustor may accept the vulnerability: namely, dispositional trust, care, competence, confidence, procedural fairness, and salient values similarity.

*Dispositional trust* is the willingness to trust others across situations and contexts (e.g., Leahy & Anderson, 2008) and is therefore likely to be the default level of trust afforded institutions. In the absence of other information about the institution, it is likely to be trusted to the extent that the trustor trusts people in general. In a test of the role of dispositional trust in predicting intended compliance with a water allocation with a student sample, Hamm and colleagues (2013b) found evidence that dispositional trust is most critical when participants know the least about the situation, a finding conceptually replicated in other contexts (Hamm, et al., 2013a). In the context of natural resources management, dispositional trust likely increases the acceptability of the vulnerability inherent in working with a natural resources manager because the trustor is generally willing to be vulnerable in working with others.

*Care* is an evaluation about whether the institution is motivated out of care for the trustor or self-interest, while *competence* is the belief that the institution has the technical competency to do its job (Barber, 1983). Together these evaluations make up what is sometimes referred to as the “dimensional” approach to trust (e.g., Cvetkovich & Nakayachi, 2007; Poortinga & Pidgeon, 2006). Qualitative research investigating the important factors of trust in natural resources managers consistently identifies these concerns as important for the public (e.g., Davenport, Leahy, Anderson, & Jakes, 2007; Leahy & Anderson, 2008), a finding also corroborated in quantitative research (e.g.,

Cvetkovich & Nakayachi, 2007). Care and competence both reduce the vulnerability involved in working with a natural resources institution by, in the case of care, reassuring the land owner that the institution is considering her interests and, in the case of competence, is actually capable of doing its job.

Although it often suffers from a lack of conceptual distinction from trust and the two are frequently used interchangeably (as discussed supra), some have proposed a distinction that suggests that *confidence* is a positive expectation about working with the target as based upon previous experience. This understanding is then contrasted with trust, which is operationalized as salient values similarity (Earle & Siegrist, 2006; Siegrist, 2010). In this research, confidence and salient values similarity are considered separate pathways to cooperation in the Trust, Confidence and Cooperation model (Earle, Siegrist, & Gutscher, 2007), which has been well supported in the broader risk management literature (e.g., Siegrist, Earle & Gutscher, 2003). In the natural resources context, confidence is likely to reduce the perception of vulnerability by increasing the perceived likelihood that working with the institution will go well for the trustor.

*Procedural fairness* is the participant's belief that he or she would be treated fairly by the institution (see, Tyler, 2006a) and has also been consistently identified as important in both qualitative (Leahy & Anderson, 2008) and quantitative (Earle & Siegrist, 2008) natural resources management scholarship. In particular, procedural fairness evaluations appear to have direct influences on the perceptions of both management actions (Syme, Nancarrow & McCreddin, 1999) and managers themselves (Cvetkovich & Nakayachi, 2003). In the natural resources management context, procedural fairness reduces the vulnerability of the trustor by suggesting that the

decisions are being made on a level playing field where both the institution and land owners' concerns are taken into account.

Finally, *salient values similarity* is the trustor's perception that he or she shares important values with the institution. In this context, salient values similarity decreases the vulnerability in working with the institution because the fact that the institution shares the important values of the trustor makes it more likely that the institution and the individual would act similarly. For example, a natural resources institution that shares land owners' value of profit is unlikely to ignore issues of productivity in favor of potentially less salient values like biodiversity. Relevant research has consistently found that the perception of shared values between institutions and the public are important aspects of trust evaluations (e.g., Cvetkovich & Nakayahci, 2007; Siegrist, Cvetkovich, & Roth, 2000). In a qualitative inquiry, Leahy and Anderson (2008) identify the perception of shared values as an important theme in responses from participants asked simply to discuss their trust in a natural resources manager. Further, Winter and Cvetkovich's (2010) quantitative analysis suggests that trust operationalized as salient values similarity is significantly related to perceptions of the efficacy of the USDA Forest Service's efforts to increase conservation behaviors.

Despite the unquestionable importance of this research literature, it is limited in three critical ways. The first and most important is that no research to date has investigated the influence of even the majority of the relevant attitudinal trust constructs simultaneously. Researchers instead tend to investigate only a subset of the constructs and therefore, no explicit understanding exists regarding their interrelationships or relative influence on trust intention or behavior. Second, previous work in natural

resources has typically measured trust exclusively in moderately to highly sophisticated (knowledgeable and experienced) individuals. The logic for these samples is typically that individuals who are most involved in and knowledgeable about natural resources issues are the most likely to act both in the assistance of and opposition to natural resource institutions' actions. Despite the soundness of this logic, the increasingly cross-cutting nature of natural resources issues implicates persons who would not otherwise have had contact with the natural resource institutions. Especially in the case of voluntary cooperation on private land, natural resource institutions are increasingly reliant upon these persons of lower sophistication for cooperation behaviors like granting access to private land and engaging in conservation-oriented land management on their property, but the relationship of the attitudinal trust constructs to these behaviors is not yet well understood for these individuals. A third limitation in this literature is a lack of sufficient attention to psychometric concerns in the existing measures. The great deal of conceptual overlap between these correlated constructs demands a careful psychometric attention to their development that has typically been overlooked. Although some researchers tend to use similar measures across their work, there are no generally accepted measures of these six constructs with strong evidence for validity. Instead most research typically either uses only single item measures – thereby exacerbating potential measurement error concerns – or a series of face valid items for which only limited measures of reliability or dimensionality are reported (e.g., Cronbach's Alpha and exploratory factor analyses; but see Smith, Leahy, Anderson, & Davenport, 2013). In order to address these limitations in the existing literature, the proposed research presents a model of trust in natural resource



institutions that explicitly hypothesizes the relationships of the six major attitudinal trust constructs identified in the literature (see Figure 2).

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INSERT FIGURE 2 HERE

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Drawing upon the relevant literature and previous work (e.g., Bornstein et al., 2013; Hamm et al., 2011; Hamm, PytlikZillig, Herian, Bornstein, Tomkins & Hoffman, 2013; Herian, Hamm, Tomkins, PytlikZillig, 2012; PytlikZillig et al., 2012), this research addresses three hypotheses embedded within the proposed model: 1) That the trust items used here will be reliable and unidimensional indicators of the six distinct constructs. 2) That the six attitudinal trust constructs will be significantly related to cooperation with a natural resources institution. 3) That the relationships between the attitudinal trust constructs and cooperation will be moderated by the sophistication – operationalized as knowledge and experience – of the trustor. Stated differently, cooperation is expected to be differentially predicted by the trust bases as a function of the sophistication of the trustor, such that for persons of limited sophistication, dispositional trust will be most predictive. With increased sophistication, however, salient values similarity, competence of the institution, care, procedural fairness, and confidence are expected to become more predictive at the expense of dispositional trust (see Hamm et al., 2013a; 2013b; Earle et al., 2007). The following two studies test the proportions of this model through a large random sample test of the relationships and distinctions among trust constructs and their independent influence on intention to cooperate with Nebraska Game and Parks by joining voluntary land owner programs as moderated by sophistication (Study 1) and a

smaller, more targeted sample test of the influence of the trust constructs on actual behavioral cooperation with natural resources management (Study 2).

### **Study 1**

As discussed above, contemporary natural resource institutions, as stewards of common pool resources (Vollan & Ostrom, 2010), typically rely heavily upon the public in managing natural resources. Natural resource institutions in Nebraska, however, stand in an especially complicated position because more than 95% of the state's land area is privately owned. Therefore, Nebraska's natural resource institutions often lack the legal jurisdiction to levy punishments against land owners who fail to cooperate with their efforts. This, coupled with the substantial resources necessary for incentivizing land owners' behavior, suggests that these institutions are typically best served by encouraging internally motivated cooperation, for example, through trust.

One natural resource institution in Nebraska that is particularly reliant upon voluntary cooperation in its efforts is the Nebraska Game and Parks Commission. The Commission is responsible for the "stewardship of the state's fish, wildlife, park, and outdoor recreation resources in the best long-term interests of the people and those resources" (Nebraska Game and Parks Commission, n.d.). One of the areas within the Commission's purview that is especially reliant on voluntary cooperation is land owner willingness to grant the Commission access to privately owned land for conservation action or to open the land for recreational use managed by the Commission. Land owners' willingness to grant access to the Commission is critical to its ability to effectively manage Nebraska's natural resources, especially in the rural areas of 44 Nebraska counties that the Commission has identified as its Target Areas (See Table 2),

but these kinds of programs have a long history throughout the United States (e.g., Wigley & Melchoirs, 1987).

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INSERT TABLE 2 HERE

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## **Method**

### *Participants*

Land owners with more than 20 acres of land were identified by Survey Sampling International from two lists of land owners within the targeted Nebraska counties. The first was a list of residences in the counties and the second was a list of farms that have used the United States government for a loan in the targeted counties. Both lists were limited to lots larger than 20 acres. Rural land owners were then identified by excluding all Nebraska urban areas by Zip Code (see Table 3; the excluded areas had an average population of 31,062 with a minimum of 2,631 and a maximum of 656,462). Duplicate addresses were eliminated, and a sample of 1716 was selected randomly from the remaining names (the sample size was chosen to achieve 600 responders as recommended by a power analysis, assuming a response rate of approximately 30%). The sample was then mailed a cover letter, a copy of the survey, a \$1 cash incentive, and a business reply envelope.<sup>6</sup> All non-responders were mailed a reminder postcard ten days later and a replacement survey packet, without the incentive, ten days after the postcard. Six hundred forty-five land owners returned the survey (a response rate of 38%). The majority of the resulting sample self-reported as male (77%), white (96%), and owned

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<sup>6</sup> Data collection for Study 1 was conducted by the University of Nebraska-Bureau of Sociological Research (<http://bosr.unl.edu>).

more than 100 acres of rural land (75%). The plurality of the sample was Republican (50%) and conservative (37%) or leaning conservative (an additional 17%), and the sample had an average age of 61.

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INSERT TABLE 3 HERE

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### *Measures*

Land owners completed an 8-page paper survey that included measures of the participant's sophistication (knowledge and experience) with, trust in, and intention to cooperate with the Nebraska Game and Parks Commission as well as questions regarding perception of risk in cooperating with the Commission (see Appendix A for a complete list of Study 1 items). Participants also completed questions about their own environmental concern, perceptions of the trustworthiness of others generally, political leanings, and other demographics discussed above (e.g., age, gender, number of rural acres owned). The following section presents the construct measures and limited evaluations of their reliability (Cronbach's Alpha) and dimensionality (Exploratory Factor Analysis). Model based evaluations are reported later in the results section.

*Sophistication.* Sophistication was measured by assessing the land owner's subjective and objective knowledge about the Commission and experience with it. *Subjective knowledge* was assessed with four items that asked participants to respond to how well they felt they knew the Commission generally as well as its practices, policies, and goals on five-point scales labeled from "not at all knowledgeable" (1) to "extremely knowledgeable" (5). The four items exhibited good internal consistency ( $\alpha = .92$ ; see Table 4) and, in a

Principal Axis Factor analysis, loaded on a single factor (loadings > .8) that accounted for 74% of the variance in responses. A scale was created by averaging the four items which yielded a slightly low mean of 2.29 (roughly corresponding to slightly knowledgeable) and a standard deviation of 0.79 (skew = 0.33 and kurtosis = 0.01).

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INSERT TABLE 4 HERE

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*Objective knowledge* was assessed using three factual questions about the Commission. The questions asked which of three potential options were actual sources of funding for the Commission (correct response was “all of the above”), which of four areas the Commission could set legally enforceable regulations (correct response was “all land in the state of Nebraska, including privately owned land”), and how members of the Commissions’ Board of Commissioners are selected (correct response was “appointed by the governor”). The three questions revealed poor internal consistency ( $\alpha = .10$ ), which was not surprising given that the items measured three different areas of knowledge about the commission – its funding, jurisdiction, and leadership. Evaluation of the individual questions indicated that the funding question was most difficult with 62% of participants responding incorrectly. The responses to the remaining two objective knowledge questions were somewhat more accurate with 42% and 49% of participants responding incorrectly to the jurisdiction and leadership questions, respectively. Overall, participants largely reported low objective knowledge, with the majority of the sample getting one or no questions correct (55%). Only 34% of the sample was able to answer two correctly and 12% answered all three. Because the three items failed to cohere sufficiently to be

treated as a scale both here and in the model reported below, the subsequent analyses focus only on the single item regarding the Commission's jurisdiction. This item was chosen because of its roughly even distribution of accurate and inaccurate responses and its greater conceptual relevance to knowledge about the institution (as compared to the institution's funding and leadership which were more difficult to answer correctly for the current sample).

*Experience* was measured using four items that asked how often the participant attended meetings of, was personally financially affected by, has personal contact with, or recreationally uses the land of the Nebraska Game and Parks Commission. Responses were scored on a 1 ("never") to 5 ("weekly") scale (2 = "once every few years;" 3 = "once every year;" 4 = "monthly"). The majority of the sample had little experience with the Commission, with the majority or plurality of participants indicating they "never" attended Commission meetings (90%), have been financially affected by its decisions (63%), or personally interact with the staff (44%). Twenty-seven percent of the sample also indicated that they never used Commission land for recreation, but the majority (67%) indicated that they recreationally used Commission land once every few years (28%), once a year (24%) or monthly (16%). These items also failed to yield good internal consistency here ( $\alpha = .58$ ) and in the model reported below and thus were not averaged to create a scale. Instead the analyses focus only on the item that measured the participant's experience with the Commission's staff because of its conceptual relevance to experience with the institution.

*Trust.* Trust was measured next as the participant's agreement with a series of 20 statements. Participants responded on a 7-point Likert-Type scale which was labeled

from “strongly disagree” (1) to “strongly agree” (7) with “neither agree nor disagree” at the mid-point (4; 2 = “disagree;” 3 = “somewhat disagree;” 5 = “somewhat disagree;” 6 = “agree”). Statements within this block were randomized but presented in the same order to all participants. The scales were evaluated as part of a larger grant which started with a large bank of 109 items from the relevant literature and was developed by the researchers (Tomkins, Bornstein, Herian, & PytlikZillig, 2011-2014). In this grant, the items were completed by university students and community members and evaluated via Confirmatory and Item Factor Analytic approaches to identify the shorter series measures used here.

*Dispositional trust* was measured using three items modified from the General Social Survey and previous work (Hamm, et al., 2011; Hamm, et al., 2013a). The items asked participants to report their agreement with three statements that “most people” can be trusted, try to be fair, and try to be helpful on the 1 (strongly disagree) to 7 (strongly agree) scale described above. The three items yielded good internal consistency ( $\alpha = .81$ ) and loaded on a single factor (loadings  $> .55$ ) that accounted for 64% of the variance in a PAF analysis. The items were averaged to create an item-total scale that had a mean of 5.02 (roughly corresponding to “somewhat agree”), standard deviation of 0.91 and was largely normal in the third and fourth moments of its distribution (skew = -1.00; kurtosis = 1.07).

*Care* was measured using a 3-item scale assembled by the researchers. The items asked the participant to respond regarding their agreement with the notion that the Commission cares about local residents generally, makes its decisions out of concern for local residents, and puts aside its interests in making decisions that are right for the

community. The items yielded a Cronbach's Alpha of .80 and loaded on a single factor (loadings > .65) that accounted for 58% of the variance in responses. The resulting item average scale had a mean of 4.49 (roughly corresponding to "somewhat agree"), standard deviation of 1.10, skewness of -0.72, and kurtosis of 0.69.

*Competence* was measured using a 4-item scale assembled by the researchers which asked participants to respond to their agreement regarding statements about the Commission's decision makers; namely, their having the requisite competence, skills, and knowledge to do their jobs and their status as highly qualified. The four items were internally valid as assessed via Cronbach's alpha ( $\alpha = .92$ ) and loaded on a single factor (loadings > .8) that accounted for 75% of the variance in responses. The resulting item average scale had a mean of 4.69 (roughly corresponding to "somewhat agree") and standard deviation of 1.09 (skew = -0.60; kurtosis = 0.58).

*Confidence* was measured using a 4- item scale assembled by the researchers. Participants rated their agreement with statements that argued that their confidence in the Commission was high, they were confident the Commission would do its job, believed that the Commission would perform its functions as it should, and that the Commission does its job well. The items were internally reliable ( $\alpha = .94$ ), loaded on a single factor (loadings > .85) that accounted for 79% of the variance in responses and yielded an item-total scale with a mean of 4.79 (roughly corresponding to "somewhat agree"), standard deviation of 1.20, skew of -0.95 and kurtosis of 0.81.

*Procedural fairness* was measured using a 3- item scale assembled by the researchers. The scale included items that assessed the perceived fairness of the Commission's procedures generally, its dealings with the community, and the



Commission's treatment of the participant specifically. The items were internally reliable ( $\alpha = .85$ ) and loaded on a single factor (loadings  $> .75$ ) which accounted for 67% of the variance in responses. Averaging the items yielded a scale which had a mean of 4.73 (roughly corresponding to "somewhat agree") and standard deviation of 1.07 and was roughly normal in the third and fourth moments of its distribution (skew = -0.69; kurtosis = 0.93).

*Salient values similarity* was measured using three items from Cvetkovich and Winter (2003) as amended to address the Nebraska Game and Parks Commission. The items asked participants to respond regarding their agreement with statements indicating that they believe the Commission shares their values, that they share the Commission's values and that they believe that the Commission supports their values about natural resource regulation. The items yielded good internal consistency ( $\alpha = .89$ ) and loaded on a single factor (loadings  $> .8$ ) that accounted for 74% of the variance in responses in a Principal Axis Factor analysis. The three items were therefore averaged to create a single scale that had a mean of 4.59 (roughly corresponding to "somewhat agree") and standard deviation of 1.21 (skew = -0.80; kurtosis = 0.56).

*Intent to Cooperate.* Cooperation intention was measured next in the survey with items that assessed willingness to cooperate with the efforts of the Commission to effectively manage Nebraska's natural resources. Participants were asked to complete four questions regarding how likely they felt they were, as of when they completed the survey, to participate in voluntary Commission land owner programs that allowed the Commission direct access to their land for conservation action or allowed the Commission to manage public access for recreation. Note that both questions were asked with and without

financial incentive, creating four questions. Importantly, in actuality, these two land owner programs only exist with financial incentive, but because of an interest in the role of trust in predicting cooperation without financial incentive, the extra two questions were included. Roughly  $\frac{1}{4}$  of participants indicated that they were “undecided” on all four questions (see Table 5). Forty-nine percent and 58% indicated that they were very unlikely, unlikely, or somewhat unlikely to participate in the non-incentivized conservation and access programs, respectively. Forty-four percent, however, indicated that they were very likely, likely, or somewhat likely to participate in the conservation program with financial incentive, while 42% indicated that they were still very unlikely, unlikely, or somewhat unlikely to participate in the access program even with the financial incentive. Repeated measures t-tests indicated that all six mean comparisons were significant, such that participants were always more likely to cooperate in the presence of financial incentive, but when incentive was held constant, conservation programs were favored over access.

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INSERT TABLE 5 HERE

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*Cooperation Risk.* Participants were also asked if they perceived any risk in participating in the access or conservation programs. The responses were roughly equivalent regarding the perception of risk in the conservation program (yes = 51%; no = 49%), with most participants indicating that the risk was “very important” for their decision (54%; 12% = “not important”). A higher percentage of participants perceived risk in the access program (versus the conservation program), with 61% indicating some level of risk in

participation, and 59% indicated that this risk was “very important” to their decision to participate (“not important” = 13%). To better understand the perceived risks, participants were also asked to include examples. Consistent with previous research, the most common risks identified for both programs concerned liability and control over the land (see Wigley & Melchior, 1987).

*Environmental Attitudes.* Participants finally completed the revised New Environmental Paradigm scale (rNEP; Dunlap, Van Liere, Mertig & Jones, 2000). The scale includes 15 items and is an update to the older NEP scale (Dunlap & Van Liere, 1978) which measures “beliefs about humanity’s ability to upset the balance of nature, the existence of limits to growth for human societies, and humanity’s right to rule over the rest of nature” (Dunlap, Van Liere, Mertig & Jones, 2000, p. 427). The previous scale has been used extensively to measure environmental worldviews and has been found to distinguish reliably between environmentalists and the general public or non-environmental interest groups and is predictive of relevant behavior and behavioral intention (see, Dunlap, Van Liere, Mertig & Jones, 2000). The revised scale improves on the original scale in three ways: “(1) it taps a wider range of facets of an ecological worldview, (2) it offers a balanced set of pro- and anti-NEP items, and (3) it avoids outmoded terminology” (p. 425). After reverse coding negative items, the 15 items yielded good internal consistency ( $\alpha = .87$ ), but an Exploratory Factor Analysis with oblique rotation and PAF extraction revealed a four-factor solution. Because of the high internal consistency, however, the items were averaged to create a single scale with a mean of 4.20 (roughly corresponding to “neither agree nor disagree”), standard deviation of 0.93, skew of 0.09, and kurtosis of 0.73.

