

**The Impact of Interdependence Awareness and Gender Identity on Consumption of
Common Resources**

By

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ABSTRACT

It is an inevitable fact that people must engage in consumption of common resources, such as sanitary drinking water, clean air, and public facilities. A major concern with common resources is overconsumption, which can lead to the common resource being temporarily or permanently depleted (e.g., deforestation, congested highways, water crisis, and desertification of pasturelands). Protecting common resources from overconsumption requires that individuals consume cooperatively (i.e., reduced consumption of a common resource) rather than competitively (i.e., increased consumption of a common resource). Although prior work has identified many factors that influence people's consumption of common resources, it remains unclear what happens when people fail to see the mutual influences of their common resource consumption in relation to each other. In this dissertation, I attempt to provide the first comparison between situations when people lack versus have awareness of the interdependent influences of their consumption on each other's well-being in the context of commons dilemmas. Building on the appropriateness framework, I hypothesize that interdependence awareness and gender identity interactively affect how people construe the commons dilemmas encountered, and hence, their competition/cooperation motivation and the ensuing consumption of common resources. Across one field and three controlled laboratory studies using different commons dilemma contexts and different manipulations of interdependence awareness, I found converging evidence that for people with a masculine gender identity, having high interdependence awareness activates a competition motivation, which guides their decision making toward advancing

their own welfare (i.e., consuming more); whereas for people with a feminine gender identity, high interdependence awareness activates both competition and cooperation motivations, resulting in controlled consumption of a common resource. Furthermore, results show that attentional focus moderates the interactive effect between interdependence awareness and gender identity. The theoretical and practical implications of these findings are discussed.

PREFACE

This thesis is an original work by Ke Tu. The research project, of which this thesis is a part, received research ethics approval from the University of Alberta Research Ethics Board, Project Name “Common goods consumption,” No. Pro00054626, February 29, 2012. My advisor Professor Jennifer Argo supervised the design of experiments and the collection of data.

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CHAPTER ONE

INTRODUCTION

“Everyone thinks chiefly of his own, hardly at all of the common interests; and only when he is himself concerned as an individual.”—Aristotle, Politics, Book 2,

Chapter 3

Many of the everyday consumption decisions that people make involve common resources, such as the clean air we breathe, the water we use all the time, the highways that take us to our destinations. Formally, a common resource is defined as a resource/good that is non-excludable but rivalrous in that individuals cannot be effectively excluded from use and where use by one individual decreases the amount available to others (Ostrom, Walker, and Gardner 1992; Samuelson 1954). We share the consumption of these resources because it is either too costly to produce our own (e.g., public television, national defense, highways) or impossible to self-produce (e.g., land, air, energy).

Unfortunately, we can easily think of many situations in which a common resource is either temporarily or permanently depleted, even when it is in no one’s interest for depletion to occur. Examples include the global water crisis, the extreme air pollution in Asian countries, and the congested highways during rush hours in metropolises. Each of these situations represents an example of commons dilemmas (a.k.a. the Tragedy of the Commons; Hardin 1968), in which an individual is faced with a conflict between self-interest and the collective interest with respect to a shared resource that is ultimately overconsumed (Van Lange, et al., 2013). Specifically, in a commons

dilemma, an individual's self-interest and the interests of other resource users are in conflict over a limited resource (Dawes 1980). Competition (i.e., taking as much as one wants), as compared to cooperation (i.e., conservation), leads to higher immediate outcomes for each resource consumer, regardless of the others' consumption, but cooperation leads to higher collective outcomes than competition (Dawes 1980). Thus, the main dilemma here is the trade-off between the temptation of immediate self-interest maximization and higher outcomes for the whole group. For example, by asking citizens to reduce their domestic water consumption by decreasing the frequency of watering their lawns, the government is identifying a commons dilemma. An individual gets more of what s/he wants (e.g., a greener front yard) by ignoring the request. However, if everyone ignores the request, the local water reservoir is likely to be depleted and all citizens will suffer. On the other hand if all citizens cooperate, the water level will be maintained and everyone will be better off. In short, cooperative consumption requires people to internalize the interests of other common resource users and to sacrifice a part of their self-interest.

Building on the idea that an individual's self-interest and the interests of the other common resource users are negatively correlated; researchers of commons dilemmas have examined a variety of factors that would encourage an individual to allocate higher importance to the interests of others than to the interest of the self. Examples include factors that reduce the intensity of the conflict between common resource users, such as reciprocity (Axelrod 1984; Milinski, Semmann and Krambeck 2002; Van Lange, Ouwerkerk, and Tazelaar 2002), incentives (i.e., rewards for reduced consumption and penalties for overconsumption; e.g., Balliet, Mulder, and Van Lange 2011; Komorita and

Parks 1994), and individual differences factors in assigning relatively higher weight to self-interest versus others' interests, such as social value orientation (e.g., Kramer McClintock, and Messick 1986; Liebrand 1984; Messick et al. 1983; Parks 1994;) and trust (e.g., Tazelaar, Van Lange, Ouwerkerk 2004; Yamagishi 2011).

However, what happens when people fail to see the trade-off? That is, when consuming a common resource, what are the consequences of people's failure to recognize the negative interdependence of consumption among all common resource users? I believe such failure is particularly likely when consumers engage in real-world commons dilemmas in which they "interact" with each other in extremely large and faceless groups. I confirmed this assumption in an online pilot study where participants indicated the extent to which they think about how their consumption affects, and is affected by, others in 14 commons dilemma situations (e.g., how long to stay in a shower, what temperature to set at home during winter, etc.; see Appendix A for details). Therefore, in the current research, I explore the implications of increasing people's interdependence awareness in decision making in commons dilemmas. Formally, interdependence awareness is defined as the extent to which people are aware of the mutual influences of their consumption of a common resource among all common resource users. It can be thought of as an internal mental state that is part of an individual's understanding of the social aspects of the commons dilemma situation encountered. More simply stated, interdependence awareness involves one's sense of the interdependency in a commons dilemma. Lacking interdependence awareness, or having very low interdependence awareness, represents a state of being ignorant of the inter-

correlation between self-interests and others' interests in commons dilemmas. Conversely, having interdependence awareness involves being conscious about such inter-correlation.

I employ the appropriateness framework (March 1994) as my general theoretical framework, which posits that decision making in commons dilemmas is driven by people's construal of the situation encountered—a result of the interplay of situational cues and people's identity. Specifically, in my dissertation, I focus on how people's gender identity interacts with interdependence awareness (determined by situational factors) in shaping their recognition of a commons dilemma, and hence, their motivated and actual consumption of the common resource. Gender identity was selected for two reasons. First, theoretically, gender differences in social interactions have been shown to be pervasive (e.g., Berg 1984; Eagly 2009; Gould and Slone 1982; Van Emmerik and Jawahar 2005). In short, male identity is often associated with competitive qualities such as aggressiveness, competence, and dominance; whereas female identity is related to cooperative qualities such as communion, agreeableness, and modesty (Berg 1984; Eagly 2009). Thus, it is highly likely that masculine and feminine people will respond differently to different levels of interdependence awareness. Second, from a practical perspective, our world is made up of half males and half females. Information about people's gender identity is readily obtainable when using biological sex as a proxy for it, which is especially valuable when it is not feasible to measure other identity information (e.g., social value orientation). Thus, understanding how gender identity influences decision making in commons dilemma situations will offer meaningful implications for marketing strategies that aim to promote conservation of common resources. In particular, in line with the appropriateness framework, it is proposed in this paper that gender

identity moderates the impact of interdependence awareness on common resource consumption, and such interaction is further mediated by a competition/cooperation motivation. Specifically, I propose and find evidence that people with a masculine gender identity consume significantly more of a common resource when their interdependence awareness is high versus low; whereas people with a feminine gender identity are more likely to control their consumption of a common resource with high, as compared to low, interdependence awareness. I also find evidence that the interactive impact of interdependence awareness and gender identity results from high interdependence awareness leading to different understandings of the situation on the part of masculine and feminine people. That is, high interdependence awareness makes masculine people construe a commons dilemma as competitive, elicits competition motivation, and leads to more aggressive consumption of the common resource. In contrast, feminine people with high interdependence awareness recognize both the competitive and cooperative sides of the situation, and hence, are motivated to behave competitively and cooperatively at the same time. As a result of these two competing motivations, the amount of the common resource they consumer will not differ from the situation when they lack interdependence awareness.

The present dissertation makes important theoretical and practical contributions. Foremost, it contributes to the literature of commons dilemmas by showing the significant impact of interdependence awareness on people's consumption of common resources. Contemporary research in commons dilemmas has focused on examining situations where the conflict between self-interest and the interests of others is readily salient, ignoring the possibility that people may simply fail to recognize such conflict.

One reason for this oversight is that social psychologists have traditionally been using simplified representations of commons dilemmas to investigate decision making, such as the two-person prisoner's dilemma and commons dilemma games with small group size (ranging from 4 to 32)¹. In both cases, it is often clear to participants that the outcomes of their decisions are inter-correlated when they either have face-to-face contact or are informed about the existence of each other. However, this might not be the case in many real-world commons dilemmas that involve extremely large and often faceless groups. Consider the example of domestic water consumption: it is unlikely that people would think about how their consumption of water might influence other people, or how others' water usage might influence their own well-being, when making daily decisions about how much water to use. To my best knowledge, this research provides the first empirical investigation of people's decision making process when they lack versus have interdependence awareness. The manipulation of interdependence awareness was accomplished by using subtle situational cues that highlight the existence of the other common resource users (personal pronouns in Studies 1a and b, presence of the other users in Studies 2 and 3), illustrating the malleability of this construct.

Results from the current research extend our understanding about people's consumption of common resources in extremely large groups (e.g., the whole world's population). As mentioned earlier, prior laboratory experiments in commons dilemmas

¹ In a two-person's prisoner dilemma, two participants must decide whether to cooperate or not, with non-cooperative behavior leading to higher outcomes for each, regardless of the other's action, but mutual cooperation leading to higher joint outcomes than mutual or unilateral non-cooperation (Rapoport and Chammah 1965). In a prototypical commons dilemma game, participants are collectively endowed with a resource of money or chips from which each group member can request an amount. As long as the total group request does not exceed the resource size, all individual requests are granted. If the collective request, however, exceeds the amount available in the collective resource, the resource becomes depleted and all group members receive zero outcomes (e.g., Mosler 1993).

tend to use small group sizes. The generalizability of the results from these studies to real world commons dilemmas remains questionable. Foremost, the relationship between group size and cooperation is still unclear. On one hand, some researchers argue a deleterious effect of group size on cooperation because as the size of a group increases, it leads to lower incentives or payoffs of cooperative behavior (Dawes 1980; Messick 1973), deindividuation (Hamburger, Guyer, and Fox 1975), and diffusion of responsibility (Messick and McClelland 1983). On the other hand, empirical investigations provide ambiguous results. For example, using commons dilemma tasks, Messick and McClelland (1983) found that participants were most cooperative in groups of 3, compared to single individuals and groups of 6; while Liebrand (1984) found no differences in levels of cooperation between groups of 7 and 20. These mixed findings suggest a complex relationship between group size and cooperation in commons dilemmas. Moreover, many of the real world commons dilemmas are characterized by high environmental uncertainty (e.g., lacking information about the size of a common resource pool; Messick, Allison, and Samuelson 1988; Suleiman and Rapoport 1988), and high environmental turbulence (e.g., negative noise; Axelrod and Dion 1988), both of which have been shown to cause increased competitive behavior. Finally, in many real world commons dilemmas with extremely large group size, people usually do not have direct interaction with each other, which limits the possibility of utilizing many of the structural factors that have been found to promote cooperation, such as communication (Chen and Komorita 1994; Zheng et al. 2002), reciprocity (Komorita, Parks, and Hulbert 1992; Weber and Murnighan 2008), and feelings of shared group identity (Van Vugt 2001). Taken together, decision making in real-world commons dilemmas with large

group sizes is likely to be more complex and possibly more competitive than in laboratory settings with small groups. Therefore, I investigate consumption behavior using real-world commons dilemma contexts in both an actual commons dilemma setting (Study 1a) and controlled laboratory settings (Studies 1b, 2 and 3) with a large group of people involved.

The current research adds to the literature of marketing by looking at consumption/overconsumption of environmental common resources, and it provides a substantive contribution by identifying practical suggestions for effective marketing activities aimed at resource preservation. Although marketing scholars have examined environmental issues since the early 1970s (e.g., Anderson and Cunningham 1972; Fisk 1973; Kassarian 1971), there have been few studies during the past four decades that focus on consumer decision making in commons dilemmas (except ; Press and Arnould, 2009; Shultz and Holbrook 1999; Wiener 1993; Wiener and Doescher, 1991). Because many of the pressing environmental problems we face today entail a commons dilemma at their core, it is of both theoretical and practical importance to have more studies on consumption of common resources that help to identify potential avenues for marketing strategies that encourage conservation.

CHAPTER TWO

COMMONS DILEMMAS AND THEORIES

In this chapter, I first discuss the nature of commons dilemmas, and then provide a general review of the theories that have been applied to this topic. The purpose of this chapter is to delineate the consumption situation under investigation, as well as to present an overview of the theories pertinent to the proposed investigation.