## Results

### *Missing Data Analysis*

The far majority of participants had complete data ( $n = 583$ ; 90%), but missing data analyses were conducted to evaluate the influence of demographics, trust, and sophistication on missingness in the variables of interest. Three count variables were constructed to account for the number of missing data points on the trust, sophistication and cooperation/risk variables. All three variables had a minimum of zero and a maximum such that all of the items counted were missing and, as would be expected in a count variable, were significantly positively skewed and kurtotic. The count missing variables were then regressed on demographics and item total scales of the trust and sophistication constructs via generalized models. None of the resulting models was significant, so the data were assumed to be MAR and appropriate for the subsequent analyses.

### *Attitudinal Trust Construct Confirmatory Factor Analysis*

In order to evaluate the dimensionality and reliability of the attitudinal trust items, the trust items were next subjected to confirmatory factor analysis using Mplus v.7. These models directly account for potential measurement error by explicitly modeling the covariance in items such that any variance shared by items is deemed “true score” and any unshared variance, “error.” Statistically, then, individual scores are modeled as follows,

$$Y_{is} = \mu_i + \lambda_i F_s + e_{is},$$

where an individual's (i) observed score ( $Y_{is}$ ) is made up of its intercept ( $\mu_i$ ) plus the individual's factor score ( $F_s$ ) weighted by its loading on, or relationship to, the factor ( $\lambda_i$ )

and any error of the item and subject ( $e_{is}$ ). Importantly, confirmatory factor analyses permit  $p$ -value tests of the hypothesized dimensionality of measures by essentially subtracting an observed matrix of the covariance in the items from a hypothesized matrix based on the relationships specified by the researcher. The result of these subtracted matrices is the fit index that provides the basis for the  $\chi^2$  test of exact fit by testing whether the fit index is statistically different from zero. As a  $\chi^2$  test, however, this fit statistic is particularly influenced by sample size and model complexity. Therefore, many researchers suggest relying on alternative fit indices like the Comparative Fit Index (CFI) and Tucker Lewis Index (TLI; for which values greater than .95 are recommended), the Root Mean Square Error of Approximation (RMSEA; for which values less than .08 are recommended) and its accompanying test of close fit (for which non-significance is indicative of good fit), and the Standardized Root Mean-Square Residual (SRMR; for which values less than .05 are recommended; Hu & Bentler, 1998).

In the first trust item Confirmatory Factor Analysis model, the items were estimated as indicators of their latent construct in a six-factor model, saturated such that all correlations among the six factors were estimated. The latent constructs were identified by setting the factor means to 0 and their variances to 1 (i.e., a z-score approach), thereby allowing all of the loadings to be estimated freely. The model was estimated using Maximum Likelihood-Robust (MLR), which differs from the more common Maximum Likelihood (ML) estimator only in its inclusion of a correction factor for non-normal data. Importantly, when the data are normal (correction factor = 1), the results converge to those of ML. The model fit moderately to the data,  $\chi^2(155) = 514.11$ ,  $p < .001$ ; CFI = .95; TLI = .94; SRMR = .04; RMSEA = .06,  $p = .002$ , and indicated that

all 20 items loaded significantly on their hypothesized factors (standardized loadings > .55,  $p$ 's < .001, S.E.'s  $\leq$  .04). Evaluation of the normalized residual covariances revealed none greater than 3 and only four positive residuals greater than 2 (*dt3* and *icon3*; *dt3* and *icon4*; *care3* and *dt3*; *dt3* and *svs3*), indicating that they were somewhat more related than hypothesized by the model. Evaluation of the modification indices indicated three changes to the model that would result in a chi-square change greater than 30, specifically one additional loading (*care* by *comp3* = 36) and two error covariances (*comp4* with *icon2* = 36; and *comp3* with *comp2* = 80). Because of the relatively high expected increase in fit and its conceptual and statistical redundancy with *comp4* ("most Commission decision makers have the skills to do their job"), *comp3* ("most Commission decision makers have the knowledge necessary to do their jobs") was removed from the model. The model was re-estimated with the remaining 19 items specified and identified as before. The model fit well to the data,  $\chi^2(137) = 381.03$ ,  $p < .001$ ; CFI = .96; TLI = .95; SRMR = .03; RMSEA = .05,  $p = .22$ , and as before, all items' standardized loadings were significant on their hypothesized factors at or greater than .6 (see Table 6). Evaluation of the normalized residual covariance matrix indicated no values over 3 but the same four positive values greater than 2 as in the previous model (*dt3* and *icon3*; *dt3* and *icon4*; *care3* and *dt3*; *dt3* and *svs3*), indicating stronger relationships than those hypothesized by the model. Note that all four residual covariances included item *dt3* ("I would say that most of the time people try to be helpful"), but given the good fit of the model and its necessity for local identification of the dispositional trust factor, it was included in subsequent analyses. The modification indices revealed only one recommended modification that would result in a chi-square increase greater than 30

(*comp2* with *pf1*), but the good fit of the model made its inclusion unnecessary. All six latent constructs yielded good evidence of reliability in model based reliability estimates ( $\omega$ ; see Table 7).

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INSERT TABLE 6 HERE

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Most of the latent constructs were significantly correlated with the exception of care and dispositional trust ( $r = .10$ ;  $p = .05$ ). In fact, dispositional trust's correlations with all five other latent constructs were relatively low ( $r$ 's  $< .20$ ;  $p$ 's  $> .008$ ) as compared to the other five trust constructs (confidence, care, competence, values similarity, and procedural fairness) which were all very strongly correlated ( $r$ 's  $> .85$ ,  $p$ 's  $< .001$ ; see Table 7). This extreme covariance among constructs meant that there was little independent covariance in the constructs, thus meaning that there would likely be insufficient independent covariance to identify significant independent predictive effects on outcomes in a structural regression. Conceptually, this suggests that the constructs did not seem to tap truly independent ideas in participants, challenging the conceptual distinctness of the items. Importantly, however, evaluation of the item wording shows that the constructs do, in fact, measure somewhat ostensibly different concepts. For example, questions about the similarity of the values of the Commission regarding natural resource regulation are distinct from the Commission's having the requisite

knowledge to manage resources which are, in turn, distinct from questions about the Commission's treatment of the participant. We, therefore, estimated another model which accounted for the potential distinctions among constructs while accounting for the extreme covariance among five of them through the inclusion of a higher order factor (see Figure 3). In this model, the five excessively correlated constructs are included as indicators of a latent, more global institutional evaluation that underlies them. Because of the addition of the higher order factor, the lower-order latent factors were identified using the marker item approach in which the loading of the item with the highest loading from the previous model was set to one (see Table 6), and the higher order factor was identified using the z-score approach allowing for the estimation of all five of its loadings. The resulting model fit well to the data,  $\chi^2(146) = 401.74, p < .001$ ; CFI = .96; TLI = .95; SRMR = .03; RMSEA = .05,  $p = .30$ , and left all 19 items significant on their hypothesized factors (standardized loadings  $\geq 0.60$ , S.E.'s  $< 0.05$ ,  $p$ 's  $< .001$ ). The latent constructs also loaded significantly on the higher order factor (see Table 8) which was significantly correlated with latent dispositional trust ( $r = .13, p = .008$ ). The normalized residual covariance matrix revealed the same four residual covariances over 2 as the previous model, and the modification indices recommended the same error correlation between *comp2* and *pf1*. Although the model fit well to the data, it is important to note that its fit was statistically significantly worse than a model in which all six latent constructs were directly correlated ( $-2LL\Delta(9) = 20.96, p = .01$ ; see Table 9), but the use of a scaled (-2) log-likelihood test (scaled to approximate a chi-square value) with a large sample and complex model increased the probability that small (arguably not meaningful) differences would be significant.



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INSERT FIGURE 3 HERE

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INSERT TABLE 8 HERE

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Given the excessive correlations of the model and the statistically poorer fit of the higher order factor model, a third model was also tested in which the indicators of the five highly correlated factors were estimated as indicators of a single factor (dispositional trust was again included as a correlated latent factor). The model fit moderately to the data,  $\chi^2(151) = 528.36, p < .001$ ; CFI = .94; TLI = .93; SRMR = .04; RMSEA = .06,  $p < .001$ , and revealed significant loadings for each of the 16 items on the single factor greater than 0.60 (see Table 10). The model revealed the same four large ( $> |2|$ ) residual covariances involving *dt3* (“I would say that most of the time people try to be helpful”) as in the correlated factors model and revealed 8 recommended error covariances that would result in large ( $\chi^2\Delta > 20$ ) increases in model fit (see Table 10). Five of the error covariances were recommended between items originally hypothesized to be indicators of the same construct (*icon4* with *icon3*, *pf3* with *pf3*, *svs1* with *svs3*, *svs2* with *svs3*, *comp1* with *comp4*), and three were recommended between items hypothesized to indicate different factors (*pf1* with *icon2*, *comp2* with *pf1*, *comp2* with *svs1*). Like the previous,

higher order factor, the model fit significantly worse than the correlated constructs model ( $-2LL\Delta (14) = 129.92, p < .001; -2LL\Delta/df = 9.28$ ; see Table 9), but the difference in fit between this model and the correlated constructs model was substantially larger than the difference between the higher order and the correlated factors models ( $-2LL\Delta (9) = 20.96$ ), especially when considered in light of the changes in model parameters ( $-2LL\Delta/df = 2.33$ ). The excessive covariance in the correlated factors solution made it untenable. Given this, the fact that the higher order factor model fit well, and the fact that the single factor solution fit was more worse than the higher order factor model, the higher order model was accepted as the best representation of the data.

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INSERT TABLE 10 HERE

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### ***Trust and Cooperation***

To test the influence of the trust constructs on cooperation, a confirmatory factor model was estimated next that differed from the previous higher order factor model in the inclusion of the four cooperation variables as indicators of a latent cooperation factor. The cooperation factor was identified using the z-score approach in order to allow the estimation of the item loadings. The resulting model provided limited fit to the data,  $\chi^2(222) = 768.93, p < .001$ ; CFI = .93; TLI = .92; SRMR = .04, RMSEA = .06,  $p < .001$ , though all four cooperation items loaded significantly on their factor (standardized loadings  $> 0.65, p$ 's  $< 0.001, S.E. < .05$ ). Evaluation of the residual covariance matrix revealed one large residual covariance involving the cooperation items and an item on another scale (*coaccfin* [cooperation with the access program with financial incentive])

and  $svs3 = 2.03$ ), but three among the items on the cooperation factor (*coaccfin* and *coconno* [cooperation with the conservation program without incentive] = -3.55; *coconfin* [cooperation with the conservation program with financial incentive] and *coaccno* [cooperation with the access program without incentive] = -2.75; *coaccfin* and *coconfin* = 2.92), indicating that the two items that included financial incentive were more strongly related to each other than argued by the model, while the items that did include financial incentive were less related to those without financial incentive than expected by the model. These relationships were corroborated by the modification indices which suggested large ( $\chi^2\Delta > 100$ ) chi-square increases for the inclusion of error correlations between *coconfin* and *coaccfin* ( $\chi^2\Delta = 148.78$ ) and between *coaccno* and *coconno* ( $\chi^2\Delta = 154.96$ ).

The model was, therefore, re-estimated with the four items as separate but correlated criterion variables. The resulting model fit well to the data,  $\chi^2(214) = 503.25$ ,  $p < .001$ ; CFI = .96; TLI = .96; SRMR = .03, RMSEA = .05,  $p = .89$ , and revealed that while the higher order factor was significantly correlated with all of the cooperation variables ( $r$ 's  $> .2$ ), dispositional trust never was ( $p$ 's  $> .5$ ). A structural equation model was then estimated in which the higher order factor and dispositional trust were entered as predictors of the four cooperation constructs with correlated error terms. As an equivalent model, it again fit well to the data and, as hypothesized, revealed the same pattern of relationships as the correlations model above (see Table 11). The higher order factor significantly predicted *coconno*, *coaccno*, *coconfin*, and *coaccfin* but dispositional trust was never a significant predictor. The variance accounted for by the regressions was significant but somewhat limited (see Table 11).

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INSERT TABLE 11 HERE

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Next, in order to understand the influence of attitudinal trust in light of other potential drivers, a second model was estimated in which the average of the four subjective knowledge items, objective knowledge about the institution's jurisdiction (coded 0 = wrong; 1 = correct), reported experience with staff, whether the participant perceived any risk in the specific program (coded 0 = no risk; 1 = risk), and environmental concern (operationalized as the average of the rNEP items) were entered as additional observed predictors of the cooperation variables. Model fit was somewhat limited,  $\chi^2(334) = 759.75, p < .001$ ; CFI = .94; TLI = .93; SRMR = .08; RMSEA = .05,  $p = .41$ , but revealed that the higher order factor maintained its significant independent predictive influence on all four cooperation constructs (see Table 12), while dispositional trust's influence remained non-significant. Across models, perceived risk was also typically predictive (with the exception of cooperation with a conservation program with financial incentive), such that those who perceived risk were less likely to cooperate. Importantly, perceived risk was most predictive of cooperation with the access programs (for which participants reported more perceived risk). Objective and subjective knowledge and experience were not significant except in predicting cooperation with a conservation program with financial incentive for which subjective knowledge emerged with a significant independent effect, such that individuals with more subjective knowledge were more likely to indicate they would cooperate. Environmental concern was also only predictive of cooperation with the conservation program with financial

incentive, such that participants who reported more environmental concern were more likely to indicate an intention to cooperate. The variance accounted for by these regressions was only slightly increased as compared to the previous models.

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INSERT TABLE 12 HERE

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### *Sophistication Variable Confirmatory Factor Analysis*

In order to best operationalize sophistication for the sophistication moderation test, the sophistication variables were next subjected to latent factor analysis. The 11 items were entered as indicators of their respective latent constructs, but because of the binary nature of the objective knowledge questions (coded 0 = wrong, 1 = correct), item factor analysis was utilized (see Wirth & Edwards, 2007). Item factor models explicitly account for categorical data by assuming that the categorical responses represent an underlying continuous latent trait, in this case, objective knowledge. These models assume that at a certain point along the distribution of the latent construct lies a threshold at which individuals above the threshold and individuals below the threshold will respond differently. Thus, in these models, these thresholds are modeled as,

$$x_{ij} = c, \text{ if } \tau_{jc} < x_{ij}^* < \tau_{jc+1},$$

where the observed response ( $x_{ij}$ ) is the categorical responses ( $c$ ), if the observed response falls between the lower ( $\tau_{jc}$ ) and upper threshold bounds ( $\tau_{jc+1}$ ). Importantly, these models do not account for error which is held constant at 1. As with the previous models, the fit of these models was evaluated primarily via the CFI and TLI (values greater than .95 are recommended for good fit) and the RMSEA (values less than .08 are

recommended for good fit) along with its accompanying test of close fit (non-significance is recommended for good fit; Hu & Bentler, 1998). In addition, the Weighted Root-Mean Residual was also evaluated, a fit statistic specific to binary or continuous models (values less than 1 are recommended for good fit; Muthén & Muthén, 1998)

The model was estimated using the Weighted Least Squares-Mean and Variance correction estimator (WLSMV). The model fit well to the data,  $\chi^2(41) = 77.59, p < .001$ ; CFI = .96; TLI = .95; WRMR = .75; RMSEA = .04,  $p = .95$ , but left only the subjective knowledge and experience items significant on their factors. Subjective knowledge's factor structure was largely unremarkable (standardized loadings  $> .75$ ;  $p$ 's  $< .001$ ), but experience included one relatively high (standardized loading<sub>exp3</sub> = .68) and one relatively low loading (standardized loading<sub>exp4</sub> = .45). Objective knowledge, however, yielded no significant loadings. Given this additional evidence that these items were poor candidates for a scale, the analyses focused on the single objective knowledge and experience questions most conceptually relevant to sophistication with an institution (objective knowledge about its jurisdiction and experience with its staff). An additional model was, therefore, estimated with subjective knowledge modeled as before (a latent factor with four item-level indicators). Objective knowledge and experience were entered as single observed variables (categorical and continuous respectively) and were correlated with subjective knowledge. The model fit well to the data,  $\chi^2(8) = 25.71, p = .001$ ; CFI = .97; TLI = .95; WRMR = .42; RMSEA = .06,  $p = .25$ , and revealed significant correlations among all three sophistication measures ( $r_{\text{subjective knowledge.objective knowledge}} = .27, p < .001$ ;  $r_{\text{subjective knowledge.experience}} = .57, p < .001$ ;  $r_{\text{objective knowledge.experience}} = .34, p < .001$ ).

### ***Moderation Model***

To test the sophistication moderation hypothesis, a series of invariance tests were conducted that estimated separate models for individuals who were high and low on each sophistication construct (objective knowledge regarding the institution's jurisdiction, subjective knowledge, and experience with its staff). To that end, two binary variables were created which indicated participants who were above or below the mean of the item average scale for the subjective knowledge and the single experience item. Because the objective knowledge item was already dichotomous (correct/incorrect) it was not recoded. The three variables roughly divided the sample in half with 55% below the mean of subjective knowledge ( $M = 2.29$ ). Fifty-eight percent of the sample was correct on the objective knowledge question and 59% was above the mean of experience ( $M = 2.33$ ).

Before testing the moderating influence of each of the sophistication constructs on the regression coefficients, metric (indicator loadings), scalar (indicator means), and residual (indicator error) invariance were first tested between groups for each sophistication variable. By systematically constraining the relevant model parameters to be equivalent across groups, invariance tests identify the extent to which the model parameters are statistically equivalent across groups. Thus, if a parameter constraint results in a significant decrease in model fit, it indicates that the parameters are not statistically equivalent. In the current situation, invariance testing is important because it determines the extent to which the latent factors can be reasonably assumed to be the same thing for both groups and simplifies the interpretation of the moderation test that follows.

As reported in the top panel of Table 13, the lower order factor model was fully invariant for individuals above and below the mean of subjective knowledge at the metric (factor loading) level. At the scalar (item mean) level, however, constraints resulted in a significant decrease in model fit which was indicative of non-invariance. The modification indices suggested freeing the item mean for *pf3* (“I have generally been treated fairly by Game and Parks”;  $\chi^2\Delta = 8.42$ ) for which individuals below the mean of subjective knowledge had less positive responses ( $M = 4.80$ ) than individuals above the mean ( $M = 5.24$ ). After freeing the item mean to be different across models, both partial scalar and partial residual<sup>7</sup> (error variance) invariance held for the models. The invariance of the higher order model was tested next (see the middle panel of Table 13). For identification, marker items were added to the lower order factors, and *pf3*'s mean and error variance were not constrained. Metric invariance held as did scalar invariance, but it is important to note that because the latent factor means had been set to zero, the metric and scalar invariance models were equivalent (and thus not testable). Residual invariance, however, failed for the model, but after freeing the latent procedural fairness error variance ( $\chi^2\Delta = 10.18$ ), partial residual invariance was achieved for the higher order model. Having tested the invariance of the lower and higher order models, the moderation of the effects of the higher order factor and dispositional trust on cooperation by subjective knowledge was tested next. As reported in the bottom panel of Table 13, none of these comparisons was significant, indicating that the pathways were statistically equivalent for individuals above and below the mean of subjective knowledge.

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<sup>7</sup> Note that a finding of non-invariance at a lower level requires that the model parameter be freed at all subsequent levels. Therefore, when testing residual invariance, both the mean and the error variance for item *pf3* were freed.



INSERT TABLE 13 HERE

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Next the invariance of the model across levels of objective knowledge of the institution's jurisdiction was tested. As reported in the top two panels of Table 14, lower order invariance held through the residual level and the higher order invariance held up to residual invariance. The modification indices recommended freeing the error variance for the latent care factor ( $\chi^2\Delta = 7.35$ ) and upon doing so, the model achieved partial residual invariance. Objective knowledge's moderation of the higher order and dispositional trust regression coefficients was then tested. As reported in the bottom panel of Table 14, three of these effects were significant. For the regression of the higher order factor on cooperation with access programs without financial incentive, the model revealed that individuals who responded incorrectly to the objective knowledge question about the Commission's jurisdiction had a weaker effect for the higher order factor on cooperation ( $\beta = .16; p = .02$ ) than did individuals who responded correctly ( $\beta = .34; p < .001$ ). Additionally, individuals who responded incorrectly had a stronger, albeit non-significant, effect for dispositional trust on cooperation with the conservation program without financial incentive ( $\beta = -.11; p = .12; \beta_{\text{correct}} = .05; p = .29$ ) and on cooperation with the access program without financial incentive ( $\beta = -.12; p = .09; \beta_{\text{correct}} = .06; p = .22$ ).