Commons Dilemmas

A common resource refers to a valuable resource (e.g., water, fish stocks, highways) that is difficult or, sometimes impossible, to exclude users from benefiting from even though it is subject to degradation as a result of overconsumption (Dietz et al. 2002). The consumption of a common resource creates a commons dilemma in which an individual needs to make a trade-off between self-interest and the interests of others in respect to a shared resource (Dawes 1980). In a prototypical scenario of commons dilemmas, a large number of people consume a valuable but limited resource. Each individual faces a decision about how much of the resource to consume. Overconsumption leads to serious problems, such as depletion of the resource (Dawes 1980; Dietz et al. 2002). The dilemma lies in the fact that if an individual restrains his or her consumption, others might not, and the resource might still be depleted. As a result, everyone is tempted to take as much as he or she can, leading to the overconsumption, or even depletion, of the resource. For example, to reduce greenhouse gas emissions, some people may sacrifice convenience and take public transportation instead of driving private cars, but others may not do so. As a result, the air quality will still deteriorate and

all people will suffer from any adverse consequences resulting from the buildup of greenhouse gases despite some individuals limiting their use of private cars. Therefore, people are motivated to maximize their current self-interest (e.g., driving private cars to work), even though such a choice might sacrifice others' interests and lead to serious problems for the whole group. In other words, in a commons dilemma, the payoff to each individual for his or her socially competitive choice (e.g., turning up the thermostat, taking a long shower, driving a private car) is more tempting than the payoff from his or her cooperative choice, no matter what the other individuals in society do, yet all individuals are worse off if they all decide to behave competitively than if they opt to cooperate (Dawes 1980). Individuals facing a commons dilemma must choose whether to act competitively (i.e., consume as much as one can) or cooperatively (i.e., restrain one's consumption), even though competition is a current dominant strategy

Studies in commons dilemmas have long documented that whether people behave cooperatively or competitively in commons dilemmas depends largely on whether they adopt a competition motivation or a cooperation motivation (Smeesters, Warlop, Van Avermaet, Corneille, and Yzerbyt 2003; Van Lange, Otten, De Bruin, and Joireman 1997). Specifically, competition motivation is defined as a preference for maximizing the relative difference between the well-being of the self and the well-being of others; whereas cooperation motivation refers to the desire to maximize the joint well-being of the self and well-being of others (e.g., Smeesters et al. 2003; Van Lange et al. 2007). In general, research in commons dilemmas show that individuals with a competition motivation tend to consume a common resource more aggressively than people with a cooperation motivation. This is not surprising to see because for competition motivated

individuals, only by taking more resources than others can lead to a higher outcome for the self than the outcome for others; whereas for cooperation oriented individuals, only by taking less can lead to the sustainable consumption of the common resources, which benefits the whole group. While competition (cooperation) motivation is a necessary condition for competitive (cooperative) consumption of a common resource, it is not a sufficient condition. The effect of competition/cooperation orientation on common resource consumption is subjective to moderators. For example, researchers found that when the availability of a common resource is uncertain, people with a cooperation motivation consumed the same amount as people with a competition motivation (cf. De Kwaadsteniet, Van Dijk, Wit, and De Cremer 2006; Smeesters et al. 2003). As another example, several studies found that when confronted with a competitive interacting partner, or when expecting others to compete, people with a cooperation motivation will not cooperate either (e.g., De Cremer and Van Lange 2001; Smeesters et al. 2003).

The two defining characteristics of common resources, namely rivalry and non-excludability, distinguish common resource consumption from private goods consumption, which has been the focus of the consumer behavior literature. Private goods (e.g., food, clothing, cars) are rivalrous and excludable. Once an individual has owned a private good, he or she can exclude others from using it. In other words, competition over a private good is terminated when an individual has ownership of it. A common resource, on the contrary, cannot be owned by an individual, and thus, it is not possible to prevent others from having access to it. As a consequence, competition over a common resource exists over time among all the individuals who consume it. In other words, all consumers

of a common resource are locked in a system that one's behavior has an impact on each other's well-being via the consumption of the common resource.

Commons dilemmas may also be contrasted with public goods dilemmas in which an individual makes a decision about whether or not to contribute to something that benefits the whole (Dawes 1980; Komorita and Parks 1995). Examples of public goods dilemmas include health care and provision of broadcasting stations. Commons dilemmas emphasize “consuming” a positive outcome for the self, and hence are often referred to as take-some dilemmas; whereas public goods dilemmas are often referred to as give-some dilemmas because of their emphasis on “giving” something of the self. While both dilemmas entail a conflict between self-interest and the interests of others, previous research suggests that commons dilemmas and public goods dilemmas evoke different decision processes (e.g., Kahneman and Tversky 1979; Van Dijk and Wilke 1995; Van Dijk et al., 1999). Therefore, in the current research, I focus on commons dilemmas, and I discuss implications of the current findings for public goods dilemmas in the General Discussion chapter.

Due to their prevalence and substantial impact on human well-being, commons dilemmas have received extensive attention from a variety of disciplines, including anthropology, biology, economics, mathematics, psychology, political science, marketing, and sociology (Van Lange, et al. 2003). A variety of factors have been identified to influence people's consumption of common resources. I classify these factors in terms of whether they are external to individuals—situational factors (e.g., group size, incentives, uncertainty), or internal to individuals—individual differences (e.g., gender, social value

orientation, trust). In the following sections, I provide a brief review of the recent development in these factors.

Situational Factors

Group size. One of the most obvious structural characteristics of commons dilemmas with the potential to impact cooperation is group size. Theoretically, it is predicted that small (vs. large) group size is usually more beneficial to the management of common resources (De Cremer and Leonardelli 2003; Marwell and Ames 1979; Ostrom 1999; Wade 1988), because large groups tend to result in a lack of perceived efficacy (Kerr 1989), reduced identifiability (Karau and Williams 1993), and a reduced ability of other group members to engage in cooperative reciprocity (e.g., tit-for-tat; Komorita, Parks, and Hulbert 1992), all of which discourage cooperation. However, empirical results from both laboratory experiments and large scale field studies suggest that the relationship between group size and cooperation might be more complex than originally proposed. For example, using commons dilemma experiments, Messick and McClelland (1983) found that individuals in groups of 3 were more cooperative than single individuals (group size = 1) or groups of 6; while Liebrand (1984) found no differences in levels of cooperation between groups of 7 and 20. Using survey data from 279 forest councils in the Kumaon Hills, Agrawal and Yadama (1997) find a negligible effect of group size on forest condition. Similarly, based on survey data from 28 forest councils (group sizes ranging from 10 to 175), Agrawal and Goyal (2001) found a curvilinear relationship between group size and forest conditions: medium-size groups show more successful forest management than smaller and larger groups do. These mixed

findings suggest a complex relationship between group size and cooperation in commons dilemmas.

Incentives. It has long been demonstrated that the actual interdependence structure facing decision makers has a significant impact on cooperation in commons dilemmas (e.g., Komorita and Parks 1994; Rapoport 1967). Not surprisingly, research shows that incentives increase cooperative behavior by decreasing the actual intensity of the conflict between self-interest and others' interests. In particular, increasing the payoff for cooperative behavior can increase cooperation, and increasing the payoff for competitive behavior can increase competition (e.g., Bell, Petersen, and Hautaluoma 1989). Thus, rewards can effectively encourage cooperative behavior, while punishments can inhibit competitive behavior (e.g., Balliet, et al. 2011). Recent studies show that the effectiveness of incentives can be enhanced under certain conditions. For example, Gächter and Fehr (1999) find that the effectiveness of social rewards in inhibiting free riding and promoting cooperation is enhanced by reduced social distance between group members and by a sense of group identity. Another stream of research shows that incentives are more effective when they are perceived as guided by cooperative motives rather than the self-interest of those administering the incentive (e.g., Kelley et al. 2003; Van Lange and Rusbult 2013). An extreme case of punishment is social exclusion (a.k.a. ostracism), a situation in which competitors are threatened with expulsion from the group (Kerr et al. 2009; Williams 2001). It has been shown that when a threat of ostracism is present, people are likely to cooperate (Cinyabuguma, Page, and Putterman 2005; Kerr et al. 2009), and such an effect is stronger in small groups compared to large groups, when it is easier to identify a competitive person (Kerr et al. 2009). On the other hand, some

researchers found that incentives might discourage cooperation in certain circumstances. One mainstream explanation for this negative impact of incentives on cooperation is that incentives can reduce perceived autonomy and intrinsic motivation to cooperate in commons dilemmas (Deci and Ryan 2000; Ryan and Deci 2000), and hence they become less effective over time, with a sharp decline in cooperation likely to result when the incentives are no longer present (Deci, Koestner, and Ryan 1999). Other researchers argue that incentives may transform a commons dilemma from an ethical decision into a business decision (Gneezy and Rustichini 2000; Tenbrunsel and Messick 1999), and can decrease trust in others (Chen, et al, 2009; Mulder, et al. 2006). In sum, past research suggests that incentives in general help to promote cooperation in commons dilemmas, but they may discourage genuine cooperation in the long run because incentives might inhibit intrinsic motivation to cooperate, as well as other factors promoting cooperation such as trust in others and perceived autonomy (Mulder et al. 2006).

Asymmetries in roles. While participants in traditional commons dilemma studies are symmetric in terms of the roles they assume in the group, emerging research has started to explore and show influences of group-member asymmetries on cooperation in commons dilemmas. Asymmetric roles shift the actual interdependence structure by allowing individuals to affect each other unequally. One stream of such research has primarily focused on the role an individual assumes in the group. In general, studies clearly show that people take more from a shared resource when assigned an authority role (e.g., leader or supervisor) as compared to a lower hierarchical role (e.g., De Cremer 2003; Mannix 1993; Samuelson and Allison 2003) because of egocentric biases in fairness (Allison and Samuelson 2004; Komorita and Chertkoff 1973; Messick and Sentis

1983; Wade-Benzoni et al. 1996) and feelings of entitlement (De Cremer and Van Dijk 2005; Van Dijk and De Cremer 2006). In a recent study conducted by De Cremer and Van Dijk (2008), they found that the tendency for leaders to take more than followers emerges only when the leader has been appointed, as opposed to being elected by other group members, because elected leaders feel a stronger social responsibility for the interests of the group than appointed leaders. In conclusion, this line of research suggests that asymmetries in roles influence decision making in commons dilemmas by allowing the leaders to have stronger impact on the well-being of the followers than the other way around, but whether the leaders behave competitively or cooperatively depends on whether their focus is on the welfare of themselves or on the welfare of fellow group members.

Communication. Communication is one of the most studied factors in the commons dilemma literature (Van Lange et al. 2013). In general, a positive relationship has been established between cooperation and various forms of communication, including pregame discussion (Bouas and Komorita 1996; Dawes, McTavish, and Shaklee 1977), pretrial discussion in repeated interactions (Kerr et al. 1997), discussion among group members (Braver and Wilson 1986), continuous communication over the course of the dilemma game (Isaac and Walker 1988), sending either standard or open-ended messages (Betz 1991; Chen and Komorita 1994), emails (Frohlich and Oppenheimer 1998), and online-chat (Zheng et al. 2009). Three possible explanations as to why communication results in increased cooperation have been proposed: a) communication enhances a sense of group identity (i.e., concern for fellow group members' benefits; Dawes, van de Kragt, and Orbell 1990); b) communication (vs. no

communication) leads to higher perception of commitment (i.e., the degree to which group members are committed to cooperate; Kerr and Kaufman-Gilliland 1994; Ostrom et al. 1994); and c) communication helps to activate a social norm of being cooperative (Baum et al. 2012).

Uncertainty. In many real world commons dilemmas, individuals usually don't have full information (i.e., the characteristics of the dilemma) about the situation (Messick, Allison, and Samuelson 1988; Suleiman and Rapoport 1988); thus, uncertainty has received great attention from researchers. In general, researchers find that uncertainty about both the size of a common resource pool and the rate at which a common resource regenerates leads to greater consumption of the resource (Budescu et al. 1995; Hine and Gifford 1996). To explain the negative impact of uncertainty on cooperation, some studies show that when facing uncertainty about the availability of a resource, people are likely to overestimate the amount available (De Kwaadsteniet, et al. 2006; Gustafsson, Biel, and Gärling 1999), and such overestimation is more likely to occur for people who are egocentric (De Kwaadsteniet et al. 2006) and who intend to overconsume (Van Dijk et al. 2004).

Noise. A number of studies in commons dilemmas explored the impact of negative environmental noise (hereinafter, "noise") on common resource consumption. Noise occurs when actual cooperation is smaller than intended cooperation due to unintended errors (e.g., consume more water than intended due to a leak of the water pipe; Axelrod and Dion 1988; Bendor, Kramer, and Stout 1991; Van Lange, et al., 2002). Noise has been found to produce a detrimental effect on cooperation due to misunderstanding of others' intentions (Kelley 1967; Ross 1977; Van Lange et al. 2002).

Specifically, noise reduces overall cooperative consumption in the whole group, and it overrides the effects of some factors that have been found to promote cooperation. In a study conducted by Brucks and Van Lange (2007), they found noise significantly discouraging cooperation among people who are prosocial, probably because noise tends to make prosocials consider their cooperative behavior ineffective or fruitless in preserving the common resources. In addition, noise is likely to result in disastrous impact when people follow a tit-for-tat strategy. That is, when noise causes people to behave less cooperatively, these low levels of cooperation in turn trigger subsequent competitive consumption among other common resource users. In other words, incidents of noise may lead to relatively enduring echo effects, resulting in escalating competitive consumption.

Individual Differences

Gender. Of interest in multiple research areas, gender has received plenty of attention in the literature of commons dilemmas. Although there is some evidence that women, relative to men, are more prosocial (e.g., Oswald et al. 2004; Van Lange et al. 1997), research findings regarding the gender effect are far from conclusive. A recent meta-analysis on gender and cooperation in situations involving a conflict between self-interest and others' interests (e.g., commons dilemmas and prisoner's dilemmas; Balliet et al. 2011) shows that the relationship between gender and cooperation is moderated by a few key features of the context. This study finds that men tend to be more cooperative than women as the number of repeated interactions increases, whereas women are more cooperative than men as the size of the group increases. Gender may influence cooperation in commons dilemmas because men and women respond to different aspects

of the commons dilemma (Simpson and Van Vugt 2009), differ in understanding and reacting to others' actions (Cadsby and Maynes 1998), and/or respond differently to one another in group interactions and discussions (Stockard et al. 1988). Thus, consistent with these early studies, the current research investigates gender as a moderator of a situational impact (i.e., interdependence awareness), as explained in the next chapter.