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INSERT TABLE 14 HERE

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Finally, model invariance across levels of experience with the institution's staff was tested. As reported in the top panel of Table 15, the metric invariance held, but constraining the item means resulted in a significant decrease in model fit. Following the suggestions of the modification indices, both *pf3* ("I have generally been treated fairly by Game and Parks";  $M_{\text{less experienced}} = 4.80$ ;  $M_{\text{more experienced}} = 5.25$ ;  $\chi^2\Delta = 12.27$ ) and *care2* ("Most decision makers of Game and Parks care about residents in the area they regulate";  $M_{\text{less experienced}} = 4.56$ ;  $M_{\text{more experienced}} = 4.88$ ;  $\chi^2\Delta = 9.45$ ) were freed and the both the lower order and higher order models achieved invariance through the residual level. After testing the invariance of the models, the moderation of the effects of the higher order factor and dispositional trust on the four conservation items was tested. As reported in the bottom panel of Table 15, only the effect of the higher order factor on cooperation with the access program without financial incentive was significant, such that individuals below the mean of experience had a weaker (non-significant) effect ( $\beta = .15$ ;  $p = .14$ ) than that for individuals above the mean ( $\beta = .41$ ;  $p < .001$ ).

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INSERT TABLE 15 HERE

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## Discussion

The results here shed some light on the major questions posed by this research. Regarding the reliability of the measures, the results indicate that the 19 items are reliable measures of the six constructs. All six scales had model-based reliability estimates greater than .80, indicating that more than 60% of the variance in the items was shared. Regarding the dimensionality of the constructs, although the good fit of the

multidimensional confirmatory factor models indicates that the constructs are in fact, statistically separable, the results are somewhat more complicated than this. Specifically, the excessive correlations between five of the constructs indicate that although the relationships between the items can be explained by the relationships between latent constructs, the latent constructs themselves are roughly singular. Thus, the data argue that these five constructs might be most usefully conceptualized as indicators of an underlying higher order factor. Conceptually, this argues that for most people, most of the time, people will rely heavily on the underlying (in this case, higher order) evaluation in determining their evaluations of the five constructs. This makes sense because participants who lack salient information distinguishing these ideas from each other would, presumably, use what information they do have in responding to the other items. For example, participants who cannot recall specific positive or negative treatment or do not know how competent the Commission is might answer based on how well they feel the Commission represents their values or more inclusive evaluations like confident expectations about the Commission.

The results also shed light on the relative influence of the attitudinal trust constructs on cooperation intention. Although the lack of independent variance in the five constructs makes their sharing significant independent predictive variance with cooperation functionally impossible, the higher order factor was independently predictive of cooperation intention. Conversely, dispositional trust was neither significantly correlated nor independently predictive in any of the models reported here. These results indicate that in the context of access and conservation programs both with and without financial incentive, the participants' willingness to say they would participate is driven

only by the institution specific evaluations and is not related to the participant's dispositional willingness to trust others across situations. Notably, however, the variance accounted for by the higher order factor was limited (less than 10% of the variance in all four cooperation variables). Importantly, though, the effect of the higher order trust factor persisted even when the perception of risk in the specific program, sophistication, and environmental concern were entered into the model and, in fact, remained the strongest predictor (but note that the use of latent factors would eliminate some error variance, thereby increasing their relationship as compared to observed variables).

Finally, the results shed light on the hypothesized sophistication moderation. Following the lead of previous work, it was hypothesized that the predictive ability of the attitudinal trust constructs would depend on the level of the participant's sophistication. Although the results do provide some support for this hypothesis, the support is very limited. In place of the cleanly hypothesized increases in predictive ability for the institution specific constructs (in this case, the higher order factor) and decreases for dispositional trust as a function of increased sophistication, only individual relationships were moderated when any were moderated at all. In the case of subjective knowledge, the invariance tests revealed no significant interactions. Objective knowledge, however, did moderate the influence of the institution specific evaluations and dispositional trust on cooperation with access (and, in the case of dispositional trust, conservation) programs without financial incentive. As hypothesized, more knowledgeable participants had a stronger relationship between institution specific evaluations and cooperation and a weaker relationship for dispositional trust. For experience, only the influence of the institution specific constructs on cooperation with the access program without financial

incentive was moderated. It is important to note that although all four of these significant moderations are in line with the hypotheses, they represent 17% of the expected moderations and, although significant, only once changed the significance of the effect moderated (the higher order factor was almost always a significant predictor while the effect of dispositional trust was almost always non-significant). It is possible that the hypothesized moderation only occurs for some of the sophistication constructs in the face of non-incentivized cooperation, but even if this is the case, the results here provide less than sweeping evidence of the hypothesized sophistication moderation.

## **Study 2**

Study 2 was conducted to extend the results of Study 1 by incorporating measures of actual cooperation behavior. To that end, a survey of Nebraska land owners whose land is of importance to the Southeast Nebraska Flagship Initiative was conducted. The Initiative is a cooperative effort of the Nebraska Game and Parks Commission, the Northern Prairies Land Trust, the Spring Creek Audubon, and the Nature Conservancy that provides technical assistance and monies to land owners for conservation projects. Although these projects can include any agreed upon conservation efforts, the far majority of the Initiative's efforts surround the prevention of arboreal incursion into Nebraska's native tallgrass prairie. While the program is often able to accomplish its short term goals in these restoration actions (usually tree removal), the continued conservation oriented land management of the land owners beyond the scope of the program is vital. Most critically, these land owners must burn the grassland on their property periodically in order to preserve the native prairie ecosystem and prevent

arboreal incursion (Lett & Knapp, 2005), thus making land owner cooperation critical in this context (Morton, Regen, Engle, Miller, & Harr, 2010).

## **Method**

The Study 2 survey was mailed to 223 Nebraska land owners whose land had been identified by the Initiative as important to their efforts. Initial survey packets were sent in January and February of 2013 with a reminder postcard sent out to all non-responders in April. Of the complete sample, 59 individuals returned the survey for a response rate of 26%. Because of an interest in cooperation, this study also included a longitudinal portion. As part of their normal operations, the Initiative provided an assessment of each participant's cooperation with their efforts in November of 2013 and simply identified whether the participant was currently cooperating with their efforts ( $n = 31$ ; yes = 74%; no = 26%).<sup>8</sup> Note that within these broader two categories, cooperating individuals were further categorized into two additional groups (cooperating because they truly seem to understand the importance of conservation focused land management [ $n = 11$ ] and cooperating simply because they agreed to [ $n = 12$ ]) and two additional non-cooperation groups (appeared to intend to cooperate but failed to follow through [ $n = 6$ ] and never intended to follow through [ $n = 2$ ]). This variable is inherently subjective from the point of view of the institution, but it is important to consider for exactly that reason.

### ***Participants***

Participants self-identified as mostly male (64%), white (91%), and owning more than 100 acres of land (79%). A plurality identified as Republican (37%) or leaning Republican (7%; 10% independent, 20% Democrat, 7% leaning Democrat, 10% non-

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<sup>8</sup> Note that for some participants ( $n = 28$ ) this could not be reliably assessed for lack of information. Responses for these individuals were coded as missing.

political, 9% missing) and conservative (31%) or leaning conservative (17%; 19% moderate, 5% liberal, 12% leaning liberal, 9% non-political, 9% missing). The sample was roughly evenly divided on whether they had a previous contract with the Initiative (yes = 49%; no = 51%), and the average age was 62.7.

### *Survey Measures*

Participants completed much the same measures as in Study 1 with a few changes. First, because the survey was intended to address the Southeast Nebraska Flagship Initiative, the trust and sophistication questions were amended to target the Initiative. Additionally, because the Initiative is a cooperative effort of several environmental groups, trust and sophistication questions about the most salient partner (Nebraska Game and Parks Commission) were also included. This group was argued to be most salient because much of the Initiative's equipment (e.g., trucks) prominently displays Commission logos. Other than the addition of the items addressing the Initiative, the trust items used were identical to those in Study 1 and yielded comparable means and reliability (see Table 16). Notably, Study 2 participants reported significantly higher evaluations of competence, confidence, procedural fairness, and salient values similarity for the Initiative than the Commission. Also note that, as in Study 1, objective knowledge and experience failed to yield good reliability in assessing the Initiative ( $\alpha_{\text{obk}} = .27$ ;  $\alpha_{\text{exp}} = .43$ ) or the Commission ( $\alpha_{\text{obk}} = .41$ ;  $\alpha_{\text{exp}} = .43$ ), so the analyses again focused on the single items most relevant to sophistication with the institution. For the Commission, the objective knowledge questions that focused on the institution's jurisdiction and experience with staff were again used. For the Initiative, however, the objective knowledge question about the institutions who partnered together to create the Initiative

was used (because the Initiative has no binding jurisdiction) in addition to the experience with staff question.

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INSERT TABLE 16 HERE

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The second major change from the Study 1 survey was the inclusion of questions about cooperation behavior and attitudes toward the critical land management technique. As discussed above, the majority of the Initiative's efforts surround the prevention or remediation of arboreal incursion into the native Nebraska prairie. Tree removal is often the first step of these projects, but the trees' return is likely unless land owners adopt intentional land management strategies, most importantly including periodic burning. Periodic burning is therefore a critical cooperative behavior for the Initiative and was assessed in questions that asked whether land owners currently engaged in periodic burning on their land, whether they intended to engage in periodic burning in the future, whether they perceived any risks to themselves in engaging in periodic burning, and a series of questions about their attitudes towards burning as a land management practice. As reported in Table 17, most participants were currently engaging in periodic burning (70%) and intended to do so into the future (80%) despite overwhelmingly perceiving some level of risk in doing so (87% perceived some risk). As before, participants were asked to write in examples of the perceived risks, and the most common responses involved the unpredictability of fire and resultant damage to intentionally or unintentionally burned property. Although periodic burning is a major part of cooperation for most land owners, the institutional cooperation variable discussed above may take



much more into account. Therefore the congruence of the two measures was tested. A chi-square analysis revealed a non-significant relationship between the two variables ( $\chi(1) = 0.35, p < 1.00; r = .11$ ) but did show that only one individual who indicated that he/she was not currently burning was identified as cooperating with the Initiative.

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INSERT TABLE 17 HERE

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In addition to these burning questions, the survey also asked participants a series of questions to assess their attitudes towards periodic burning as a land management tool. Participants were asked to report their agreement with seven statements: periodic burning is an important tool, periodic burning has benefits beyond prairie restoration, periodic burning is too dangerous, I engage or would engage in periodic burning only because I have been asked to, periodic burning causes a financial strain, periodic burning is inconvenient, and I have felt the benefits of periodic burning on my land. After reverse scoring negatively worded items, the scale revealed high internal consistency ( $\alpha = .80$ ) and so was averaged to create a single scale score ( $M = 5.02; SD = 1.15; Skew = -0.63; Kurtosis = 0.11$ ). Importantly however, a PAF analysis of the seven items failed to converge (a Heywood case, likely because of the small sample size). Evaluation of the item correlations indicated that despite the good internal consistency, several of the items were not significantly correlated. To address this, a second, limited scale was computed with only three of the positively worded items (*burnstts1*, *burnstts3*, and *burnstts7*;  $\alpha = .81; M = 5.22; SD = 1.44; Skew = -1.19; Kurtosis = 0.90$ ; see Table 16).

## Results

### *Trust Variable Correlations*

We first evaluated the correlations between the trust construct scales. As mentioned above, the trust scales were administered twice within the survey, once targeting the Initiative and once targeting the Commission. As in Study 1, construct correlations within institutions were high (see top left and bottom right quadrants of Table 18) with the exception of dispositional trust which, as in Study 1, was less correlated with the other trust constructs (bottom row of Table 18). Correlations across institutions, however, were much more limited (see bottom left quadrant of Table 18), indicating that participants had somewhat distinct impressions of the two institutions.

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INSERT TABLE 18 HERE

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### *Relationships with Cooperation*

We next evaluated the relationship between trust, sophistication, perceived risk, relevant attitudes, and cooperation. Because of the small sample, the analyses focused on the evaluation of the bivariate relationship of each of the constructs with the two cooperation measures (self-reported burning behavior and dichotomous institutional assessments of cooperation). Latent variable analyses were not used because they require sufficient power to detect *ill*-fit and so would be biased towards indicating good fit with such limited samples. Multiple regressions, however, are more likely to fail to yield significant effects when underpowered, and thus could be thought of as more trustworthy,

but because of the small sample and the highly correlated nature of the trust constructs, they are not reported here.

Regarding self-reported burning, a series of one-way ANOVAs and chi-square tests were conducted to determine whether participants who reported engaging in periodic burning differed from those who did not on any of the relevant measures. As reported in Table 19, mean values of objective knowledge of the Commission; care, competence, confidence in the Initiative, and procedural fairness; and the limited scale of attitudes towards burning were significantly different between groups, such that land owners who were more accurate regarding the Commission, more trusting in the Initiative, and had more positive attitudes towards burning were more likely to report engaging in periodic burning on their land with the strongest effect being for attitudes towards burning. The dichotomous institutional cooperation assessment variable was evaluated next. As reported in Table 20, none of the investigated constructs was significantly different across groups, but evaluation of the effect sizes suggests that for subjective knowledge of the Initiative ( $d = 0.47$ ) and the limited scale of the burning attitudes ( $d = 0.99$ ), the lack of effects was likely due to the small sample.

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INSERT TABLE 19 HERE

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INSERT TABLE 20 HERE

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## **Discussion**

Study 2 was conducted to extend the results of Study 1 to actual behavior which was operationalized as self-reported periodic burning behavior and a dichotomous cooperation assessment from the Initiative. Regarding burning behavior, the results show that objective knowledge of the Commission's jurisdiction; perceptions of the Initiative's care, process fairness, competence, and confidence; and attitudes towards burning differed significantly across groups. As in Study 1, however, dispositional trust was not significantly different across groups. Regarding the dichotomous cooperation assessment from the Initiative, none of the comparisons was significant, but it is important to remember that the sample size for this measure was particularly small (23 were cooperating and just 8 were not). Evaluation of the effect sizes suggests that the effect of burning attitudes was large and those of subjective knowledge about the Initiative and its competence were just shy of moderate. A power analysis (Cohen, 1988), suggested that with slightly larger conditions (10/condition for burning attitudes, 25/condition for subjective knowledge, and 35/condition for competence) these effects would likely be significant.

### **General Discussion**

This research provides some, albeit complicated, support for the proposed model. As presented in Figure 2, the model hypothesizes that 1) the six major trust bases from the natural resources management literature are distinct constructs that can be reliably measured using these items, 2) these constructs significantly influence intention to cooperate and cooperation behavior, and 3) this influence is moderated by sophistication, such that for low sophisticates, dispositional trusting tendencies are most important,

while for more sophisticated individuals, the influence of these dispositional tendencies diminishes in favor of more institution-specific constructs.

### **Hypothesis 1 – Six Separable and Reliably Measured Constructs**

Regarding the first hypothesis, Study 1 does indeed find support for the reliability of the items and separability of the constructs. The 19 items were subjected to a confirmatory factor analysis in which the items were entered as indicators of their hypothesized factors. The analysis revealed that the hypothesized factor structure sufficiently accounted for the covariance in the data. Additionally, the models yielded good evidence of reliability, such that at least 66% of the items' variance was shared. Importantly, however, both Study 1 and Study 2 provided evidence that five of the constructs are especially highly correlated. Specifically, latent care, competence, confidence, procedural fairness, and salient values similarity were all correlated greater than .85 in Study 1. It is important to note that because of their ability to partial shared from unshared variance, latent analyses do tend to increase relationships between constructs, but in Study 2 item average correlations among the five institution-specific constructs were still greater than .75 for the Initiative and .65 for the Commission. These findings challenge the separability of the constructs in that even though the covariance among the items could be sufficiently accounted for by the hypothesized factor structure in the confirmatory factor analysis, the constructs underlying those item responses are correlated to the point that they have little independent variance. This lack of independent variance undermines any treatment of the constructs as distinct constructs, but their conceptual distinctiveness, the good fit of the five factor model, and the poor fit of a single factor model suggest that combining the items as indicators of a single latent

construct would result in the loss of some important variance. Instead, the analyses tested and found support for a higher order factor solution that models the covariance in the latent factors as a separate factor. While this factor solution did result in statistically poorer fit than the correlated factors solution, the untenable nature of a model with such highly correlated factors, coupled with the even poorer fit of the single factor solution, suggests that this may be the best representation of the constructs.

Thus it seems that although the six trust bases are distinct constructs statistically and conceptually, participants tended to respond very similarly to at least five of them, potentially because they are relying on a more global evaluation of the institution as represented by the higher order factor (e.g., “I think they are generally good so sure, they are fair and competent.”). For natural resources institutions, these findings suggest that although the “business as usual” approach of treating trust as a unitary construct is likely to produce somewhat convergent results, there are important distinctions to be made. The primary distinction seems to be between institution-specific and general trusting tendencies. Encouragingly, but somewhat unsurprisingly, this suggests that our relatively unsophisticated participants did have sufficient information about these institutions to distinguish their evaluations of them from their broader, more general evaluations of others. Additionally, the results from Study 2 provide some evidence that participants can successfully distinguish between two similar and even somewhat overlapping institutions as will be discussed further in the next section.

### **Hypothesis 2 – Trust and Cooperation**

As hypothesized, both Study 1 and Study 2 provide relatively clear evidence for a statistically significant effect of trust on cooperation. In Study 1, the institution-specific

higher order trust factor significantly predicted intention to cooperate with conservation or access programs regardless of financial incentive and whether sophistication, perceived risk, or environmental concern were included as controls. Importantly, though, the effects, although significant, were small. As an example, the strongest effect of trust in the SEM analysis was on cooperation with the conservation program without financial incentive where a one standard deviation increase in the higher order factor corresponded to a 0.38 increase in cooperation (a little more than a third of a step between options on the 7pt scale). The situation was much the same in Study 2, where perceptions of the Initiative's care, procedural fairness, competence, and confidence were all significantly related to self-reported current periodic burning status. Although the effect sizes were noteworthy ( $d$ 's  $> 0.60$ ), none was large, again suggesting a significant, but not especially large effect. Regarding the institutional assessment of cooperation, none of the trust constructs means was significantly different, and competence's slightly less than moderate effect was the largest by far ( $d = 0.41$ ). The results regarding dispositional trust, however, are much clearer in that it was never significantly associated with cooperation or cooperation intention. In the Study 1 latent correlations and structural regressions, its effect was small and insignificant and, in the Study 2 means tests, its non-significant comparisons consistently had small effect sizes ( $d$ 's  $< 0.30$ ). Thus it seems that trust in the institution, but not trust in others generally, is a significant but small predictor of cooperation intention and behavior.

For natural resources institutions, this distinction between institution-specific and tendencies to trust is encouraging because it allows for cooperation from generally untrusting individuals if the institution itself is trusted, an evaluation over which they

have much more control (Hamm et al., 2013b). Regarding the institution-specific base(s) most important for cooperation, however, the suggestions from this research are less clear. On one hand, the high correlations among the constructs seem to indicate that most of the time, for most people, there might not be important differences in focusing on one construct or another as they seem to be highly correlated. On the other hand, though, the conceptual and statistical distinctiveness argue that there might be specific situations or individuals for whom specific constructs are more or less important (though this does not seem to happen as a function of the sophistication of the trustor, as will be discussed in more detail later). It is easy to see how specific situations may create an impetus for the importance of some constructs over others. For example, once it has been determined to be necessary, the building of a dam that can successfully regulate stream flow is likely to encourage an emphasis on competence that it might not for salient values similarity or care. Previous research seems to support this postulation in that distinct trust constructs have been shown to be more or less important under some situations (e.g., Earle & Siegrist, 2008; Hamm et al., 2013a; Herian, Hamm, PytlikZillig, & Tomkins, 2012).

Importantly, however, the small percentage of variance accounted for by institution-specific trust does underscore the need for considering other potential drivers of cooperation behavior. Indeed, in the Study 1 structural regressions, all 7 predictors together accounted for no more than 12% of cooperation intention. This small percentage of the variance is not unexpected as human behavior is often multiply determined. Everything from diet to whim can play important roles and decisions like voluntary cooperation may well rely on important situational or social factors. Nevertheless, the



identification of significant psychological drivers of cooperation like attitudes and perceptions is important and, of those constructs, trust is clearly important.

Additionally, the results provide some evidence that it matters in which specific institution trust is held. In Study 2, participants rated their trust in both the Commission and the Initiative. Although the Initiative was responsible for the included programs, the Commission is likely to be an especially salient partner in the Initiative's activities especially because of the prominence of its logos on the Initiative's equipment (e.g., truck doors). Despite this overlap, participants did seem very able to distinguish their perceptions of the two institutions as indicated by the small, if existent, correlations between constructs addressing the Initiative and Commission. As tests of the rank order of variables, these small and insignificant correlations suggest that individuals who trust the Initiative do not necessarily trust the Commission. The subsequent cooperation analyses further suggest that trust in the Commission was much less important than trust in the Initiative, especially for self-reported burning but also to a lesser degree for institutional cooperation assessments. This finding is also encouraging for natural resource partnerships like the Initiative, as it suggests that what is most critical is not trust in related natural resources management institutions, but trust in the institution asking for cooperation specifically.