Social value orientation. Social value orientation (SVO) is one of the most studied identity factors in commons dilemmas (Messick and McClintock 1968; Van Lange 1999), given its direct connection with competition and cooperation motivations. Specifically, SVO has been conceptualized as a stable individual characteristic that predicts an individual's likelihood of behaving competitively or cooperatively in social interactions (McClintock 1972). Four major types have been identified: 1) individualism—the motivation to maximize one's own gains, without reference to others' interests; 2) competition—the motivation to maximize the difference between own and others' gains; 3) cooperation—the motivation to maximize joint gain; and 4) altruism—the motivation to maximize others' gains, regardless of own gains. Individualists and competitors are often collectively referred to as “proselfs” (e.g., De Cremer and Van Lange 2001; Kramer et al. 1986; Van Lange and Liebrand 1991) and cooperators and altruists as “prosocials” (e.g., Kurzban and Houser 2001; Perugini and Gallucci 2001).

It is not surprising to find that prosocials are more cooperative, while proselfs are more competitive in commons dilemmas (e.g., Au and Kwong 2004; Balliet, Parks, and Joireman 2009; Bogaert, Boone, and Declerck 2008; Van Lange et al. 2007). Research has started to explore the psychological mechanisms that underlie the associations between prosocial and cooperation, as well as proself and competition. For example,

Liebrand and colleagues (Liebrand et al. 1986) found that people with a proself social value orientation tend to interpret behavior along the might dimension (i.e., what works), whereas those with a prosocial orientation tend to view behavior along the moral dimension (i.e., what is good or bad). Results from other studies suggest that prosocials are more willing to cooperate because they evaluate commons dilemmas in terms of collective rationality, whereas proselfs evaluate the dilemma in terms of individual rationality (De Bruin and Van Lange 1999; Joireman et al. 2003; Utz et al. 2004; Van Lange and Liebrand 1991). Finally, SVO is found to influence people's expectations of others' behavior. It is shown that cooperators expect others to cooperate, competitors expect others to compete, and individualists expect others to engage in individualistic behaviors (De Cremer and Van Lange 2001). Similarly, researchers find that in commons dilemmas, competitors will behave competitively and expect others to do the same; individualists will cooperate if, and only if, they think it is individually beneficial to do so, and they expect the same from others; and cooperators will cooperate as long as they think they are not being exploited (De Bruin and Van Lange 1999; Offerman, Sonnemans, and Schram 1996; Van Lange and Kuhlman 1994; Van Lange and Liebrand 1991).

In laboratory settings where extraneous factors are controlled, the effects of social value orientation on cooperative behavior have proven to be strong; yet when contextual factors are introduced, the associations of prosocials with cooperation and proselfs with competition become less reliable. For example, research finds that proselfs take the same amount from a shared scarce resource as prosocials when the size of the resource is certain (De Kwaadsteniet et al. 2006; Smeesters et al., 2003), and when they are not given information indicating the resource pool is being depleted rapidly (Kramer et al.

1986). On the other hand, prosocials will decrease their own level of cooperation when they expect or are confronted with a competitive partner (De Cremer and Van Lange 2001; Smeesters et al. 2003). Findings from these studies indicate that in real-life commons dilemmas, prosocials may not consistently behave cooperatively, and proselves are not necessarily always competitive, but in fact, their behaviors are sensitive to contextual influences given a specific situation. The main conclusion that may be drawn from the research on social value orientation is that prosocials, in general, behave more cooperatively than proselves in commons dilemmas because people with different SVOs posit different emphases on others' interests. However, the influences of SVO on cooperation are vulnerable to situational influences, and hence, applications of SVO in real world commons dilemmas should not neglect the possible impacts of contextual factors.

Trust. Another individual trait variable that has received adequate attention in the commons dilemma literature is trust. Trust is defined as “a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions and/or behavior of another” (Rousseau, et al. 1998, p. 395). Because having trust implies holding positive expectation of the cooperative intentions or behavior of others (Evans and Krueger 2010; Rotter 1967), early work on trust in commons dilemmas shows that in general, individuals with high dispositional trust are more cooperative than those with low trust (Messick et al. 1983; Parks, Henager, and Scamahorn 1996; Parks 1994; Yamagishi 1986). Recent research starts to identify factors that moderate the positive relationship between trust and cooperation, including uncertainty, noise, and degree of conflict. These studies show that the positive impact of trust on cooperation is

bolstered when there is a large (vs. small) degree of conflict between one's self-interest and the interests of others (Balliet and Van Lange 2013), and when individuals are faced with considerable uncertainty (Yamagishi 2011) and noise (Tazelaar et al. 2004). In sum, trust has been shown to promote cooperation effectively, particularly in situations where positive expectation of others' good intention or behavior is needed.

Consideration of future consequences. In some commons dilemmas, individuals receive an immediate benefit from consumption, but a delayed collective consequence, such as the buildup of greenhouse gases due to over-reliance on private cars. Given that this type of commons dilemmas requires a trade-off between short-term (e.g., turn up the thermostat today) and long-term interests (e.g., better air quality in the future), some researchers start to investigate individual differences in consideration of future consequences, defined as “the extent to which people consider the potential distant outcomes of their current behaviors and the extent to which they are influenced by these potential outcomes” (Strathman et al. 1994, p. 743; cf. Joireman et al., 2012). Not surprisingly, studies consistently show that, compared to individuals low in consideration of future consequences, individuals high in consideration of future consequences are more cooperative in situations where current noncooperative behavior may lead to future suboptimal outcomes (Strathman et al. 1994; Kortenkamp and Moore 2006). The impact of consideration of future consequences on cooperation has often been explained from a self-control perspective (Fujita 2011; Gillebaart, Schneider, and de Ridder 2015). That is, since pursuing the long-term benefits in commons dilemmas requires self-control in order to override impulsive responses that bring immediate gratification, people who are high

(vs. low) in consideration of future consequences are more likely to exert self-control, showing higher levels of cooperative behavior.

Theories

In addition to a handful of factors that have been explored, a great number of theories and models have been proposed to cast light on the decision making process in commons dilemmas, including the integrative model of social value orientation (Van Lange 1999), the goal prescribes rationality principle (Van Lange et al.; 1990), the goal prescribes morality and power principles (Joireman et al., 2003), the might versus morality hypothesis (Liebrand et al. 1986), the goal-expectation hypothesis (Pruitt and Kimmel 1977), the goal transformation hypothesis (De Cremer and Van Vugt 1999), the interactive model of social value orientation (Bogaert, Boone, and Declerck, 2008), the self-control theory (Dewitte and De Cremer 2001), the competitive altruism theory (Hardy and Van Vugt 2006), the greed, efficiency, fairness hypothesis (Wilke 1991), the reciprocal altruism theory (Trivers 1971); and the structural goal expectation hypothesis (Yamagishi 1986). These theories/models have often been criticized for their narrow focus on a specific set of variables (e.g., social value orientation) and/or psychological processes (e.g., cooperation versus competition goals) (Van Lange et al. 2003), and hence, researchers intending to provide a coherent and macro-level analysis of the decision making process in commons dilemmas have applied more general theories to commons dilemma settings, such as the expected utility model (Luce and Raiffa 1957; Pruitt and Kimmel 1977), the interdependence theory (Kelley and Thibaut 1978; Kelley et al. 2003), and the appropriateness framework (March 1994; Weber, Kopelman, and Messick 2004). In many cases, these theories complement rather than compete with each other. I next

provide a brief overview of these broad theories with a discussion of their strengths and limitations in explaining decision making in commons dilemmas.

Expected Utility Model

The expected utility model (a.k.a. rational choice model) is one of the earliest models applied to explain decision making in commons dilemmas (cf. Luce and Raiffa 1957; Messick and McClintock 1968; Pruitt and Kimmel 1977). It assumes that when making a decision, an individual first calculates the expected payoff of each available choice according to his or her own self-interest (i.e., preference), and then selects the highest-ranked option (Samuelson 1954). In other words, the expected utility model sees decision as an outcome of the expected utility maximization process based on evaluation of all behavioral alternatives in terms of their consequences for self-interest. Thus, the expected utility model predicts that individuals should rarely if ever cooperate in commons dilemmas. The initial application of the expected utility model in commons dilemmas was Hardin's seminal work on "the tragedy of the commons" (1968). Central to Hardin's article is his analysis of a hypothetical situation of herders sharing a common parcel of land on which they are each entitled to let their cows graze. He argued that a herder enjoys all the benefits of adding a cow, while the negative impact (e.g., degraded land) is shared by all the herders; thus, it is only rational for each herder to increase the number of their cows (i.e., increase their consumption of the land) from a self-interest maximization perspective, even though the land is likely to become overgrazed. He concludes that if people act individually, consulting their own self-interest, it is only rational for them to increase their consumption of common resources, without concerns

for the public interest, and a common resource will inevitably be depleted, leading to the “tragedy of the commons.”

While the expected utility model offers its advantage of being highly analytic and precise in its prediction of behavior, many researchers have criticized its limited ability/inadequate predictability in the case of commons dilemmas (e.g., Ostrom et al. 2002; Runge 1981; Van Lange 1999; Weber et al. 2004). Indeed, findings from empirical observations and lab experiments consistently show that common resource users are more cooperative than the expected utility model would predict (Cox 1985; Kopelman, Weber, and Messick 2002; Ostrom 1990; Ostrom et al. 2002). For example, by investigating how actual communities manage common resources, such as fisheries, land irrigation systems, and farmlands, Ostrom and colleagues reached the conclusion that in many of the cases, people can manage common resources more effectively than the expected utility model predicts, and the tragedy of the commons is not as prevalent as Hardin maintained (Ostrom 1990; Ostrom et al. 2002). The inadequate predictability of the expected utility model for commons dilemmas arises primarily because of its insufficient consideration of social influences. First, within the expected utility model, decision is a result of an individual’s self-interest maximization process, which ignores the possibility that behaviors in social situations might be guided by social forces, such as altruism, reciprocity, and social norms (Falk et al. 2002; Fehr and Gächter 2000). In addition, in the expected utility model, utility is relatively narrowly defined in terms of economic payoff of a choice, de-emphasizing the possibility that people obtain “utility”—such as a feeling of warm glow (Andreoni 1989; 1990), status, and reputation (Hardy and Van Vugt 2006; Trivers 1971)—from cooperative behavior. Thus, it is believed that the

expected utility model is more appropriate when the decision context is individual (e.g., private goods consumption) rather than social, and/or when people are expected to have a singular focus on their own interest.

Interdependence Theory

Another theoretical framework that has been increasingly applied to commons dilemmas is Kelley and Thibaut's interdependence theory (Kelley and Thibaut 1978; Van Lange and Rusbult 2012), which holds that decision making occurs after people "transform" a given matrix of objective outcomes into an effective matrix of subjective outcomes. The given matrix represents possible individual outcomes determined by the situation in combination with each individual's skills, resources, etc., while the effective matrix represents the individual's perception of the possible outcomes after he or she takes into consideration broader social and temporal concerns, such as a concern with the well-being of others and the long-term consequences of one's actions. Decision making is then based on what is best to do given this subjective situation.

Central to the interdependence theory is the notion of "transformation," the process by which individuals incorporate their "broad considerations" into a given situation, resulting in a perceived situation that determines behavior. The interdependence theory does not identify any overarching driver for these "broad considerations" that determine the outcomes of the transformation. Rather, it assumes that these broad considerations could be a variety of goals, affects, and social motivations (e.g., cooperation, competition) as a function of interpersonal dispositions (e.g., communion, agency), situational motives (e.g., trust, reciprocity), and social norms (e.g., equality). In the context of commons dilemmas, transformation can be understood in terms of the

weights that people assign to the outcomes for the self and outcomes for others (e.g., Van Lange 1999). From this perspective, researchers have identified several important social motives, other than self-interest maximization, that promote cooperation (i.e., assigning a significant weight to the interests of others), including altruism, collectivism, egalitarianism, and so on (e.g., Van Lange et al., 2007). Apart from these social motives, the interdependence theory also recognizes the importance of other motivational transformations, including transformations guided by situational motives (e.g., trust, reciprocity; Balliet and Van Lange 2013; Parks and Rumble 2001), affective motives (e.g., empathy, fear; Van Lange 2008), and social norms (e.g., equality; Chen, Pillutla, and Yao 2009; Egas and Riedl 2008; Gächter and Herrmann 2011). These transformations are essential to understanding behavior in many social situations that involve a conflict between individual and other interests.

While the view of decision making as a transformation process offers a logical and straightforward framework to understand how people incorporate their own considerations when dealing with an interpersonal situation, such benefit comes with an assumption of the interdependence theory: people recognize the nature of their interdependence with the interacting party, that is, the nature and extent to which co-acting individuals are dependent on each other. For example, an individual may choose to take public transportation to work instead of driving his or her own car, knowing that this choice is likely to lessen the burden of the road, which likely benefits both him- or herself and others. As a result of this assumption, interdependence theory has been applied primarily to studies on romantic relationships and close relationships where it is assumed that people are always aware of the interdependency on each other. Unfortunately, this

assumption that people are aware of such interdependence makes the interdependence theory inappropriate for my theoretical framework as one of my key investigations is the situation in which people lack such awareness. In other words, I investigate a situation that does not afford such an assumption.

The Logic of Appropriateness Framework

Originally proposed by March in 1994, the “logic of appropriateness” framework holds that actions result from people answering for themselves, explicitly or implicitly, the question “what does a person like me (identity) do (rules) in a situation like this (situation recognition)?” (March 1994; Messick 1990) Specifically, as shown in Figure 2-1, the framework views decision making as a result of an individual’s selection of appropriate behavioral rules based on his or her perception of the situation that he or she encountered through the lens of situational features and his or her identity. This model emphasizes the interplay of three essential factors in decision making: 1) situation recognition, 2) identity of the decision maker, and 3) the selection and application of appropriate decision rules.