### **Hypothesis 3 – Sophistication Moderation Hypothesis**

Building upon previous work (Hamm et al., 2013a; 2013b), the final hypothesis was that sophistication would significantly moderate the effect of trust on cooperation, such that institution-specific constructs would be more important for more sophisticated individuals, while more general constructs would be more important for less sophisticated

individuals. The rationale for this hypothesis lies in the expectation that less sophisticated individuals are likely to have less relevant information upon which to base their evaluations and will therefore have to rely more on their predispositions to trust generally. Although the research provides some evidence of this moderating relationship, it falls considerably short of providing strong support. Study 1 tested this moderating influence of subjective knowledge about the Commission, objective knowledge about the Commission's jurisdiction, and experience with the Commission's staff. Invariance tests revealed that for individuals above and below the mean of subjective knowledge the relationships of trust and cooperation intention were not statistically different from each other. The same was true for most of the comparisons for objective knowledge and experience with the exception of four specific relationships (see Tables 14 and 15). Interestingly three of the four relationships involved an effect on cooperation with an access program without financial incentive, suggesting that the sophistication moderation hypothesis may exist only for this situation (relatively risky situations that have no incentive and thus low cooperation) and these more objective measures of sophistication. It is not unreasonable that these relatively limited situations may best lend themselves to differences by objective and not subjectively perceived sophistication, as when cooperation is less likely (no financial incentive) and harder (more perceived risk), individuals are likely to be more dissimilar as a function of their objectively measured sophistication (objective knowledge and experience). That is to say, it is possible that in the face of this more difficult cooperation, when evaluations of the institution might be especially important, individuals who spend more time with the institution may have more relevant information upon which to base their perceptions of the institution (e.g.,

fair and respectful treatment or evaluations of competence) than those who spend less time with it. Contrastingly though, increases in subjective knowledge may not reflect any actual increase in trust relevant data, making individuals who are more and less subjectively knowledgeable more similar. Although this explanation is unquestionably tenuous, it is somewhat bolstered by evaluation in light of the previous research. In the studies where the sophistication moderation hypothesis was identified, individuals were likely in more risky situations. Hamm and colleagues (2013a) investigated perceptions of the courts that have considerable jurisdiction over individual liberty, while Hamm and colleagues (2013b) investigated compliance with water allocations which are likely to have direct impacts on livelihoods. Problematically, however, neither study measured perceived risk, and Hamm and colleagues (2013b) utilized a student sample to approximate farmer behavior which is likely to attenuate the difficulty and risk that may have been perceived by an actual farmer.

A second, more likely explanation for the lack of moderation in this sample may lie in the current operationalization of sophistication. In both previous studies, sophistication was conceptualized or operationalized in ways that were especially relevant to the situation. Across the courts inquiries (Hamm et al., 2011, 2013a), sophistication was conceptualized as the difference between students (some of whom reported little contact with the courts) and recent defendants who, by definition, had been in contact with the courts recently. In the water allocation study, sophistication was the information the participant received about the allocation decision in the vignette itself. In this dissertation, however, sophistication was measured using 11 items that were hypothesized to be important to achieving a level of general knowledge and experience

with an institution. If the current measures of sophistication in this study failed to tap this more general level of sophistication with the institution and instead targeted only peripheral aspects, it is not surprising that they would not significantly moderate the effect of trust.

### **Conclusion**

The research was conducted to test a model of trust in and cooperation with natural resources institutions. Embedded within the model were three specific hypotheses that received mixed support. Regarding the separability of the constructs, the results here do provide support but also suggest that five of the constructs may be particularly strongly correlated, potentially because they are all driven by an underlying evaluation of the institution. Regarding the influence of trust on cooperation, the results consistently show that institution-specific constructs do have a small but significant influence on trust but that this influence is specific to trust in the institution requesting cooperation and is attenuated for trust in other institutions or the participant's tendency to trust others generally. Regarding the sophistication moderation hypothesis, the results provide scant support, finding a significant moderation in only 17% of the effects hypothesized. The lack of moderation could be evidence of a boundary condition of the effect, such that it only occurs in relatively low likelihood, risky cooperation situations but is more likely evidence that only specific operationalizations of sophistication will result in the expected moderation.

## CHAPTER FOUR: DISCUSSION

Trust is a critical part of every human interaction. Because of the fundamental human dilemma (Lind, 2001), all human interaction involves *some* level of vulnerability such that at any time, the “other” may act in favor of or against the trustor’s interests. As argued here, this importance holds true in the context of natural resources governance. This dissertation explores this importance by investigating trust and cooperation within the context of natural resources management. Chapter One suggests that a fundamental conflict in land owner and natural resource institutions’ interests in natural resources may be less optimally negotiated via formal challenges in court without an emphasis on procedural fairness, a construct of trust that is likely to be especially important in this context. Chapter Two argued that while the critical importance of trust across contexts has spawned a great deal of relevant scholarship, it has not resulted in a generally accepted understanding of trust across contexts. To address this, Chapter Two proposed a framework of trust which, by incorporating existing understandings of trust, has the potential to integrate the existing bodies of relevant scholarship and provide some clarity to understanding the construct. Specifically, the framework argues that attitudinal trust is a willingness to be vulnerable in dealings with an “other” and is driven by a considerable number of potential bases that lend themselves to the lessening of the trustor’s vulnerability or increasing its acceptability. Further, the framework hypothesizes that attitudinal trust is itself a driver of an intention to act trustingly and trusting behavior. Application of the framework to the three major trust literatures reveals considerable

congruence, such that although the major bases and specific understandings vary across domains, the central arguments of the framework are generally supported.

Using this framework as a basis, Chapter Three went on to present and test a model of trust in natural resources governance that incorporates the six major bases of vulnerability in this context and argued that they are predictive of an intention to act trustingly (operationalized as intention to cooperate) or trusting behavior (operationalized as cooperation behavior). To these postulations of the proposed framework, however, the model added the sophistication moderation hypothesis (Hamm et al., 2013a), which argues that the bases of trust should themselves be moderated by the knowledge and experience (i.e., sophistication) of the trustor, such that with limited sophistication, more general constructs like dispositional trust should be most predictive. With increased sophistication, however, more specific constructs are expected to increase in predictive ability.

The Chapter Three results both challenge and support its hypothesized model. Study 1 provides support for the hypothesized dimensionality of the constructs in that the confirmatory factor analysis of the six trust bases confirmed that the covariance among constructs was adequately accounted for by the relationships among the latent factors. Importantly, however, the five institution-specific constructs (care, competence, confidence, procedural fairness, and salient values similarity) were all strongly correlated, not only in the latent analyses of Study 1 (which can increase construct correlations by partialing out measurement error) but also in the observed variable correlations of Study 2. Functionally, this extreme covariance precludes the evaluation of the independent effects of the constructs in a regression analysis, but, more importantly, it

challenges the statistical distinctiveness of the constructs themselves. If the constructs are so highly correlated as to share virtually all of their variance (more than 75% in the latent analyses), they are functionally equivalent, suggesting that the model may have been over-parameterized. Importantly, however, the constructs themselves are conceptually distinct. Despite the likely conceptual overlap in constructs like perceptions of care and salient values similarity or procedural fairness, it is certainly possible for an institution to care about the public generally, but neither share the values of the trustor nor offer the opportunity for voice in a decision making process. Perceptions of competence are likely even more distinct because it is not hard to imagine an institution that is especially competent but cares little for the public. Indeed, some of the most limited trust construct correlations identified in the analyses here were between competence and the other bases of trust. Even so, other constructs are likely to overlap conceptually with competence. Confidence, for example, likely overlaps in that institutions are likely to do their jobs well when they are sufficiently competent to do so. Importantly, though, a single factor model of the constructs fit especially poorly to the data, and most of the requested model changes suggested recombining items into their previous scales. This suggests that, despite the conceptual overlap, the constructs are somewhat distinct statistically.

The subsequent inclusion of a higher order factor was intended, primarily, to address the functional issue of insufficient independent variance for a structural regression, but it also suggests a potential conceptual development to the understanding of trust. It may be that when responding about specific perceptions of an institution, individuals rely heavily upon a more global evaluation of it. Thus institutions that are perceived positively overall may also be perceived as caring, competent, fair, et cetera,

not because the trustor has evaluated and responded to each construct individually but because of the positive overall impression. This, however, does not preclude the potentiality that in some specific situations, individuals may have distinct perceptions of the various constructs (e.g., immediately after learning competence relevant information). Indeed the separability of the constructs in this research and the differential effects of various bases in other research seem to suggest this (e.g., Hamm et al., 2013a; 2013b). What it does suggest, though, is that for most individuals, most of the time, the institution-specific bases of trust cohere strongly, and at least one reasonable explanation for this is because of their basis in an underlying, more global evaluation.

Given this, the next logical question regards the nature of this underlying global evaluation for which some guidance can be elicited by applying the more general framework of trust presented in Chapter Two. This framework suggests that the bases of trust are drivers of a willingness to accept vulnerability in dealings with an “other.” Given the statistical evidence suggesting that participants may be relying on a broader evaluation of the institution, this might mean that individuals’ broader evaluation of the institution may be their willingness to be vulnerable to it and that this in turn may be a driver of their responses to the bases of trust themselves. Importantly, the causality suggested in the final model of natural resources trust in Chapter Three (Figure 3) is the opposite of that suggested by the more global framework of trust in Chapter Two (Figure 1), but it stands to reason that these relationships may be somewhat recursive. In the context of a novel institution, it is likely that the bases would drive the willingness to be vulnerable in dealing with the institution. In this situation, the trustor would be expected to be determining his or her level of willingness to accept vulnerability to the institution,



and one would expect this determination to be based on the information (bases) available. As this willingness becomes more settled, however, it also stands to reason that it could be itself used as a, and potentially *the*, basis for specific evaluations of the institution, especially those for which more relevant information is not readily available.

Consider, for example, a land owner who is approached by a new natural resources partnership in his area that is seeking his voluntary cooperation by requesting that he engage in patch burning on land that he uses for grazing. The process will require the land owner to select some percentage of his land to be burned periodically and thus be unavailable for grazing. Although the process is expected to increase the suitability of the land for future grazing (e.g., by increasing biodiversity and controlling trees), it is not without its own risk of decreased productivity if the grasses fail to return or if too much land is unintentionally burned by an out of control grass fire. Assume that the partnership has presented itself as particularly caring and has convinced the land owner that they espouse his most salient value of productivity. In determining his willingness to cooperate, the land owner is likely to take what information is available to him, which in this case is likely to be the evaluation of its care and salient values similarity. In this situation, the causal direction of the relationship between the constructs and the willingness to be vulnerable is likely to follow that suggested in the Chapter Two framework. Assume now, however, that the land owner has no information regarding the competence or procedural fairness of the institution but is asked about his perceptions of these bases. It stands to reason that these responses may themselves now be driven by the underlying willingness to accept vulnerability in dealing with the institution, such that if he is now generally willing to be vulnerable to the institution, he would also be motivated

to feel that it is more competent and more procedurally fair. This would flip the causal direction of the relationship to follow that suggested in the Chapter Three model. Thus the underlying evaluation may function as both a driver and result of the relevant bases as a function of the situation.

The second major proposition of the proposed model is the influence of trust on cooperation and intention to cooperate which is largely supported in both Chapter Three studies, such that both find a small but statistically significant effect for trust on cooperation. Critically, it seems that it is trust in the specific institution requesting cooperation that matters most and not trust in other closely related institutions or trust in others generally. This stands to reason in that when determining whether to cooperate, the most salient evaluations upon which to base that decision are likely the evaluations of the institution asking for cooperation. In both Study 1 and Study 2, these institution-specific evaluations were significantly related to cooperation intention and also to cooperation behavior, but only when cooperation behavior was operationalized as self-report and not when operationalized as the cooperation assessment of the institution. Part of the reason for the lack of effect on institutional cooperation assessments is likely statistical in that these assessments included a great deal of missing data (responses for almost half of the participants were coded as missing by the Initiative for lack of sufficient information), but the issue may also be conceptual or methodological. Conceptually, burning behavior and institutional cooperation may simply not be the same thing. Although periodic burning is an important part of advancing the Initiative's interests, its cooperation assessment was necessarily much broader. Indeed, a chi-square analysis of the congruence between the measures of self-report burning behavior and institutional

cooperation assessments revealed a non-significant relationship, such that burning behavior did not completely overlap with the institutional cooperation assessment. Notably, however, this lack of congruence seems to have been mostly for individuals who reported that they were currently burning, as only one individual who reported not burning was identified as cooperating. Methodologically, it is also possible that responses to the self-report burning questions were less accurate as a result of either demand characteristics or unintentionally inaccurate reporting, but it is not clear why respondents would have been dishonest about their behavior in a third-party survey, and it is unlikely that they would not know if periodic burning was being used on their land. Additionally, the similarities between the results regarding self-report burning behavior in Study 2 and intention to cooperate in Study 1 permit some confidence in the measures because of the similarity in relationships across studies. This is especially true when considered in light of the effect sizes of the analyses with the institutional cooperation assessments in Study 2 which suggested that with a slightly larger sample, many of the same effects would likely become significant.

The final proposition of the proposed model is the sophistication moderation hypothesis. According to the hypothesis, less sophisticated (i.e., less knowledgeable and experienced) individuals are expected to rely more heavily upon more general tendencies to trust others, while more sophisticated individuals are expected to rely more heavily upon more target-specific information, and the hypothesis has been supported in research (Hamm et al, 2013a; 2013b; but see Lubell, 2007, who finds an opposite effect such that dispositional trust becomes *more* important with increased sophistication). Study 1 tested the hypothesis that the predictive ability of trust on cooperation would differ for

individuals as a function of their subjective knowledge, objective knowledge about the institution's jurisdiction, or experience with the institution's staff. Overall, despite a few hypothesis consistent findings, the results failed to support this hypothesis and suggest that individuals rely roughly equivalently on the bases of trust regardless of their sophistication. There are a few potential reasons for this lack of an effect, including the possibility that the moderation effect is constrained to cooperation/compliance in a relatively risky and difficult situation. More likely, however, the lack of an effect in the research here was a result of the more peripheral measures of sophistication used. Unlike the previous research (Hamm et al, 2013a; 2013b; Herian, Hamm, Tomkins, & PytlikZillig, 2012), the measures used here may have targeted relatively peripheral aspects of sophistication and missed the more global understanding of the construct relevant to the moderation proposed here. For example, is knowing enough about an institution to have perceptions of it distinct from your tendency to trust others really reasonably indicated by knowledge of its jurisdiction?

The rationale for the sophistication moderation hypothesis is that when unsophisticated individuals interact with a novel other, their lack of knowledge and experience with the novel target suggests that they will have only their tendency to trust others generally upon which to rely. Despite the relative failure of the analyses here to support this hypothesis, reason dictates that individuals cannot base evaluations on information they do not have. As a result, unsophisticated individuals cannot base their evaluations of an institution on their evaluations of institution-specific bases. Thus, these results likely provide less evidence of the inaccuracy of the hypothesis but instead indicate that, as suggested above, the kind of sophistication necessary for the moderation

is somewhat particular as may be the requisite sophistication level. Unlike this research, the previous research that supported the hypothesized moderation (Hamm et al., 2013a; 2013b) compared individuals who were moderately to highly sophisticated regarding aspects of the institution salient to the institutional evaluation (e.g., defendants who had contact with the courts and students who had received specific information about a water allocation) to very unsophisticated individuals (students who reported very little contact with the courts and students who had not yet received the information about the water allocation). These samples represent relatively ideal comparisons for the hypothesized moderation in that the unsophisticated individuals are especially lacking in relevant knowledge and experience and the more sophisticated individuals would have had information that was especially relevant; a situation which is arguably untrue in the present research, where the participants who were identified as more and less sophisticated were much more similar in terms of both the kind and level of their sophistication.

### **Limitations**

Despite the contribution of this research, there are important limitations, especially in terms of generalizability. Study 2 used an extremely limited sample of geographically limited land owners and although Study 1 utilized a random, and therefore presumably representative sample of Nebraska land owners, it is necessarily limited to land owners who were willing to complete a survey about natural resources regulation in the state. While this is likely to include individuals who were both especially happy (and thus cooperative) and especially unhappy (and thus motivated to express their discontent) with natural resources regulation in Nebraska, this sample, like all survey samples, is

necessarily limited to respondents who are more willing to comply with our participation request. Thus this survey may well have over-sampled individuals who are dispositionally more willing to indicate that they would be willing to comply. It is important to note that our intended cooperation rates were not especially high, but none of the data collected in this research is able to speak directly to this potential problem.

### **Implications**

From biodiversity to food production and ecosystem services, effectively meeting the plethora of natural resources challenges is a critical responsibility of modern society. Thus, effective natural resources governance is of critical import in today's world. After decades of "command and control" management, modern natural resources institutions have generally begun to recognize that more collaborative approaches are typically preferable and that trust may, therefore, have an important role to play in their success. This dissertation investigates the role of trust in this context and in so doing, suggests three important policy implications. Regarding the role of trust, this dissertation suggests that natural resources institutions are, in fact, likely to be well-served by enhancing public trust. Importantly, however, the "kind" of trust most critical to this benefit is likely to be trust in the institution itself. Although some research has suggested that bonds among wider communities like social capital might be important drivers of effective natural resources management (e.g., Pretty, 2003), this research suggests that these more diffuse constructs may be less important than more institution-specific evaluations. This is encouraging for natural resources institutions because it is likely these evaluations that institutions will have the most control over. It is hard to see how an institution could reasonably affect the level of trust that land owners have in each other generally, but it is

much easier to conceive of efforts that these institutions could engage in to improve perceptions of themselves. From efforts to increase public knowledge about the institutions that focus on their competence and track record to meeting with land owners individually or in groups to discuss salient values similarity to public input events that provide land owners with real voice, these institutions will likely experience increased land owner cooperation, at least in so much as these events actually result in increases in perceived trust in the institution.

Unfortunately, however, the guidance that this dissertation provides regarding the specific constructs most critical to land owner cooperation is somewhat complicated. Instead of identifying one or two constructs that most significantly predict cooperation, the analyses identified a few constructs that are too correlated to permit testing their independent effects. To address this concern, a latent construct made up of the covariance in these institution specific constructs was added to the model and the analyses revealed that it had the strongest influence on cooperation. As discussed above, this suggests that these institution-specific evaluations may be the most important for cooperation but also suggests that it may, in fact, be a broader institutional evaluation underlying the more specific constructs that is most relevant to cooperation decisions and that the specific bases may be important only in so much as they overlap with the underlying evaluation. This would suggest that natural resources institutions may be best served by targeting this evaluation specifically, making an understanding of the nature of this evaluation especially important. While these analyses themselves provide precious little guidance as to the nature of the construct, the proposed framework from Chapter Two suggests that it might be a willingness to accept vulnerability. If true, this would suggest that natural

resources institutions may most efficiently increase cooperation by increasing public willingness to be vulnerable to them. Such efforts would likely focus on institution-specific bases of trust like competence and salient values similarity, but the recognition of vulnerability as the critical construct would encourage natural resources institutions to work to identify the perceived vulnerabilities and focus their efforts there. For example, if a specific land owner group of importance to a specific natural resources institution perceives an especially salient vulnerability in terms of lost productivity, efforts to address the bases of trust in light of these productivity issues are likely to be much more effective in increasing cooperation than efforts focused on less salient vulnerabilities like saving the environment.

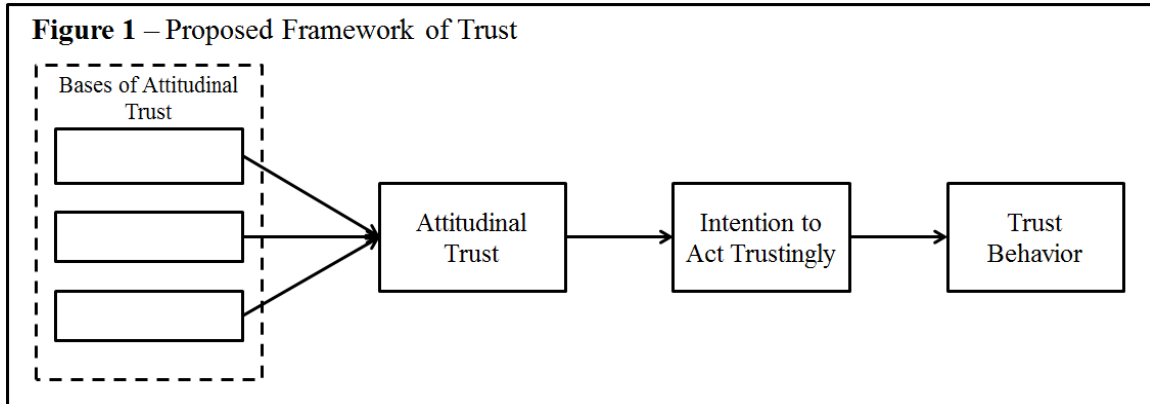
The final policy implication of this dissertation regards the role of sophistication. Previous research has suggested that sophistication may play an important role in the importance of the bases of trust as predictors of cooperation, such that more institution-specific constructs are most important for more sophisticated individuals (e.g., Hamm et al., 2013a; 2013b). This has been argued to be ideal for natural resources institutions because by increasing the sophistication of the individual, natural resources institutions could reduce the importance of trust in others, which they are unlikely to be able to increase efficiently, in favor of an increased importance for trust in the institution, which is far more under their control (Hamm et al., 2013b). Although it fails to provide strong support for the hypothesis, this dissertation, when considered in light of the previous work, does suggest that the level of sophistication required for institution-specific constructs to dominate models predicting cooperation is relatively low and/or fairly global. Across the relevant analyses, only those including students who reported little

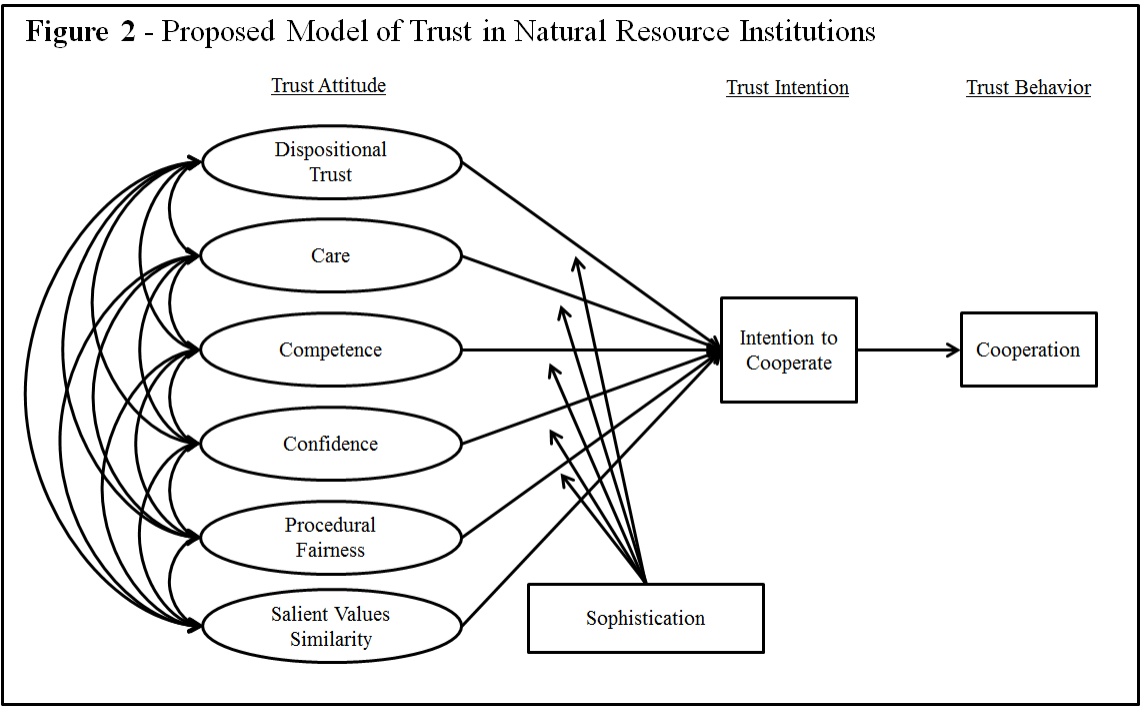


contact with the courts (Hamm et al., 2013a) or who had not yet been given specific information about a water allocation (Hamm et al., 2013b) identified dispositional trust as a major predictor of the relevant criterion. When the sample was highly (e.g., defendants; Hamm et al., 2013) or moderately sophisticated, however, the importance of dispositional trust was lost in favor of institution-specific bases, as was the case in this dissertation. This is also encouraging for natural resources institutions because it suggests that efforts to increase public sophistication regarding them need only to result in relatively low increases in relevant knowledge or experience. Indeed, just a few paragraphs of information were sufficient to eliminate the influence of dispositional trust in a water allocation vignette study (Hamm et al., 2013b), and the means of the sophistication variables were typically well below the midpoint in this dissertation, where dispositional trust was never a significant predictor.

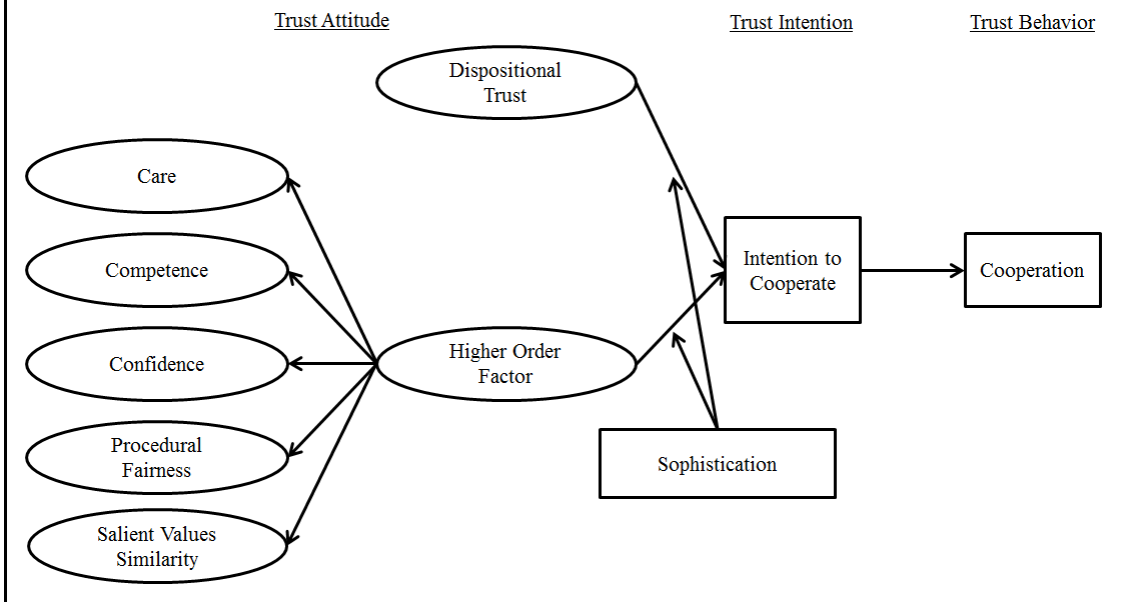
In conclusion, the dissertation contributes to the literature an evaluation of the role of trust in cooperation by proposing a framework of trust and an evaluation of a model of trust and cooperation in the natural resources context. The results provide mixed support for the hypotheses by 1) confirming that trust is important for cooperation, 2) suggesting that the constructs of trust, though separable, are often highly correlated, and 3) failing to provide convincing support for the sophistication moderation hypothesis. The results suggest three implications for policy: 1) Trust does matter for cooperation but that the target of that trust is critical. 2) Natural resources institutions may be best served by identifying and targeting the construct underlying the institution specific trust bases. 3) If sophistication is an important moderator of the effects of the bases of trust, it is likely to require only a very low level of very general sophistication with the institution.

## FIGURES AND TABLES





**Figure 3 - Proposed Model of Trust in Natural Resource Institutions (with Higher Order Factor)**



**Table 1** – Summary of Understandings of Attitudinal Trust, its Major Bases, and Intentional/Behavioral Trust in Each Major Body of Literature

Body of Literature	Attitudinal Trust	Major Bases	Intentional/ Behavioral Trust
Organizations	An acceptance of the vulnerability in working with others towards a common goal	Trustworthiness, Organizational Justice, Anticipatory Justice	Cooperative behavior that advances the common goal of the organization
Risk Management	An acceptance of the vulnerability in allowing another to manage a risk to the trustor	Confidence, Salient Values Similarity, Dimensions of Trust, Fairness	Allowing managers to manage risks with limited obstruction
Government/Courts	An acceptance of the vulnerability in allowing the government/court to have authority over the trustor	Satisfaction, Legitimacy, Encapsulated Interests, Procedural fairness, Confidence	The efficient and effective functioning of governance institutions

**Table 2 – Nebraska Game and Parks Commission Target Area Counties**  
 44 Targeted Nebraska Counties (in alphabetical order)

Adams	Gage	Lincoln	Richardson
Buffalo	Garden	Madison	Saline
Burt	Gosper	Merrick	Sarpy
Butler	Hall	Morrill	Saunders
Cass	Hamilton	Nance	Scotts Bluff
Colfax	Howard	Nemaha	Seward
Cuming	Jefferson	Otoe	Stanton
Dakota	Johnson	Pawnee	Thurston
Dawson	Kearney	Phelps	Washington
Dodge	Keith	Platte	Wayne
Douglas	Lancaster	Polk	York

**Table 3 – Excluded Urban Areas**

43 Urban Areas Excluded by ZIP Code (in alphabetical order)			
Alliance	Crete	Lincoln	Scottsbluff
Ashland	David City	McCook	Seward
Auburn	Fairbury	Minden	Sidney
Aurora	Falls City	Nebraska City	Sioux City
Beatrice	Fremont	Norfolk	Valentine
Blair	Gothenburg	North Platte	Wahoo
Broken Bow	Grand Island	Ogallala	Waverly
Central City	Hastings	Omaha	Wayne
Chadron	Holdrege	O'Neill	West Point
Columbus	Kearney	Plattsmouth	York
Cozad	Lexington	Schuyler	Scottsbluff

*Note.* Not all of these urban areas are within the Target Area Counties.

**Table 4** – Observed Variable Scales Evaluation

Construct	N of items	$\alpha$	EFA Results	Averages Across Items			
				M	SD	Skew	Kurtosis
Subjective Knowledge	4	.92	1 Factor – 74% of the variance	2.29	0.79	0.33	0.01
Dispositional Trust	3	.81	1 Factor – 64% of the variance	5.02	0.91	-1.00	1.07
Care	3	.80	1 Factor – 58% of the variance	4.49	1.10	-0.72	0.69
Competence	4	.92	1 Factor – 75% of the variance	4.69	1.09	-0.60	0.58
Confidence	4	.94	1 Factor – 79% of the variance	4.79	1.20	-0.95	0.81
Procedural Fairness	3	.85	1 Factor – 67% of the variance	4.73	1.07	-0.69	0.93
Salient Values Similarity	3	.89	1 Factor – 76% of the variance	4.59	1.21	-0.80	0.56
NEP	15	.87	4 Factors – 48% of the variance	4.20	0.93	0.09	0.73



**Table 5** – Cooperation Variables

Variable	Response Option (%)						
<i>Conservation</i> (no financial incentive)	VU (22)	U (16)	SU (11)	UD (30)	SL (13)	L (6)	VL (2)
<i>Conservation</i> (with financial incentive)	VU (11)	U (11)	SU (8)	UD (25)	SL (27)	L (13)	VL (4)
<i>Access</i> (no financial incentive)	VU (25)	U (21)	SU (12)	UD (29)	SL (8)	L (3)	VL (1)
<i>Access</i> (with financial incentive)	VU (16)	U (16)	SU (10)	UD (30)	SL (18)	L (8)	VL (2)
Perceived risk in <i>Conservation</i> programs	Yes (51)	No (49)					
Perceived risk in <i>Access</i> programs	Yes (61)	No (39)					

*Note.* VU = very unlikely, U = unlikely, SU = somewhat unlikely, UD = undecided, SL = somewhat likely, L = likely, VL = very likely. Row totals may not equal 100 because of rounding.

**Table 6** – Trust Construct CFA Model Items

Dimension	Variable Name	Std <sub>y<sub>x</sub></sub> Loading	S.E.	var <sub>e</sub>
Dispositional Trust	<i>dt1</i>	.79***	.04	.38***
	<i>dt2</i> <sup>a</sup>	.97***	.04	.06***
	<i>dt3</i>	.60***	.04	.64***
Care	<i>care1</i> <sup>a</sup>	.86***	.02	.26***
	<i>care2</i>	.65***	.04	.57***
	<i>care3</i>	.76***	.02	.42***
Competence	<i>comp1</i> <sup>a</sup>	.88***	.02	.23***
	<i>comp2</i>	.85***	.02	.28***
	<i>comp4</i>	.84***	.02	.30***
Confidence	<i>icon1</i>	.89***	.01	.21***
	<i>icon2</i>	.87***	.01	.24***
	<i>icon3</i> <sup>a</sup>	.91***	.01	.18***
	<i>icon4</i>	.90***	.01	.19***
Procedural Fairness	<i>pf1</i> <sup>a</sup>	.87***	.01	.24***
	<i>pf2</i>	.81***	.03	.34***
	<i>pf3</i>	.74***	.03	.45***
Salient Values Similarity	<i>svs1</i>	.84***	.02	.30***
	<i>svs2</i>	.83***	.02	.32***
	<i>svs3</i> <sup>a</sup>	.90***	.02	.19***

Note. \*\*\*  $p < .001$ ; <sup>a</sup> marker items (when used)

**Table 7** – Trust Construct CFA Model Latent Variable Correlations (Reliability [ $\omega$ ] in the Diagonal)

	1	2	3	4	5	6
1-Dispositional Trust	$\omega = .84$					
2-Care	.10 <sup>+</sup>	$\omega = .81$				
3-Competence	.13*	.95***	$\omega = .89$			
4-Confidence	.14*	.98***	.94***	$\omega = .94$		
5-Procedural Fairness	.14*	.94***	.95***	.94***	$\omega = .85$	
6-Salient Values Similarity	.12*	.93***	.87***	.92***	.92***	$\omega = .89$

*Note.* \*\*\*  $p < .001$ , \*  $p < .05$ , <sup>+</sup>  $p < .10$

**Table 8** – Trust Construct CFA Higher Order Factor Loadings

Latent Factor	Std <sub>YX</sub> Loading	S.E.	R <sup>2</sup>	Var <sub>e</sub>
Care	.99***	.01	.98***	.02
Competence	.96***	.01	.91***	.09***
Confidence	.98***	.01	.96***	.04**
Procedural Fairness	.97***	.01	.94***	.07**
Salient Values Similarity	.94***	.01	.88***	.12***

*Note.* \*\*\*  $p < .001$ , \*\*  $p < .01$

**Table 9** – Trust Construct CFA Model Fit Comparisons

Model	$\chi^2$	DF	CFI	TLI	RMSEA	SRMR	H <sub>0</sub> LL	Comparison to Model #1
1- Correlated Factors	381.03***	137	.96	.95	.05	.03	-13873.06	-
2- Higher Order	401.74***	146	.96	.95	.05	.03	-13888.97	-2LLΔ (9) = 20.96*
3- Single Factor	528.36***	151	.94	.93	.06***	.04	-13985.31	-2LLΔ (14) = 129.92***

*Note.* \*\*\*  $p < .001$ , \*  $p < .05$

**Table 10** – Trust Construct CFA Single Factor Model Items

Dimension	Variable Name	Std <sub>y<sub>x</sub></sub> Loading	S.E.	var <sub>e</sub>	Recommended cov <sub>e</sub> with:
Dispositional Trust	<i>dt1</i>	.79***	.04	.38***	-
	<i>dt2@1</i>	.97***	.04	.06	-
	<i>dt3</i>	.60***	.04	.64***	-
Single Factor	<i>care1</i>	.85***	.02	.28***	-
	<i>care2</i>	.65***	.04	.58***	-
	<i>care3</i>	.75***	.02	.43***	-
	<i>comp1</i>	.84***	.02	.30***	<i>comp4</i>
	<i>comp2</i>	.82***	.02	.33***	<i>pf1/svs1</i>
	<i>comp4</i>	.80***	.02	.35***	<i>comp1</i>
	<i>icon1</i>	.89***	.01	.26***	-
	<i>icon2</i>	.86***	.01	.26***	<i>pf1</i>
	<i>icon3</i>	.89***	.01	.20***	<i>icon4</i>
	<i>icon4</i>	.89***	.01	.21***	<i>icon3</i>
	<i>pf1</i>	.85***	.02	.28***	<i>icon2/comp2</i>
	<i>pf2</i>	.79***	.03	.38***	-
	<i>pf3</i>	.72***	.03	.49***	-
	<i>svs1</i>	.80***	.02	.35***	<i>svs3/comp2</i>
	<i>svs2</i>	.79***	.02	.38***	<i>svs3</i>
<i>svs3</i>	.84***	.02	.29***	<i>svs1/svs2</i>	

Note. \*\*\*  $p < .001$

**Table 11** – SEM Cooperation Intention on Trust

Criterion	Variance Accounted	Predictor	Standardized Regression Coefficient	S.E.	<i>p</i> -value
<i>Conservation</i> (no financial incentive)	$R^2 = .06,$ $p = .007$	<b>Higher Order</b>	.25***	.05	<.001
		Dispositional Trust	-.01	.04	.88
<i>Access</i> (no financial incentive)	$R^2 = .07,$ $p = .001$	<b>Higher Order</b>	.27***	.04	<.001
		Dispositional Trust	-.01	.04	.76
<i>Conservation</i> (with financial incentive)	$R^2 = .07,$ $p = .005$	<b>Higher Order</b>	.26***	.05	<.001
		Dispositional Trust	-.02	.04	.73
<i>Access</i> (with financial incentive)	$R^2 = .08,$ $p = .001$	<b>Higher Order</b>	.29***	.04	<.001
		Dispositional Trust	-.03	.04	.47

*Note.* \*\*\*  $p < .001$ ; **bolded** constructs are significant predictors

**Table 12** – SEM Cooperation Intention on Trust, Sophistication, Perceived Risk and Environmental Concern (significant predictors italicized)

Criterion	Variance Accounted	Predictor	Std <sub>yx</sub> Regression Coefficient	S.E.	<i>p</i> -value
<i>Conservation</i> (no financial incentive)	<i>R</i> <sup>2</sup> = .08, <i>p</i> = .001	<b>Higher Order</b>	.24	.05	< .001
		Dispositional Trust	-.01	.05	.90
		<b>Perceived Risk in Conservation Programs</b>	-.09	.04	.03
		rNEP	.08	.05	.10
		Obj. Knowledge (juris.)	-.05	.05	.32
		Subj. Knowledge	.08	.05	.14
		Experience (staff)	.03	.05	.55
<i>Access</i> (no financial incentive)	<i>R</i> <sup>2</sup> = .12, <i>p</i> < .001	<b>Higher Order</b>	.21	.06	< .001
		Dispositional Trust	.01	.05	.79
		<b>Perceived Risk in Access Programs</b>	-.25	.04	< .001
		rNEP	.05	.03	.12
		Obj. Knowledge (juris.)	-.07	.04	.17
		Subj. Knowledge	.02	.05	.63
		Experience (staff)	-.03	.05	.55
<i>Conservation</i> (with financial incentive)	<i>R</i> <sup>2</sup> = .08, <i>p</i> = .001	<b>Higher Order</b>	.21	.06	< .001
		Dispositional Trust	-.001	.05	.98
		Perceived Risk in Conservation Programs	-.08	.04	.06
		<b>rNEP</b>	.08	.04	.03
		Obj. Knowledge (juris.)	-.03	.05	.52
		<b>Subj. Knowledge</b>	.11	.05	.04
		Experience (staff)	.07	.05	.21
<i>Access</i> (with financial incentive)	<i>R</i> <sup>2</sup> = .09, <i>p</i> < .001	<b>Higher Order</b>	.21	.05	< .001
		Dispositional Trust	.01	.05	.88
		<b>Perceived Risk in Access Programs</b>	-.17	.04	< .001
		rNEP	.06	.03	.054
		Obj. Knowledge (juris.)	-.08	.05	.09
		Subj. Knowledge	.07	.05	.19
		Experience (staff)	-.07	.05	.21

Note. \*\*\* *p* < .001, \*\* *p* < .01, \* *p* < .05, + *p* < .10; **bolded** constructs are significant predictors



**Table 13** – Subjective Knowledge Measurement Invariance Tests

Model	$\chi^2$	df	CFI	TLI	RMSEA	SRMR	Relevant Comparison
Subjective Knowledge – Lower Order Factors							
Configural Invar. Model	580.09	274	.96	.95	.06*	.04	-
Metric Invar. Model	600.97	287	.96	.95	.06*	.04	-2LL $\Delta$ (13) = 20.74; $p$ = .07
<b>Scalar Invar. Model</b>	<b>625.14</b>	<b>300</b>	<b>.95</b>	<b>.95</b>	<b>.06*</b>	<b>.05</b>	<b>-2LL<math>\Delta</math> (13) = 23.34; <math>p</math> = .04</b>
Partial Scalar Invar. Model	616.29	299	.95	.95	.06*	.05	-2LL $\Delta$ (12) = 12.64; $p$ = .40
Partial Residual Invar. Model	626.083	317	.96	.95	.06	.05	-2LL $\Delta$ (18) = 19.68; $p$ = .35
Subjective Knowledge – Higher Order Factor							
Configural Invar. Model	657.32	336	.95	.95	.06	.05	-
Metric Invar. Model	665.75	340	.95	.95	.06	.05	-2LL $\Delta$ (4) = 8.52; $p$ = .07
Scalar Invar. Model	665.75	340	.95	.95	.06	.05	-
<b>Residual Invar. Model</b>	<b>681.02</b>	<b>345</b>	<b>.95</b>	<b>.95</b>	<b>.06</b>	<b>.05</b>	<b>-2LL<math>\Delta</math> (5) = 14.93; <math>p</math> = .01</b>
Partial Residual Invar. Model	669.33	344	.95	.95	.06	.05	-2LL $\Delta$ (4) = 4.31; $p$ = .37
Subjective Knowledge Moderation Tests							
<i>coconno</i> on the Higher Order Factor	862.47	481	.95	.95	.05	.05	-2LL $\Delta$ (1) = 0.02; $p$ = .89
<i>coaccno</i> on the Higher Order Factor	862.88	481	.95	.95	.05	.05	-2LL $\Delta$ (1) = 0.04; $p$ = .84
<i>coconfin</i> on the Higher Order Factor	862.43	481	.95	.95	.05	.05	-2LL $\Delta$ (1) = 0.04; $p$ = .84
<i>coaccfin</i> on the Higher Order Factor	862.92	481	.95	.95	.05	.05	-2LL $\Delta$ (1) = 0.34; $p$ = .56
<i>coconno</i> on Dispositional Trust	865.13	481	.95	.95	.05	.05	-2LL $\Delta$ (1) = 2.90; $p$ = .09
<i>coaccno</i> on Dispositional Trust	862.65	481	.95	.95	.05	.05	-2LL $\Delta$ (1) = 0.00; $p$ > .99
<i>coconfin</i> on Dispositional Trust	863.23	481	.95	.95	.05	.05	-2LL $\Delta$ (1) = 0.67; $p$ = .41
<i>coaccfin</i> on Dispositional Trust	862.79	481	.95	.95	.05	.05	-2LL $\Delta$ (1) = 0.24; $p$ = .62