Situation recognition. Situation recognition is the heart of the appropriateness framework. Is this a group task or an individual task? Is this a cooperative situation or a competitive situation? According to March (1994), situation recognition is a process of matching features of the situation encountered to features of situations that have already (or at least partly) been experienced and understood. In other words, situation recognition is a process of categorization. This provides a couple of important theoretical implications. First, it suggests that situation recognition is likely to be driven by certain key features of the environment. Second, it suggests that manipulation of these key

features is likely to result in different interpretations of the situation, affecting people's decision making. For example, when a study is labeled "Wall Street Game," it is considered to be more competitive, than a study labeled "Community Game" (e.g., Liberman, Samuels, and Ross 2004; Pillutla and Chen 1999). Viewing situation recognition as a categorization process also implies that this factor depends on one's existing knowledge structure (i.e., schema), which, in the appropriateness framework, constitutes one's identity. For example, expertise has been demonstrated to influence the categorization process in a variety of domains, including playing chess (Chase and Simon 1973); problem solving (Chi, Feltovich and Glaser 1981), physics (Larkin et al. 1980), and brand evaluations (Sujan 1985). Knowledge structures influence how one interprets a social situation, what he or she is likely to feel and infer about the situation, and the motivation(s) that tend to be activated in that situation.

Identity. In the appropriateness framework, identity is another critical factor in the decision making process. Not only does it influence interpretation of the situational cues as discussed above, it also affects one's choice of appropriate behavioral rules, which ultimately lead to final action. For example, a couple of studies in the commons dilemma literature demonstrate that prosocial individuals are more cooperative than proself individuals because they understand the situation differently. Specifically, prosocial individuals view behavior along moral dimensions (i.e., what is good or bad), evaluate commons dilemmas in terms of collective rationality, and expect others to cooperate as well; whereas proself individuals are likely to see behavior along the might dimension (i.e., what works; Liebrand et al., 1986), examine the situation in terms of individual rationality (e.g., De Bruin and Van Lange 1999; Joireman et al. 2003; Utz, Ouwerkerk,

and Van Lange 2004; Van Lange and Liebrand 1991a, 1991b), and expect others to compete (De Cremer and Van Lange 2001). Identity in the appropriateness framework is a complex, multifaceted factor. The appropriateness framework argues that people differ in many systematic ways, including both personal and social aspects. On the personal dimension, people have different personalities (e.g., Lefcourt 2014; Snyder and Gangestad 1986), values (Messick and McClintock 1968), and personal histories and experiences (Bettenhausen and Murnighan 1985, 1991). Identity also encompasses social identity (Brewer 1991), as well as cultural influences (Moghaddam, Taylor, and Wright 1993). In short, identity is an umbrella concept that includes various idiosyncratic qualities, traits, and personal characteristics that individuals could bring with them into a situation. It is important to clarify that this multidimensional view of identity does not imply that every individual will view a situation differently; rather it suggests the importance of taking into consideration different aspects of the decision maker that might predict situation recognition and then decision making.

Rule selection. Appropriate rule selection follows situation recognition. Rules are selected because they are seen as natural, appropriate and expected in the construed situation and will guide behavior. In the social cognition literature, distinctions are often drawn between rules and heuristics (Chaiken and Trope 1999; Smith and DeCoster 1999), with rule-based processing characterized as deliberate and effortful, and heuristics processing, on the other hand, characterized as a “fast, associative information-processing mode based on low-effort systematic reasoning” (Chaiken and Trope 1999, p. ix). The appropriateness framework sees the selection of deliberative processing and shallow processing a result of the interaction between the situation and the person. Building on

research findings that human behavior is often more likely to be driven by heuristics and habit than by deliberate utility maximization (e.g., Bargh and Chartrand 1999), the appropriateness framework proposes that decision making is only consciously articulated in situations that evoke attentional and cognitive resources, otherwise, people will engage in shallow information processing and use rule of thumb².

Compared to the expected utility framework, the appropriateness framework is more “social” and thus offers greater explanatory power for social situations like commons dilemmas (Messick 1999; Weber et al. 2004). The expected utility framework is essentially an individual-based model: an individual maximizes his or her expected utility according to his or her own preferences. In contrast, the appropriateness framework starts with the objective situation (i.e., what are the characteristics of the situation), and thus the social dimension is already incorporated into the analysis. In addition, it assumes that decision making is driven by the interplay of the situation and the individual—thus the unit of analysis is the dynamics between the situation and the individual, rather than the individual only. Finally, unlike the expected utility framework’s assumption that utility maximization as the only single rule people use for decision making, the appropriateness framework recognizes a variety of decision rules that one might select to guide behavior, including both highly cognitive rules and very simplified heuristics (Chaiken and Trope 1999; Smith and DeCoster 1999), with utility maximization being only one of the many possible decision rules that may apply. The latter approach allows a variety of actions that are driven by social forces, such as

² Following the appropriateness framework, when the term “behavioral rule” is used in this paper, it can be either a decision rule or a heuristic from the perspective of dual-process theory (Petty and Cacioppo 1986). I do not explore, whether people engage in deliberate or shallow processing in the commons dilemma context I study as it goes beyond the scope of this paper. However, future research might take the opportunity to investigate under which circumstances deliberate or shallow processing is more likely to be evoked.

development of social norms (“understood rules for accepted and expected behavior”; Cialdini, Bator, and Guadagno 1999, p. 196), conformity (Crutchfield 1955), and mimicry (Chartrand and Van Baaren 2009).

Rather than competing, the interdependence theory and the appropriateness framework complement each other in many aspects. On one hand, they share many commonalities. First, they both start with the analysis of the objective situation, and make a clear distinction between the objective situation and the perceived situation. By doing so, both theories explicitly outline the psychological process from the objective situation to the perceived situation (motivational transformation in the interdependence theory and situation recognition in the appropriateness framework), thereby offering a lens for researchers to examine “what and how people make of a given situation.” Second, both theories stress the determining role of situation construal in decision making. This is in line with many other theories, as well as empirical findings, that actions are driven by people’s interpretation of a situation rather than the actual characteristics of the situation. As a result of these two similarities, the interdependence theory and the appropriateness framework share the same framework structure: individual differences moderate the impact of objective situational features on behavior, and such interactive effect is further mediated by situation construal. Finally, both theories consider individual differences to be multi-faceted, including stable personality differences, motives, values, personal history and cultural background; and both theories argue that certain aspects of individual differences that determine an individual’s perception of and response to the objective characteristics of a situation are activated by the situation. In other words, a situation

triggers distinctive aspects of individual identities, which in turn lead to identity-consistent interpretations of the situation.