Note. \*\*\*  $p$  < .001, \*\*  $p$  < .01, \*  $p$  < .05, +  $p$  < .10; **bolded** rows are significantly different from the previous model

**Table 14** – Objective Knowledge Measurement Invariance Tests

Model	$\chi^2$	df	CFI	TLI	RMSEA	SRMR	Relevant Comparison
Objective Knowledge – Lower Order Factors							
Configural Invar. Model	579.55	274	.95	.94	.06**	.04	-
Metric Invar. Model	597.94	287	.95	.94	.06*	.05	-2LL $\Delta$ (13) = 19.35; $p$ = .11
Scalar Invar. Model	619.54	300	.95	.94	.06*	.06	-2LL $\Delta$ (13) = 19.98; $p$ = .10
Residual Invar. Model	609.77	319	.96	.95	.05	.06	-2LL $\Delta$ (19) = 8.41; $p$ = .98
Objective Knowledge – Higher Order Factor							
Configural Invar. Model	639.29	338	.96	.96	.05	.06	-
Metric Invar. Model	647.78	342	.96	.96	.06	.05	-2LL $\Delta$ (4) = 8.65; $p$ = .07
Scalar Invar. Model	647.78	342	.96	.96	.06	.05	-
<b>Residual Invar. Model</b>	<b>663.81</b>	<b>347</b>	<b>.95</b>	<b>.95</b>	<b>.05</b>	<b>.06</b>	<b>-2LL<math>\Delta</math> (5) = 14.96; <math>p</math> = .01</b>
Partial Residual Invar. Model	656.34	346	.95	.96	.05	.06	-2LL $\Delta$ (4) = 8.43; $p$ = .08
Objective Knowledge Moderation Tests							
<i>coconno</i> on the Higher Order Factor	859.26	483	.95	.95	.05	.06	-2LL $\Delta$ (1) = 0.17; $p$ = .68
<b><i>coaccno</i> on the Higher Order Factor</b>	<b>862.00</b>	<b>483</b>	<b>.95</b>	<b>.95</b>	<b>.05</b>	<b>.06</b>	<b>-2LL<math>\Delta</math> (1) = 3.99; <math>p</math> &lt; .05</b>
<i>coconfin</i> on the Higher Order Factor	860.85	483	.95	.95	.05	.06	-2LL $\Delta$ (1) = 2.13; $p$ = .14
<i>coaccfin</i> on the Higher Order Factor	861.00	483	.95	.95	.05	.06	-2LL $\Delta$ (1) = 2.33; $p$ = .13
<b><i>coconno</i> on Dispositional Trust</b>	<b>862.42</b>	<b>483</b>	<b>.95</b>	<b>.95</b>	<b>.05</b>	<b>.06</b>	<b>-2LL<math>\Delta</math> (1) = 4.53; <math>p</math> = .03</b>
<b><i>coaccno</i> on Dispositional Trust</b>	<b>862.99</b>	<b>483</b>	<b>.95</b>	<b>.95</b>	<b>.05</b>	<b>.06</b>	<b>-2LL<math>\Delta</math> (1) = 5.37; <math>p</math> = .02</b>
<i>coconfin</i> on Dispositional Trust	859.65	483	.95	.95	.05	.06	-2LL $\Delta$ (1) = 0.79; $p$ = .37
<i>coaccfin</i> on Dispositional Trust	859.00	483	.95	.95	.05	.06	-2LL $\Delta$ (1) = 0.01; $p$ = .94

Note. \*\*\*  $p$  < .001, \*\*  $p$  < .01, \*  $p$  < .05, +  $p$  < .10; **bolded** rows are significantly different from the previous model

**Table 15** – Experience Measurement Invariance Tests

Model	$\chi^2$	df	CFI	TLI	RMSEA	SRMR	Relevant Comparison
Experience – Lower Order Factors							
Configural Invar. Model	559.38	274	.96	.95	.06*	.04	-
Metric Invar. Model	570.81	287	.96	.95	.06	.05	-2LL $\Delta$ (13) = 11.86; $p = .54$
<b>Scalar Invar. Model</b>	<b>610.28</b>	<b>300</b>	<b>.96</b>	<b>.95</b>	<b>.06*</b>	<b>.05</b>	<b>-2LL<math>\Delta</math> (13) = 43.14; <math>p &lt; .001</math></b>
<b>Partial Scalar Invar. Model</b>	<b>597.64</b>	<b>299</b>	<b>.96</b>	<b>.95</b>	<b>.06</b>	<b>.05</b>	<b>-2LL<math>\Delta</math> (12) = 27.69; <math>p = .006</math></b>
Partial Scalar Invar. Model	587.61	298	.96	.95	.06	.04	-2LL $\Delta$ (11) = 15.39; $p = .17$
Partial Residual Invar. Model	598.98	315	.96	.96	.05	.04	-2LL $\Delta$ (17) = 19.15; $p = .32$
Experience – Higher Order Factor							
Configural Invar. Model	625.06	334	.96	.96	.05	.05	-
Metric Invar. Model	629.01	338	.96	.96	.05	.05	-2LL $\Delta$ (4) = 3.59; $p = .46$
Scalar Invar. Model	629.01	338	.96	.96	.05	.05	-
Residual Invar. Model	632.94	343	.96	.96	.05	.05	-2LL $\Delta$ (5) = 4.64; $p = .46$
Experience Moderation Tests							
<i>coconno</i> on the Higher Order Factor	825.29	480	.96	.96	.05	.05	-2LL $\Delta$ (1) = 3.28; $p = .07$
<b><i>coaccno</i> on the Higher Order Factor</b>	<b>829.38</b>	<b>480</b>	<b>.96</b>	<b>.96</b>	<b>.05</b>	<b>.06</b>	<b>-2LL<math>\Delta</math> (1) = 10.75; <math>p = .001</math></b>
<i>coconfin</i> on the Higher Order Factor	823.45	480	.96	.96	.05	.05	-2LL $\Delta$ (1) = 1.50; $p = .22$
<i>coaccfin</i> on the Higher Order Factor	822.68	480	.96	.96	.05	.05	-2LL $\Delta$ (1) = 0.67; $p = .41$
<i>coconno</i> on Dispositional Trust	822.88	480	.96	.96	.05	.05	-2LL $\Delta$ (1) = 0.81; $p = .37$
<i>coaccno</i> on Dispositional Trust	822.64	480	.96	.96	.05	.05	-2LL $\Delta$ (1) = 2.30; $p = .13$
<i>coconfin</i> on Dispositional Trust	822.84	480	.96	.96	.05	.05	-2LL $\Delta$ (1) = 0.74; $p = .39$
<i>coaccfin</i> on Dispositional Trust	822.09	480	.96	.96	.05	.05	-2LL $\Delta$ (1) = 0.00; $p > .99$

Note. \*\*\*  $p < .001$ , \*\*  $p < .01$ , \*  $p < .05$ , +  $p < .10$ ; **bolded** rows are significantly different from the previous model

**Table 16** – Study 2 Observed Variable Scales Evaluation

	Construct	N of items	$\alpha$	Averages Across Items			
				M	SD	Skew	Kurtosis
Commission	Subjective Knowledge	4	.91	2.69	0.75	0.50	0.54
	Care	3	.83	4.69	1.19	-0.39	-0.34
	Competence	3	.88	4.96*	1.12	-1.03	1.79
	Confidence	4	.95	4.79*	1.31	-0.63	-0.08
	Procedural Fairness	3	.88	4.97*	1.03	-0.12	-0.72
	Salient Values Similarity	3	.93	4.88*	1.33	-0.57	-0.67
Initiative	Subjective Knowledge	4	.96	2.68	1.07	-0.04	-0.63
	Care	3	.85	5.00	1.15	-1.78	6.22
	Competence	3	.92	5.42*	0.89	-0.59	-0.98
	Confidence	4	.91	5.29*	0.94	-0.41	-0.99
	Procedural Fairness	3	.86	5.22*	0.90	-0.25	-1.34
	Salient Values Similarity	3	.94	5.29*	1.05	-0.96	1.09
rNEP		15	.89	4.52	1.02	-0.11	1.04
Dispositional Trust		3	.74	5.51	0.64	-0.83	0.29
Periodic Burning Attitudes (limited)		3	.81	5.22	1.44	-1.19	0.90

*Note.* \* indicates significant differences across institutions ( $p < .05$ ).

**Table 17 – Burning Questions**

Variable	Response Options (%)						
Burn Now	No (23)	Yes (70)					
Burn Future	VU (11)	U (4)	SU (2)	UD (4)	SL (17)	L (26%)	VL (36)
Risk in Burning	No (13)	Yes (87%)					

*Note.* VU = very unlikely, U = unlikely, SU = somewhat unlikely, UD = undecided, SL = somewhat likely, L = likely, VL = very likely. Row totals may not equal 100 because of rounding.

**Table 18** – Trust Construct Item Average Score Correlations

Construct	1	2	3	4	5	6	7	8	9	10
1- GP Care										
2- GP Competence	.80**									
3- GP Confidence	.88**	.84**								
4- GP Procedural Fairness	.88**	.76**	.84**							
5- GP Salient Values Similarity	.82**	.65**	.79**	.84**						
6- FI Care	.19	.08	.12	.16	.20					
7- FI Competence	.30*	.13	.28	.37*	.38**	.90**				
8- FI Confidence	.22	.04	.24	.29*	.24	.82**	.85**			
9- FI Procedural Fairness	.21	.06	.24	.30*	.23	.82**	.78**	.85**		
10- FI Salient Values Similarity	.22	.07	.21	.31*	.31*	.82**	.78**	.88**	.88**	
11- Dispositional Trust	.31*	.28*	.28*	.36**	.33*	.12	.24	.24	.27	.23

*Note.* GP = Nebraska Game and Parks Commission, FI = Southeast Nebraska Flagship Initiative; \*\*  $p < .01$ , \*  $p < .05$

**Table 19** – Bivariate Self-Report Burn Now Comparisons

Construct	Comparison	Does Not Burn ( <i>n</i> = 12)	Does Burn ( <i>n</i> = 41)	Effect Size
Subjective Knowledge	$F(1,51) = 0.06, p = .80$	$M = 2.65$	$M = 2.71$	$d = 0.07$
<b>Obj. Knowledge (jurisdiction)</b>	$\chi(1) = 6.31, p = .02^*$	% correct = 25	% correct = 66	$r = .33$
Experience (staff)	$F(1,51) = 0.01, p = .93$	$M = 2.63$	$M = 2.60$	$d = 0.03$
Care	$F(1,51) = 0.02, p = .90$	$M = 4.61$	$M = 4.66$	$d = 0.04$
Competence	$F(1,51) = 0.24, p = .63$	$M = 5.09$	$M = 4.90$	$d = 0.13$
Confidence	$F(1,51) = 0.70, p = .41$	$M = 4.48$	$M = 4.86$	$d = 0.23$
Procedural Fairness	$F(1,51) = 0.15, p = .70$	$M = 4.82$	$M = 4.96$	$d = 0.11$
Salient Values Similarity	$F(1,51) = 1.16, p = .29$	$M = 4.45$	$M = 4.94$	$d = 0.30$
Subjective Knowledge	$F(1,51) = 1.18, p = .28$	$M = 2.38$	$M = 2.76$	$d = 0.30$
Obj. Knowledge (partner orgs.)	$\chi(1) = 0.36, p = .62$	% correct = 17	% correct = 10	$r = .08$
Experience (staff)	$F(1,45) = 1.65, p = .21$	$M = 2.09$	$M = 2.60$	$d = 0.37$
<b>Care</b>	$F(1,51) = 6.32, p = .02^*$	$M = 4.27$	$M = 5.24$	$d = 0.69$
<b>Competence</b>	$F(1,51) = 5.66, p = .02^*$	$M = 4.83$	$M = 5.57$	$d = 0.65$
<b>Confidence</b>	$F(1,51) = 4.80, p = .03^*$	$M = 4.73$	$M = 5.45$	$d = 0.60$
<b>Procedural Fairness</b>	$F(1,51) = 5.88, p = .02^*$	$M = 4.63$	$M = 5.39$	$d = 0.67$
Salient Values Similarity	$F(1,51) = 2.05, p = .16$	$M = 4.87$	$M = 5.41$	$d = 0.39$
rNEP	$F(1,51) = 0.13, p = .72$	$M = 4.61$	$M = 4.48$	$d = 0.10$
Dispositional Trust	$F(1,51) = 1.32, p = .26$	$M = 5.31$	$M = 5.55$	$d = 0.32$
Burn Risk	$\chi(1) = 0.65, p = .65$	% perceive risk = 83	% perceive risk = 88	$r = .10$
<b>Periodic Burning Attitudes (limited)</b>	$F(1,51) = 27.96, p < .001$	$M = 3.64$	$M = 5.68$	$d = 1.45$
Previous contract with the Initiative	$\chi(1) = 8.14, p = .07$	% with contract = 17	% perceive risk = 63	$r = .37$

*Note.* Bolded constructs are significantly different by Burn Now condition.  $d$  (Cohen's  $d$ ),  $d = 0.20$  (small),  $d = 0.50$  (medium),  $d = 0.80$  (large);  $r$  (Pearson's  $r$ ),  $r = .10$  (small),  $r = .30$  (medium),  $r = .50$  (large)

**Table 20** – Bivariate Dichotomous Objective Cooperation Comparisons

Construct	Comparison	Not Cooperating ( <i>n</i> = 8)	Cooperating ( <i>n</i> = 23)	Effect Size	
Commission	Subjective Knowledge	$F(1,28) = 0.51, p = .48$	$M = 2.34$	$M = 2.57$	$d = 0.26$
	Obj. Knowledge (jurisdiction)	$\chi(1) = 0.34, p = .68$	% correct = 75	% correct = 64	$r = .10$
	Experience (staff)	$F(1,28) = 0.98, p = .33$	$M = 2.38$	$M = 2.73$	$d = 0.36$
	Care	$F(1,28) = 0.09, p = .77$	$M = 4.79$	$M = 4.64$	$d = 0.11$
	Competence	$F(1,28) = 0.34, p = .57$	$M = 5.13$	$M = 4.86$	$d = 0.21$
	Confidence	$F(1,28) = 0.06, p = .80$	$M = 5.00$	$M = 4.87$	$d = 0.09$
	Procedural Fairness	$F(1,28) = 0.07, p = .79$	$M = 4.96$	$M = 5.07$	$d = 0.10$
	Salient Values Similarity	$F(1,28) = 0.28, p = .60$	$M = 4.83$	$M = 5.12$	$d = 0.19$
Initiative	Subjective Knowledge	$F(1,28) = 1.67, p = .21$	$M = 2.66$	$M = 3.19$	$d = 0.47$
	Obj. Knowledge (partner orgs.)	$\chi(1) = 1.34, p = .54$	% correct = 0	% correct = 15	$r = .21$
	Experience (staff)	$F(1,26) = 0.15, p = .70$	$M = 2.86$	$M = 2.70$	$d = 0.15$
	Care	$F(1,28) = 0.09, p = .76$	$M = 5.33$	$M = 5.17$	$d = 0.11$
	Competence	$F(1,27) = 1.23, p = .28$	$M = 5.58$	$M = 5.88$	$d = 0.41$
	Confidence	$F(1,27) < 0.00, p = .95$	$M = 5.69$	$M = 5.70$	$d = 0.00$
	Procedural Fairness	$F(1,26) = 0.10, p = .76$	$M = 5.67$	$M = 5.58$	$d = 0.12$
Salient Values Similarity	$F(1,26) = 0.02, p = .90$	$M = 5.67$	$M = 5.70$	$d = 0.05$	
rNEP	$F(1,29) = 0.07, p = .80$	$M = 4.63$	$M = 4.50$	$d = 0.10$	
Dispositional Trust	$F(1,29) = 0.12, p = .74$	$M = 5.58$	$M = 5.67$	$d = 0.12$	
Burn Risk	$\chi(1) = 0.72, p = .44$	% perceive risk = 86	% perceive risk = 95	$r = .15$	
Periodic Burning Attitudes (limited)	$F(1,27) = 2.22, p = .15$	$M = 6.17$	$M = 5.73$	$d = 0.99$	
Previous contract with the Initiative	$\chi(1) = 0.10, p < 1.00$	% with contract = 88	% perceive risk = 91	$r = .06$	

*Note.* Bolded constructs are significantly different by Burn Now condition.  $d$  (Cohen's  $d$ ),  $d = 0.20$  (small),  $d = 0.50$  (medium),  $d = 0.80$  (large);  $r$  (Pearson's  $r$ ),  $r = .10$  (small),  $r = .30$  (medium),  $r = .50$  (large)



## REFERENCES

- Adams, J. S. (1965). Inequity in social exchange. In L. Berkowitz (Ed.) *Advances in experimental social psychology* (Vol. 2, pp. 267-299). New York: Academic Press.
- Administrative Procedures Act, 5 U.S.C.A. §557 (1946).
- Allen, C. R., Fontaine, T. J., Pope, K. L., & Garmestani, A. S. (2011). Adaptive management for a turbulent future. *Journal of Environmental Management*, *92*, 1339-1345.
- Allum, N. (2007). An empirical test of competing theories of hazard-related trust: The case of GM food. *Risk Analysis*, *27*, 935-946.
- Amin, L., Jahi, J. M., Nor, A. R. M., Osman, M., & Mahadi, N. M. (2007). Public acceptance of modern biotechnology. *Asia Pacific Journal of Molecular Biology and Biotechnology*, *15*(2), 39-51.
- Armitage, D. R., Plummer, R., Berkes, F., Arthur, R. I., Charles, A. T., Davidson-Hunt, I. J., Diduck, A. P., Doubleday, N. C., Johnson, D. S., Marschke, M., McConney, P., Pinkerton, E. W., & Wollenberg, E. K. (2009). Adaptive co-management for social-ecological complexity. *Frontiers in Ecology and the Environment*, *7*, 95-102. doi: 10.1890/070089
- Ashraf, N., Bohnet, I., & Piankov, N. (2006). Decomposing trust and trustworthiness. *Experimental Economics*, *9*, 193-208.
- Bamford v. Upper Republican Natural Resources District, 245 Neb. 299, 512 N.W.2d 642 (Neb. 1994).
- Barber, B. (1983). *The Logic and Limits of Trust*, Rutgers University Press New Brunswick New Jersey.
- Barnett, T. P., Pierce, D. W., Hidalgo, H. G., Bonfils, C., Santer, B. D., Das, T., Bala, G., Wood, A. W., Nozawa, T., Mirin A. A., Cayan, D. R., & Dettinger, M. D. (2008). Human-induced changes in the hydrology of the western United States. *Science*, *319*, 1080-1083.
- Beetham, D. (1991). *The legitimation of power*. London: Macmillian.
- Bell, B., Ryan, A. M., & Wiechmann, D. (2004). Justice expectations and applicant perceptions. *International Journal of Selection and Assessment*, *12*, 24-38.
- Bell, B., Wiechmann, D., & Ryan, A. M. (2006). Consequences of organizational justice expectations in a selection system. *Journal of Applied Psychology*, *91*, 455-466.
- Benesh, S. (2002). Understanding public confidence in American courts. *The Journal of Politics*, *68*, 697-707.

- Benesh, S. C. & Howell, S. E. (2006). Confidence in the courts: A comparison of users and non-users. *Behavioral Sciences and the Law*, *19*, 199-214.
- Berkes, F. (2009). Evolution of co-management: Role of knowledge generation, bridging organizations and social learning. *Journal of Environmental Management*, *90*, 1692-1702.
- Besley, J. C. (2010). Public engagement and the impact of fairness perceptions on decision favorability and acceptance. *Science Communication*, *32*, 256-280.
- Bies, R. J. & Moag, J. F. (1986). Interactional justice: Communication criteria of fairness. In R. J. Lewicki, B. H. Sheppard, & M. H. Bazerman (Eds.) *Research on negotiations in organizations* (Vol. 1, pp.43-55). Greenwich, CT: JAI Press.
- Bigley, G. A. & Pearce, J. L. (1998). Straining for shared meaning in organization science: problems of trust and distrust. *Academy of Management Review*, *23*, 405-421.
- Bornstein, B. H., Tomkins, A. J., Neeley, E. M., Herian, M. N., & Hamm, J. A. (2013). Reducing courts' failure-to-appear rate by written reminders. *Psychology, Public Policy, and Law*, *19*, 70-80. doi: 10.1037/a0026293
- Boukaert, G. & van de Walle, S. (2003). Comparing measures of citizen trust and user satisfaction as indicators of 'good governance': Difficulties in linking trust and satisfaction indicators. *International Review of Administrative Sciences*, *69*, 329-343.
- Catlaw, T. J. & Hu, Q. (2009). Legitimacy and public administration: Constructing the American bureaucratic fields. *American Behavioral Scientist*, *53*, 458-481.
- Cademan, K., Frendberg, J., & Savic, N. (2012). *Relationship marketing regarding the fashion industry: Trust, commitment and communication*. Bachelor thesis from Linneaus University, School of Business and Economics. Retrieved from <http://lnu.diva-portal.org/smash/get/diva2:532210/FULLTEXT01>
- Central Nebraska Public Power And Irrigation District v. North Platte Natural Resources District, 280 Neb. 533, 788 N.W.2d 252 (Neb. 2010).
- Chanley, V. A., Rudolph, T. J., & Rahn, W. M. (2000). The origins and consequences of public trust in government: A time series analysis. *The Public Opinion Quarterly*, *64*, 239-256.
- Chevron U.S.A., Inc. V. Natural Resources Defense Council, Inc., 467 U.S. 837 (1984).
- Clark, D., & Downes, D. (1996). What price biodiversity? Economic incentives and biodiversity conservation in the United States. *Journal of Environmental Law and Litigation*, *11*, 9-90.
- Clean Water Act, 33 U.S.C.A. §1365 (1972).
- Clean Air Act, 42 U.S.C.A. §7604 (1963).

- Cobb, M. D., & Macoubrie, J. (2004). Public perceptions about nanotechnology: Risks, benefits, and trust. *Journal of Nanoparticle Research*, 6, 395-405.
- Cochran v. State Department of Agriculture, Division of Water Resources, 291 Kan. 898 (2011).
- Colquitt, J. A. (2001). On the dimensionality of organizational justice: A construct validation of a measure. *Journal of Applied Psychology*, 86, 386-400.
- Colquitt, J. A., & Rodell, J. B. (2011). Justice, trust, and trustworthiness: A longitudinal analysis integrating three theoretical perspectives. *Academy of Management Journal*, 54, 1183-1206.
- Colquitt, J. A., Scott, B. A., & LePine, J. A. (2007). Trust, trustworthiness, and trust propensity: A meta-analytic test of their unique relationships with risk taking and job performance. *Journal of Applied Psychology*, 92, 909-927.
- Cook, J., & Wall, T. (1980). New work attitude measures of trust, organizational commitment and personal need non-fulfillment. *Journal of Occupational Psychology*, 53, 39-52.
- Cook T. E., & Gronke, P. (2005). The skeptical American: Revisiting the meanings of trust in government and confidence in institutions. *The Journal of Politics*, 67, 784-803.
- Cropanzano, R., & Ambrose, M. L. (2001) Procedural and distributive justice are more similar than you think: A monistic perspective and a research agenda. In J. Grenberg & R. Cropanzano (Eds.), *Advances in organizational justice* (pp. 119-151). Lexington, MA: New Lexington Press.
- Cvetkovich, G., & Nakayachi K. (2007). Trust in a high-concern risk controversy: A comparison of three concepts. *Journal of Risk Research*, 10, 223-237.
- Cvetkovich, G., & Winter, P. (2003). Trust and social representations of the management of threatened and endangered species. *Environment and Behavior*, 35, 286-307.
- De Cremer, D., & Tyler, T. R. (2007). The effects of trust in authority and procedural fairness on cooperation. *Journal of Applied Psychology*, 92, 639-649.
- De Jonge, J., Van trijp, H., Renes, R. J., & Frewer, L. (2007). Understanding consumer confidence in safety of food: Its two-dimensional structure and determinants. *Risk Analysis*, 27, 729-740.
- Delli Carpini, M. X., & Keeter, S. (1993). Measuring political knowledge: Putting first things first. *American Journal of Political Science*, 37, 1179-1206.
- Denning V. KPERS, 285 Kan, 1045, 180 P.3d 564 (Kan. 2008).
- Deutsch, M. (1975). Equity, equality, and need: What determines which value will be used as the basis for distributive justice? *Journal of Social Issues*, 31(3), 137-149.

- Duerfeldt v. State Game and Parks Commission, 184 Neb. 242, 166 N.W.2d 737 (Neb. 1969).
- Dunlap, R. E., Van Liere, K. D. (1978). The “new environmental paradigm”: A proposed measuring instrument and preliminary results. *Journal of Environmental Education*, 9(3), 10-19.
- Dunlap, R. E., Van Liere, K. D., Mertig, E. G., & Jones, R. E. (2000). Measuring endorsement of the New Ecological Paradigm: A revised NEP scale. *Journal of Social Issues*, 56, 425-442.
- Duram, L. A., & Brown, K. G. (1999). Assessing public participation in U.S. watershed planning activities, *Society and Natural Resources*, 12, 455-467.
- Earle, T. C., & Siegrist, M. (2008). On the relation between trust and fairness in environmental risk management. *Risk Analysis*, 28, 1395-1413.
- Earle, T. C., Siegrist, M., & Gutscher, H. (2007). Trust, risk perception and the TCC model of cooperation. In M. Siegrist, T. C. Earle, H. Gutscher (Eds.) *Trust in Cooperative Risk Management: Uncertainty and Skepticism in the Public Mind* (pp. 1-49). London: Earthscan.
- Earle, T. C. (2010). Trust in risk management: A model-based review of empirical research. *Risk Analysis*, 30, 541-574.
- Easton, D. (1965). *A systems analysis of political life*. New York: Wiley.
- Finkel, N. J. (2000). But it's not fair!: Commonsense notions of unfairness. *Psychology, Public Policy and the Law*, 6, 898-951.
- Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention, and behavior: An introduction to theory and research*. Reading, MA: Addison-Wesley.
- Fischman, R. (2005). Cooperative federalism and natural resources law. *New York University Environmental Law Journal*, 14, 179-231.
- Flitcrift, R., Dedrick, D. C., Smith, C. L., Thieman, C. A., & Bolte, J. P. (2010). Trust: The critical element for successful watershed management. *Ecology and Society*, 15(3), resp.3. [online] URL <http://www.ecologyandsociety.org/vol15/iss3/resp3/>
- Foos v. Terminix, 277 Kan. 687, 89 P.3d 546 (Kan. 2004).
- Frank v. Kansas Dept. of Agriculture, Div. of Water Resources, 40 Kan.App.2d 1024 (2008).
- Frenchman-Cambridge Irrigation District v. Department of Natural Resources, 281 Neb. 992, 801 N.W.2d 253 (Neb. 2011).
- Fukuyama, F. (1995). *Trust: Social virtues and the creation of prosperity*. NY: Free Press.

- Garey v. Nebraska Department of Natural Resources, 277 Neb. 149, 759 N.W.2d 919 (Neb. 2009).
- Gibson, J. L., & Caldeira, G. A. (2003). Defenders of democracy? Legitimacy, popular acceptance, and the South African Constitutional Court. *Journal of Politics*, 65, 1-30.
- Gibson, J. L. (1991). Institutional legitimacy, procedural fairness, and compliance with Supreme Court decisions: A question of causality. *Law and Society Review*, 25(3), 631-636.
- Gibson, J. L. (2008). Challenges to the impartiality of state supreme courts: Legitimacy theory and “new-style” judicial campaigns. *American Political Science Review*, 102, 59-75.
- Gibson, J. L., Caldeira, G. A., & Spence, L. K. (2002). The role of theory in experimental design: Experiments without randomization. *Political Analysis*, 10, 362-375.
- Gibson, J. L., Caldeira, G. A., & Spence, L. K. (2005). Why do people accept public policies they oppose? Testing legitimacy theory with a survey-based experiment. *Political Research Quarterly*, 58, 187-201.
- Gibson, J. L., Caldeira, G. A., & Spence, L. K. (2003). Measuring attitudes toward the United States Supreme Court. *American Journal of Political Science*, 47, 354-367.
- Gilley, B. (2006). The meaning and measure of state legitimacy: Results for 72 countries. *European Journal of Political Research*, 45, 499-525.
- Golparvar, M., & Javadian, Z. (2012). Moderating effects of the Big Five Personality Factors on the relationship between perceived organizational behaviors (OCBs). *European Journal of Scientific Research*, 74, 527-543.
- Grabner-Krauter, S., & Kaluscha, E. A. (2003) Empirical research in on-line trust: A review and critical assessment. *International Journal of Human-Computer Studies*, 58, 783-812.
- Graham v. Dokter Trucking Group, 284 Kan. 547, 554, 161 P.3d 695 (Kan. 2007).
- Greenberg, J. (1987). A taxonomy of organizational justice theories. *The Academy of Management Review*, 12, 9-22.
- Greenberg, J. (1993). Stealing in the name of justice: Informational and interpersonal moderators of theft reactions to underpayment inequity. *Organizational Behavior and Human Decision Process*, 54(1), 81-103.
- Gupta, V., & Singh, S. (2013). An empirical study of the dimensionality of organizational justice and its relationship with organizational citizenship behavior in the Indian context. *The International Journal of Human Resource Management*, 24, 1277-1299.

- Hamm, J. A., PytlikZillig, L. H., Tomkins, A. J., Herian, M. H., Bornstein, B. H., & Neeley, E. M. (2011). Exploring separable components of institutional confidence. *Behavioral Sciences and the Law*, *29*, 95-115. doi: 10.1002/bsl.965
- Hamm, J. A., PytlikZillig, L. M., Herian, M. N., Bornstein, B. H., Tomkins, A. J., & Hoffman, L. (2013a). Deconstructing confidence in state courts. *Journal of Trust Research*, *3*, 11-31.
- Hamm, J. A., PytlikZillig, L. M., Herian, M. N., Tomkins, A. J., Dietrich, H., & Michaels, S. (2013). Trust and intention to comply with a water allocation decision: The moderating roles of knowledge and consistency. *Ecology and Society*, *18*(4), art. 49. Retrievable at <http://www.ecologyandsociety.org/vol18/iss4/art49/>
- Hans, V. P., & Ermann, M. D. (1989). Responses to corporate versus individual wrongdoing. *Law and Human Behavior*, *13*, 151-166.
- Hardin, G. (1968). The tragedy of the commons, *Science*, *162*, 1243-1248.
- Hardin, R. (1998). Trust in government. In V. Braithwaite and M. Levi (Eds.) *Trust & Governance* (pp. 9-27). New York: Russell Sage Foundation.
- Hardin, R. (1999). Do we want trust in government? In M. E. Warren (Ed.) *Democracy and Trust* (pp. 22-41). New York: Cambridge University Press.
- Hardin, R. (2006a). The street-level epistemology of trust. In R. M. Kramer (Ed.), *Organizational trust: A reader* (pp. 21-47). New York: Oxford University Press.
- Hardin, R. (2006b). *Trust*. Malden, MA: Polity Press.
- Haven Home Inc. v. Department of Public Welfare, 216 Neb. 731, 346 N.W.2d 225 (Neb. 1984).
- Hechter, M. (2009). Legitimacy in the modern world. *American Behavioral Scientist*, *53*, 279-288.
- Hegtvedt, K. A., Clay-Warner, J., & Johnson, C. (2003). The social context of responses to injustice: Considering the indirect and direct effects of group-level factors. *Social Justice Research*, *16*, 343-366.
- Hegtvedt, K. A., & Johnson, C. (2009). Power and justice: Toward and understanding of legitimacy. *American Behavioral Scientist*, *53*, 376-399.
- Hegtvedt, K. A., Johnson, C., Ganem, N. M., Waldron, K. W., & Brody, L. M. (2009). When will the unaffected seek justice for others? Perceptions of and responses to another's injustice. *Australian Journal of Psychology*, *61*, 22-31.
- Herian, M. N., Hamm, J. A., Tomkins, A. J., PytlikZillig, L. M. (2012). Public participation, procedural fairness and evaluations of local governance: The moderating role of uncertainty. *Journal of Public Administration Research and Theory*, *22*, 815-840.

- Hetherington, M. J., & Globetti, S. (2002). Political trust and racial policy preferences. *American Journal of Political Science*, 46, 253-275.
- Hetherington, M. J. (1999). The effect of political trust on the Presidential vote. *The American Political Science Review*, 93, 311-326.
- Hetherington, M. J. (1998). The political relevance of political trust. *The American Political Science Review*, 92, 791-808.
- Hibbing, J., & Theiss-Morse, E. (2001). Process preference and American politics: What the people want government to be. *American Political Science Review*, 95, 145-153.
- Holling, C. S. (1973). Resilience and stability of ecological systems. *Annual Review of Ecology and Systematics*, 4, 1-23.
- Horne, C. (2009). A social norms approach to legitimacy. *American Behavioral Scientist*, 53, 400-415.
- Hu, L., & Bentler, P. M. (1998). Fit indices in covariance structure modeling: Sensitivity to underparameterized model misspecification. *Psychological Methods*, 3, 424-453.
- Huang, L., Sun, K., Ban, J., & Bi, J. (2010). Public perception of blue-algae bloom risk in Hongze Lake of China. *Environmental Management*, 45, 1065-1075.
- In Re 2007 Administrations of Appropriations of Waters of the Niobrara River, 283 Neb. 629, 820 N.W.2d 44 (Neb. 2012).
- In Re Application of Jantzen, 245 Neb. 81, 511 N.W.2d 504 (Neb. 1994).
- In Re Application of United Telephone. Company, 230 Neb. 747, 433 N.W.2d 502 (Neb. 1988).
- Jacobson v. Solid Waste Agency of Northwest Nebraska, 264 Neb. 961, 653 N.W.2d 482 (Neb. 2002).
- Jury, W. A., & Vaux, H. Jr. (2005) The role of science in solving the world's emerging water problems. *Proceedings of the National Academy of Science*. 102, 15715-15720.
- Kasperson, R. E., Golding, D., & Tuler, S. (1992). Social distrust as a factor in siting hazardous facilities and communicating risk. *Journal of Social Issues*, 48, 161-187.
- Kelleher, C. A. & Wollak, J. (2007). Explaining public confidence in branches of state government. *Political Research Quarterly*, 60(4), 707-721.
- Kleppe V. New Mexico, 426 U.S. 529 (1976).

- Koch, E. D. (2002). The practice of endangered species conservation on private lands: One federal biologist's experiences. *Idaho Law Review*, 38, 505-520.
- Kochan, T. A. (2003). Restoring trust in American corporations: Addressing the root cause. *Journal of Management and Governance*, 7, 223-231.
- Kramer, R. M. (1999). Trust and distrust in organizations: emerging perspectives. *Annual Review of Psychology*, 50, 569-598.
- Krauter v. Lower Big Blue Natural Resources District, 199 Neb. 431, 259 N.W.2d 472 (Neb. 1977).
- Lake, D. (2009). Relational authority and legitimacy in international relations. *American Behavioral Scientist*, 53, 331-353.
- La Porta, R. Lopez-de-Silanes, F., Schleifer, A., & Vishny, R. W. (1997). Trust in large organizations. *The American Economic Review*, 87, 333-338.
- Lauber, T. B., & Knuth, B. A. (1997). Fairness in moose management decision-making: The citizens' perspective. *Wildlife Society Bulletin* 25, 776-87.
- Lawrence, R. (1995). Procedural fairness and public involvement in natural resource decision-making. (Unpublished master's thesis). Oregon State University, Corvallis, Oregon.
- Leahy, J. E. & Anderson, D. H. (2008). Trust factors in community-water resource management agency relationships. *Landscape and Urban Planning*, 87, 100-107.
- Lett, M. S., & Knapp, A. M. (2005). Woody encroachment and removal in Mesic Grassland: Production and composition responses of herbaceous vegetation. *The American Midland Naturalist*, 153, 217-231.
- Levi, M. (1997). *Consent, Dissent, and Patriotism*. New York: Cambridge University Press.
- Levi, M., & Stoker, L. (2000). Political trust and trustworthiness. *Annual Review of Political Science*, 3, 475-507.
- Levi, M., Sacks, A. & Tyler, T. R. (2009). Conceptualizing legitimacy, Measuring legitimating beliefs, *American Behavioral Scientist*, 53, 354-375.
- Lewicki, R. J., Tomlinson, E. C., & Gillispie, N. (2006). Models of interpersonal trust development: Theoretical approaches, empirical evidence, and future directions. *Journal of Management*, 32, 991-1022.
- Liljeblad, A., Watson, A. E., & Borrie, W. T. (2007). A look inside the dynamics of trust: A guide for managers. USDA Forest Service Proceedings RMRS-P-49. Retrieved from the Aldo Leopold Wilderness Research Institute website: <http://www.leopold.wilderness.net/pubs/627.pdf>



- Lind, E. A., Kanfer, R., & Earley, P. C. (1990). Voice, control, and procedural fairness: Instrumental and noninstrumental concerns in fairness judgments. *Journal of Personality and Social Psychology*, *59*, 952-959.
- Lind, E. A. (2001). Fairness heuristic theory: Justice judgments as pivotal cognitions in organizational relations. In J. Greenberg & R. Cropanzano (Eds.) *Advances in Organizational Justice*, (pp. 56-88). Stanford, CA: Stanford University Press.
- Lind, E. A., & Tyler, T. R. (1988). *The Social Psychology of Procedural fairness*. New York: Plenum Press.
- Linerooth-Bayer, J., & Fitzgerald, K. B. (1996). Conflicting views on fair siting processes: Evidence from Austria and the U.S. Risk. *Safety & Environment*, *7*, 119-34.
- Lipset, M. S., & Schneider, W. (1987). The confidence gap during the Reagan Years, 1981-1987, *Political Science Quarterly*, *102*, 1-23.
- MacCoun, R. J. (1996). Differential treatment of corporate defendants by juries: An examination of the "deep-pockets" hypothesis. *Law & Society Review*, *30*, 121-162.
- Marbury v. Madison, 5 U.S. 137 (1803).
- Marincioni, F., & Appiotti, F. (2009). The Lyon-Turin high-speed rail: The public debate and perception of environmental risk in Susa Valley, Italy. *Environmental Management*, *43*, 863-875.
- Mayer, R. C., & Davis, J. H. (1999). The effect of the performance appraisal system on trust for management: A field quasi-experiment. *Journal of Applied Psychology*, *84*, 123-136.
- Mayer R. C., Davis, J. H., & Schoorman, F. D. (1995). An integrative model of organizational trust. *The Academy of Management Review*, *20*, 709-734.
- McAllister, D. J. (1995). Affect and cognition-based trust as foundations for interpersonal cooperation in organizations. *Academy of Management Review*, *38*, 24-59.
- McEvily, B., & Tortoriello, M. (2011). Measuring trust in organizational research: Review and recommendations. *Journal of Trust Research*, *1*, 23-63.
- McEvily, B., Perron, V., & Zaheer, A. (2003). Introduction to the special issue on trust in an organizational context. *Journal of Trust Research*, *1*, 1-4.
- McKnight, D. H., & Chervany, N. L. (1996) The meanings of trust. Retrieved from University of Minnesota, Management Information Systems Research Center Web site:  
[http://www.misrc.umn.edu/workingpapers/fullPapers/1996/9604\\_040100.pdf](http://www.misrc.umn.edu/workingpapers/fullPapers/1996/9604_040100.pdf)
- Menell, P. S. (1991). Limitations of legal institutions for addressing environmental risks. *Journal of Economic Perspectives*, *5*, 93-113.

- Metlay, D. (1999). Institutional trust and confidence: A journey into a conceptual quagmire. In G. T. Cvetkovich & R. E. Lofstedt (Eds.), *Social trust and the management of risk* (pp. 100-161). London: Earthscan.
- Middle Niobrara Natural Resources District v. Department Of Natural Resources, 281 Neb. 634, 799 N.W.2d 305 (Neb. 2011).
- Miller, A. H., & Listhaug, A. (1990). Political parties and confidence in government: A comparison of Norway, Sweden, and the United States. *British Journal of Political Science*, 20, 357-286.
- Mischler, W., & Rose, R. (2001). Political support for incomplete democracies: Realist vs. idealist theories and measures. *International Political Science Review*, 22(4), 303-320.
- Mondak, J. J. (1993). Institutional legitimacy and procedural fairness: Reexamining the question of causality. *Law and Society Review*, 27, 559-608.
- Mondak, J. J. (1994). Policy legitimacy and the Supreme Court: The sources and contexts of legitimation. *Political Research Quarterly*, 47, 675-692.
- Mondak, J. J. (1997). The dynamics of public support for the Supreme Court. *The Journal of Politics*, 59, 1114-1142.
- Moorman, R. H., Niehoff, B. P., & Organ, D. W. (1993). Treating employees fairly and organizational citizenship behavior: Sorting the effects of job satisfaction, organizational commitment, and procedural fairness. *Employee Responsibilities and Rights Journal*, 6(3), 209-225.
- Morton, L. W., Regen, E., Engle, D. M., Miller, J. R., & Harr, R. N. (2010). Perceptions of landowners concerning conservation, grazing, fire, and Eastern Red Cedar management in Tallgrass Prairie. *Rangeland Ecology & Management*, 63(6), 645-654.
- Mortensen, M., & Neeley, T. B. (2012). Reflected knowledge and trust in global collaboration. *Management Science*, Articles in Advance, 1-18. doi: <http://dx.doi.org/10.1287/mnsc.1120.1546>.
- Murphy, K., & Tyler, T. R. (2008). Procedural fairness and compliance behavior: The mediating role of emotions. *European Journal of Social Psychology*, 38, 652-668.
- Murphy, K., Tyler, T. R., & Curtis, A. (2009). Nurturing regulatory compliance: Is procedural fairness effective when people question the legitimacy of the law. *Regulation and Governance*, 3, 1-26.
- Muthén, L. K., & Muthén, B. O. (1998) Mplus [v2.0] guide.
- Nannestad, P. (2008). What have we learned about generalized trust, if anything? *Annual Review of Political Science*, 11, 413-436.

- Natural Resources Council of Maine (n.d.). Public land ownership. [Online Report]. Retrieved from <http://www.nrcm.org/documents/publiclandownership.pdf>.
- Nebraska Game and Parks Commission (n.d.). *Nebraska Game and Parks Commission Homepage*. <http://outdoornebraska.ne.gov/default.asp>
- Nebraska Ground Water Management and Protection Act, Nebraska Revised Statutes §46-713.
- Nye, J. S. (2010). The future of American power: Dominance and decline in perspective. *Foreign Affairs*, 2, 2-12.
- Organ, D. W., & Ryan K. (1995). A meta-analytic review of attitudinal and dispositional predictors of organizational citizenship behavior. *Personnel Psychology*, 48, 775-801.
- Organic Technologies Corp. v. State Ex Rel. Iowa Department of Natural Resources, 609 N.W.2d 809 (Iowa 2000).
- Ostom, E., Burger, J., Field, C. B., Norgaard, R. B, & Policansky, D. (1999). Revisiting the commons: local lessons, global challenges, *Science*, 284, 278-282.
- Ostrom, E. (1998). A behavioral approach to the rational choice theory of collective action: Presidential address, *The American Political Science Review*, 92, 1-22.
- Pahl-Wostl, C., Craps, M., Dewulf, A., Mostert, E., Tabara, D., & Taillieu, T. (2007). Social learning and water resources management. *Ecology and Society*, 12(2), art. 5 [online] URL: <http://www.ecologyandsociety.org/vol12/iss2/art5/>
- Papachristos, A.V., Meares, T. L., & Fagan, J. (2009). Why do criminals obey the law? The influence of legitimacy and social networks on active gun offenders. John M. Olin Center Research Paper No. 373, Yale University Law School.
- Peters, R. G., Covello, V. T., & McCallum, D. B. (1997). The determinants of trust and credibility in environmental risk communication. *Risk Analysis*, 17, 43-54.
- Podsakoff, P. M., & MacKenzie, S. B (1993). Citizenship behavior and fairness in organizations: Issues and directions for future research. *Employee Responsibilities and Rights Journal*, 6(3), 257-269.
- Poortinga, W., & Pidgeon N. F. (2006). Prior attitudes, salient values similarity and dimensionality: Toward an integrative model of trust in risk regulation. *Journal of Applied Social Psychology*, 36, 1674-1700.
- Pretty, J. (2003). Social capital and the collective management of resources. *Science*, 302, 1912-1914.
- Putnam, R. D. (2007). E pluribus unum: Diversity and community in the twenty-first century: The 2006 Johan Skytte prize lecture. *Scandinavian Political Studies*, 30, 137-174.

- PytlikZillig, L. M., Tomkins, A. J., Herian, M. N., Hamm, J. A., & Abdel-Monem, T. (2012). Public input methods impacting confidence in government. *Transforming Government: People, Process and Policy*, 6, 92-111. doi: 10.1108/17506161211214840
- Reeson A. F., Tisdell, J. G., & McAllister, R. R. J., (2011). Trust, reputation, and relationships in grazing rights markets: An experimental economic study. *Ecological Economics*, 4(15), 651-658.
- Renn, O., & Levine, D. (1991). Credibility and trust in risk communication. In R. E. Kasperson and P. J. Stallen (Eds.) *Communicating Risks to the Public: International Perspectives* (pp. 175-218): Dordrecht, The Netherlands: Kulwer Academic Publishers.
- Ritter B. A, Fischbein R. L., & Lord R. G. (2005). Implicit and explicit expectations of justice as a function of manager and subordinate race. *Human Relations*, 58, 1501-1521.
- Roberts, K. H., & O'Reilly, C. A. (1974). Failures in upward communication in organizations: Three possible culprits. *Academy of management Journal*, 17, 205-215.
- Robinson, P. H., & Bowers, J. (2011). Perceptions of fairness and justice: The shared aims & occasional conflicts of legitimacy and moral credibility. Retrieved from Social Science Research Network Website: <http://ssrn.com/abstract=1814006>
- Rodell, J. B., & Colquitt, J. A. (2009). Looking ahead in times of uncertainty: The role of anticipatory injustice in an organizational change context. *Journal of Applied Psychology*, 94, 989-1002.
- Rosseau, D. M., Sitkin, S. B., Burt, R. S., & Camerer, C. (1998). Introduction to special topics forum: Not so different after all: A cross-discipline view of trust. *The Academy of Management Review*, 23, 393-404.
- Rothstein, B., (2009). Creating political legitimacy: Electoral democracy versus quality of government. *American Behavioral Scientist*, 53, 311-330.
- Rudolph, T. J., & Evans J. (2005). Political trust, ideology, and public support for government spending. *American Journal of Political Science*, 49, 660-671.
- Sabatier, P. A, Focht, W., Lubell, M., Trachtenberg, Z., Vedlitz, A., & Matlock, M. (2005) Collaborative approaches to watershed management. In P. A. Sabatier, W. Focht, M. Lubell, Z. Trachtenberg, A. Vedlitz, M. Matlock (Eds.) *Swimming Upstream: Collaborative Approaches to Watershed Management* (pp. 3-21). Cambridge, Massachusetts, The MIT Press.
- Schmitz v. Department of Natural Resources, Fish and Wildlife Division, 674 N.W.2d 682 (Iowa 2003).
- Scofield v. Nebraska Department of Natural Resources, 276 Neb. 215, 753 N.W.2d 345 (Neb. 2008).

- Selin, S. W., Pierskalla, C., Smaldone, D., & Robinson, K. (2007). Social learning and building trust through a participatory design for natural resource planning. *Journal of Forestry, 105*, 421-425.
- Shapiro, D. L., & Kirkman, B. L. (2001). Anticipatory injustice: The consequences of expecting injustice in the workplace. In J. Greenberg & R. Cropanzano (Eds.) *Advances in Organizational Justice*, (pp. 56-88). Stanford, CA: Stanford University Press.
- Siegrist, M., Cvetkovich, G., & Roth, C. (2000). Salient value similarity, social trust, and risk/benefit perception. *Risk Analysis, 20*, 353-362.
- Siegrist, M., & Cvetkovich, G. (2000). Perception of hazards: The role of social trust and knowledge. *Risk Analysis, 20*, 713-719.
- Siegrist, M. (2000). The influence of trust and perceptions of risks and benefits on the acceptance of gene technology. *Risk Analysis, 20*, 195-203.
- Siegrist, M. (2010). Trust and confidence: The difficulties in distinguishing the two concepts in research. *Risk Analysis, 30*, 1022-1024.
- Siegrist, M., Earle, T. C., & Gutscher, H. (2003). Test of a trust and confidence model in the applied context of electromagnetic field (EMF) risks. *Risk Analysis, 23*, 705-716.
- Singer, J. W. (2006). The ownership society and takings of property: Castles, investments, and just obligations. *Harvard Environmental Law Review, 30*, 309-338.
- Singh, J.S. (2002). The biodiversity crisis: A multifaceted review. *Current Science, 82*, 638-647.
- Skidmore v. Swift & Co., 323 U.S. 134 (1944).
- Skowronski, J. J. & Carlston, D. E. (1989). Negativity and extremity biases in impression formation: A review of explanations. *Psychological Bulletin, 105*, 131-142.
- Slovic, P. (1999). Trust, emotion, sex, politics, and science: Surveying the risk-assessment battlefield. *Risk Analysis, 19*, 689-701.
- Slovic, P. (2010). Trust in risk management: A model-based review of empirical research. *Risk Analysis, 30*, 541-574.
- Smith, C. A., Organ, D. W., & Near, J. P. (1983). Organizational citizenship behavior: Its nature and antecedents. *Journal of Applied Psychology, 68*, 653-663.
- Spear T. Ranch v. Nebraska Department of Natural Resources, 270 Neb. 130, 699 N.W.2d 379 (Neb. 2005).
- State, Iowa Department of Natural Resources v. Shelley, 512 N.W.2d 579 (Iowa 1993).

- Stewart, R. B. (2001-2002). A new generation of environmental regulation? *Capital University Law Review*, 29, 21-182.
- Stern, M. J. (2008). The power of trust: Toward a theory of local opposition to neighboring protected areas. *Society and Natural Resources*, 21, 859-875.
- Stokes, D. E. (1962). "Popular evaluations of government: An empirical assessment." In H. Cleveland and H. D. Lasswell (Eds.), *Ethics and Bigness: Scientific, Academic, Religious, Political, and Military*, (pp. 61-72) New York: Harper and Brothers.
- Sunrise Country Manor v. Nebraska Department of Social Services, 246 Neb. 726, 735, 523 N.W.2d 499 (Neb. 1994).
- Sweeney, P. D. & McFarlin, D. B. (1993). Workers' evaluation of the "ends" and the "means:" An examination of four models of distributive and procedural fairness. *Organizational Behavior and Human Decision Processes*, 155, 23-40.
- Syme, G. J., Nancarrow, B. E., & McCreddin, J. A. (1999). Defining the components of fairness in the allocation of water to environmental and human uses. *Journal of Environmental Management*, 57, 51-70.
- Thibaut, J., & Walker, L. (1975). *Procedural fairness: A psychological analysis*. Hillsdale, NJ: Erlbaum.
- Tomkins, A. J., Bornstein, B. H., Herian, M. N., & PytlikZillig, L. M. (2011-2014). *Testing a three-stage model of institutional confidence across branches of government*. Ongoing research project funded by National Science Foundation (SES-1061635).
- Turel, O., Yuan, Y. & Connelly, C. E. (2008). In justice we trust: Predicting user acceptance of e-customer services. *Journal of Management Information Systems*, 24, 123-151.
- Turnbull, S. (2003). Building trust in corporations. Presented to 6th International Conference on Corporate Governance and Board Leadership Paper, Henley Management College, UK, 6-8 October 2003. Available at SSRN: <http://ssrn.com/abstract=436401> or <http://dx.doi.org/10.2139/ssrn.436401>
- Tyler, T. R. (2006a). Psychological perspectives on legitimacy and legitimation. *Annual Review of Psychology*, 57, 375-400.
- Tyler, T. R. (2006b) Does the American public accept the rule of law? The findings of psychological research on deference to authority. *DePaul Law Review*, 56, 661-694.
- Tyler, T. R. (2004). Enhancing police legitimacy. *Annals of the American Academy of Political and Social Science*, 593, 84-99.
- Tyler, T. R. (1997). Procedural fairness and compliance with the law. *Swiss Journal of Economics and Statistics*, 133, 219-240.

- Tyler, T. R. (1989). The psychology of procedural fairness: A test of the Group-Value Model. *Journal of Personality and Social Psychology*, 57, 830-838.
- Tyler, T. R., Casper, J. D., & Fisher, B. (1989) Maintaining allegiance toward political authorities: The role of prior attitudes and the use of fair procedures. *American Journal of Political Science*, 33, 629-652.
- U.S. v. General Motors Corporation, 323 U.S. 373 (1945).
- Underwood, V. J., Ober, H. K., Miller, D. J., & Munn, I. A. (2012). Contributions of private landowners to the conservation of the Gopher Tortoise (*Gopherus polyphemus*). *Environmental Management*, 49, 846-854.
- Van den Bos, K., & Lind, E. A. (2002). Uncertainty management by means of fairness judgments. *Advances in Experimental Social Psychology*, 34, 1-60.
- Van Slyke, C., Belanger, F., & Communale, C. L. (2009). A behavioral beliefs model of trustworthiness in consumer-oriented E-commerce. *Journal of Electric Commerce in Organizations*, 7(2), 22-43.
- Vaske, J. J., Bright, A. D., & Absher, J. D. (2007) Salient values similarity, social trust, and attitudes towards wildland fire management strategies. In *Fire Social Science Research from the Pacific Southwest Research Station: Studies Supported by National Fire Plan Funds*, (pp. 233-251). Retrieved from [http://www.fs.fed.us/psw/publications/documents/psw\\_gtr209/psw\\_gtr209.pdf](http://www.fs.fed.us/psw/publications/documents/psw_gtr209/psw_gtr209.pdf)
- Vollan, B., & Ostrom, E. (2010). Cooperation and the commons. *Science*, 330, 923-924.
- Wagoner v. Central Platte Natural Resources District, 247 Neb. 233, 236, 526 N.W.2d 422 (Neb. 1995).
- Walters, C. (1997). Challenges in adaptive management of riparian and costal ecosystems. *Ecology and Society*, 1(2), art. 1. [online] Available from the Internet. URL: <http://www.ecologyandsociety.org/vol1/iss2/art1/>
- Warren, M. E. (1999). *Democracy and trust*. Cambridge, United Kingdom: Cambridge University Press.
- Wheatland Elec. Co-Op., Inc. v. Polansky, 46 Kan.App.2d 746 (2011).
- Wigley, T. B., & Melchior, M. A. (1987). State wildlife management programs for private lands. *Wildlife Society Bulletin*, 15, 580-584.
- Winter, P. L., & Cvetkovich, G. T. (2008). The role of trust, knowledge, concern and gender in the prediction of Californians' reactions to fire management. In *Fire Social Science Research from the Pacific Southwest Research Station: Studies Supported by National Fire Plan Funds*, (pp. 209-210). Retrieved from [http://www.fs.fed.us/psw/publications/documents/psw\\_gtr209/psw\\_gtr209.pdf](http://www.fs.fed.us/psw/publications/documents/psw_gtr209/psw_gtr209.pdf)
- Winter, P. & Cvetkovich, G. (2010). Trust mediates conservation-related behaviors. *Ecopsychology*, 2, 211-219

- Wirth, R. J. & Edwards, M. C. (2007). Item factor analysis: Current approaches and future directions. *Psychological Methods, 12*, 58-79.
- Yandle, T., Hajj, N., & Raciborski, R. (2011). The Goldilocks solution: Exploring the relationship between trust and participation in resource management within the New Zealand Commercial Rock Lobster Fishery. *The Policy Studies Journal, 39*, 631-658. doi: 10.1037/1082-989X.12.1.58.
- Zellmer, S. (2013). Treading water while Congress ignores the nation's environment. *Notre Dame Law Review, 88*, 2323-2398.
- Zellmer, S. & Harder, J. (2008) Unbundling property in water. *Alabama Law Review, 58*, 679-745.
- Zellmer, S. & Johnson, S. A. (2002). Biodiversity in and around McElligot's pool. *Idaho Law Review, 38*, 473-504.



## APPENDIX A – CHAPTER 3 STUDY 1 ITEM NAME AND WORDING LIST

Item Name	Item Wording
<i>subj1</i>	How knowledgeable do you feel you are about the Nebraska Game and Parks Commission generally?
<i>subj2</i>	How knowledgeable do you feel you are about the practices of the Nebraska Game and Parks Commission?
<i>subj3</i>	How knowledgeable do you feel you are about the policies of the Nebraska Game and Parks Commission?
<i>subj4</i>	How knowledgeable do you feel you are about the goals of the Nebraska Game and Parks Commission?
<i>objk1</i>	Where does Nebraska Game and Parks Commission obtain its funding? (mark all that apply)
<i>objk2</i>	The Nebraska Game and Parks Commission can set legally enforceable regulations in what areas? (select the single best answer)
<i>objk3</i>	Members of the Game and Parks Board of Commissioners are: (select the single best answer)
<i>exp1</i>	How often do you attend meetings held by the Nebraska Game and Parks Commission?
<i>exp2</i>	How often have you or your family been financially affected by a decision of the Nebraska Game and Parks Commission?
<i>exp3</i>	How often do you personally have contact with the Nebraska Game and Parks Commission staff?
<i>exp4</i>	How often do you use Nebraska Game and Parks Commission land for recreation (hunting, boating, fishing, hiking, etc.)?
<i>dt1</i>	Generally speaking, I would say that most people can be trusted.
<i>dt2</i>	I think that most people would try to be fair.
<i>dt3</i>	I would say that most of the time people try to be helpful.
<i>care1</i>	For the most part, the decisions made by Game and Parks are made out of care and concern for area residents.
<i>care2</i>	Most decision makers of Game and Parks care about residents in the area they regulate.
<i>care3</i>	The decision makers of Game and Parks put aside their own personal interests in making decisions that are right for the community.
<i>svs1</i>	I believe Game and Parks shares my values about how natural resources should be regulated.
<i>svs2</i>	To the extent that I understand them, I share Game and Park's values about how natural resources should be regulated.
<i>svs3</i>	I believe that Game and Parks supports my values about natural resources allocation.
<i>comp1</i>	Most decision makers of Game and Parks are competent to do their jobs.
<i>comp2</i>	Most decision makers of Game and Parks are highly qualified individuals.
<i>comp3</i>	Most Game and Parks decision makers have the knowledge necessary to do their jobs.
<i>comp4</i>	Most Game and Parks decision makers have the skills necessary to do their jobs.
<i>icon1</i>	My confidence in Game and Parks is high.
<i>icon2</i>	Game and Parks does its job well.
<i>icon3</i>	I have confidence in Game and Parks to do its job.
<i>icon4</i>	I believe Game and Parks will perform its functions as it should.
<i>pf1</i>	The procedures by which Game and Parks decision makers make decisions are fair.
<i>pf2</i>	In my experience, Game and Parks generally has been fair in their dealings with the community.
<i>pf3</i>	I have generally been treated fair by Game and Parks
<i>ricons</i>	Do you believe that there is any risk to you involved in granting the Game and Parks access to your land for the conservation programs? (Note that we are interested in any risk you might perceive regardless of how likely or problematic you believe it is.) Y/N
<i>q16</i>	How important is this risk to your decision to participate in the conservation programs? 3pt
<i>riacce</i>	Do you believe that there is any risk to you involved in granting the Game and Parks access to your land for the access programs? (Note that we are interested in any risk you might perceive

	regardless of how likely or problematic you believe it is.) Y/N
<i>q19</i>	How important is this risk to your decision to participate in the access programs? 3pt
<i>coconno</i>	As of today, how likely are you to voluntarily participate in Nebraska Game and Parks Commission conservation programs that do NOT provide financial incentive?
<i>coconfin</i>	As of today, how likely are you to voluntarily participate in Nebraska Game and Parks Commission conservation programs that DO provide financial incentive?
<i>coaccno</i>	As of today, how likely are you to voluntarily participate in Nebraska Game and Parks Commission access programs that do NOT provide financial incentive?
<i>coconfin</i>	As of today, how likely are you to voluntarily participate in Nebraska Game and Parks Commission access programs that DO provide financial incentive?
<i>nep1</i>	We are approaching the limit of people the earth can support.
<i>nep2</i>	Humans have the right to modify the natural environment to suit their needs.
<i>nep3</i>	When humans interfere with nature it often produces disastrous consequences.
<i>nep4</i>	Human ingenuity will ensure that we do NOT make the earth unlivable.
<i>nep5</i>	Humans are severely abusing the environment.
<i>nep6</i>	The earth has plenty of natural resources if we learn how to develop them.
<i>nep7</i>	Plants and animals have as much right to as humans to exist.
<i>nep8</i>	The balance of nature is strong enough to cope with the impacts of modern industrial nations.
<i>nep9</i>	Despite our special abilities humans are still subject to the laws of nature.
<i>nep10</i>	The so-called "ecological crisis" facing humankind has been greatly exaggerated.
<i>nep11</i>	The earth is like a spaceship with very limited room and resources.
<i>nep12</i>	Humans were meant to rule over the rest of nature.
<i>nep13</i>	The balance of nature is very delicate and easily upset.
<i>nep14</i>	Humans will eventually learn enough about how nature works to be able to control it.
<i>nep15</i>	If things continue on their present course, we will soon experience a major ecological catastrophe.