On the other hand, the two theoretical frameworks differ in certain aspects. First, despite the fact that both frameworks start with the objective situation, they approach it differently. The interdependence theory focuses exclusively on the interpersonal dimensions of a situation, such as the correspondence of outcomes, basis and intensity of dependence, and the amount of information an individual has about the interdependence structure. Thus, the interdependence theory is exclusive to social situations and assumes that interacting parties have a basic understanding about their interdependency. The appropriateness framework, on the other hand, does not focus solely on the interpersonal characteristics of a situation but embraces any possible situational factors that might influence people's understanding of the situation. As compared to the interdependence theory, the appropriateness framework can be applied to both social and individual situations. The two theories also differ in terms of their specifications about the relationship between situational and individual factors. Specifically, the interdependence theory builds on the affordance theory (Kelley et al. 2003; Reis 2008) and assumes that the structural characteristics of an interpersonal situation narrow down or constrain the number of ways an individual interacts with another. Individual differences (such as personality, motives, values, preferences, and beliefs) then determine which option an individual will choose from the set. In other words, within the interdependence theory, situation characteristics predetermine the possible actions, and individual differences simply react to those possibilities. By contrast, the appropriateness framework builds on the categorization theory (Cohen and Lefebvre 2005), which implies that situational

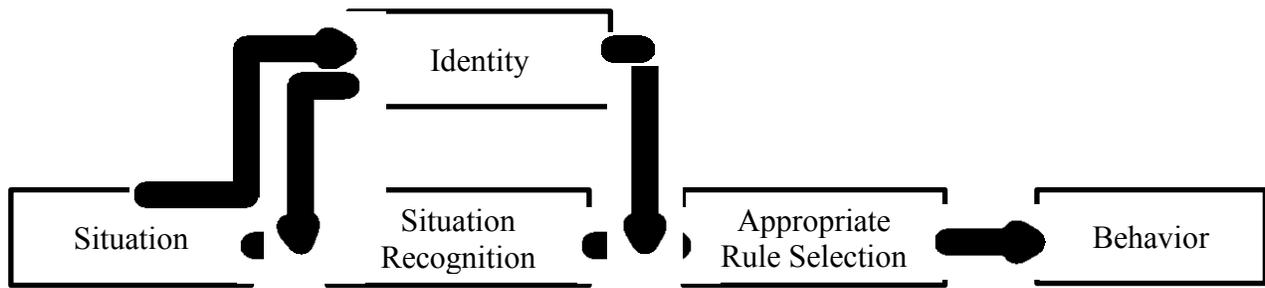
characteristics and individual differences have relatively equal power in determining possible actions in the situation: while the diagnostic features of a situation significantly affect the perception of that situation, individuals choose which features to focus on and how those features are understood. Finally, these theories also differ with respect to what happens after situation transformation/recognition. As mentioned earlier, the interdependence theory considers actions to be the result of people making rational choices among available behavior alternatives afforded by situations. In other words, the interdependence theory assumes utility maximization as the single decision rule. Yet, the appropriateness framework acknowledges the possibility of both highly cognitive rational decision rules and simple heuristics, with the latter empirically documented by abundant studies (e.g., Huber et al. 1982; Simonson and Tversky 1992).

Taking all of these theoretical factors into consideration, I believe the appropriateness framework, as compared to the interdependence theory, is more suitable to serve as the general theoretical framework for the current investigation, for the following reasons: First, the interdependence theory's exclusive focus on how people interact with others limits its explanatory power for situations when people fail to see their interdependency with others, which is one of the main conditions under current investigation. Second, consistent with early research findings that decision making in mundane situations is often driven by heuristics and habitual responses (e.g., Bargh and Chartrand 1999), I expect people to be unlikely to engage in heavily cognitive utility maximization processes in many commons dilemma situations they encounter on a frequent basis, such as how long to stay in a shower, how to commute to work every morning, how many pieces of paper towel to use at a public restroom, and so on—

situations when they are more likely to use a simple rule of thumb or to react habitually.

Thus, the appropriateness framework is adopted.

Figure 2-1 The Logic of Appropriateness Framework



Note: The figure is adopted from Weber et al. 2004.

CHAPTER THREE

CONCEPTUAL FRAMEWORK

This chapter delineates the relationship among interdependence awareness, gender identity, and consumption of common resources. Building on the appropriateness framework, the present research proposes that interdependence awareness and gender identity interactively influence consumption of common resources via shaping people's construal of the situation encountered. Formal hypotheses pertaining to those relationships are presented.

Interdependence Awareness

People in commons dilemmas are interdependent on each other's consumption behavior of the shared resources (Deutsch 1949; Johnson and Johnson 1989; Thibaut and Kelley 1959). Each individual's consumption in a commons dilemma has an impact on everyone else's well-being. The interdependence arises because of the two characteristics that define a common resource: non-excludability and rivalry (Samuelson 1954). Non-excludability refers to the fact that it is infeasible to prevent people from having access to and utilizing a common resource. For instance, we all breathe the air, and no group or individual can claim exclusive ownership of it. Rivalry means that an individual's consumption of such a resource leads to subtractions from any other individual's consumption of that resource. As an example, because we have a limited amount of water, one's consumption of fresh water reduces the amount available to others; and if all people use water at an excessive level, a water crisis is likely to follow. Thus, people who share a common resource are "locked in" a social situation where each individual is

expected to exercise restraint in consuming a common resource, and failing to do so would cause negative outcomes for everyone.

While interdependence is part of the inherent nature of all commons dilemmas, the degree to which people are aware of such interdependence might vary significantly across different actual situations. For example, when taking a shower, it is uncommon for an individual to think how his or her consumption of the water might influence the well-being of others. As another example, when electricity demand spikes during summer, people are unlikely to think about how each household's consumption of the power burdens the whole community's electrical infrastructure until a blackout happens. Intuitively, individuals' decision making in commons dilemmas is likely to be significantly affected by the extent to which they are consciously thinking about the mutual influences of their consumption among resource users. Foremost, lacking interdependence awareness represents high uncertainty about the social aspects of the situation encountered. Inadequate information about the outcome structure of a given situation gives rise to ambiguity and misunderstanding, challenging cooperative interaction (Kelley 2003). As discussed in Chapter Two, studies consistently find that environmental uncertainty leads to greater consumption of common resources (Budescu, Broomell, and Por 1995; Hine and Gifford 1996; Messick, et al. 1988; Suleiman and Rapoport 1988) as a result of people's overestimation of the availability of resources (De Kwaadsteniet, et al. 2006; Gustafsson, et al. 1999). In the present research, low interdependence awareness should represent further environmental uncertainty (i.e., lacking information about the interdependence structure of the situation) more than a condition of high interdependence awareness, and holding everything else equal, the low

awareness condition thus is less likely to encourage cooperative consumption. Moreover, failure to recognize the negative impact that one's consumption has on others precludes the possibility of prosocial behavior (i.e., restraining one's consumption to leave more for others; De Cremer and Van Lange 2001; Kramer et al. 1986; Van Lange and Liebrand 1991). Based on this assumption, some researchers propose that informing individuals about the interdependence of their consumption may encourage cooperation. For example, Schwartz (1970) argues that people behave cooperatively only when the consequences of their consumption on others are salient to them (see also Schwartz 1977; Schwartz and Howard 1982; Van Dijk and Wilke 1997), because unveiling the negative influences of one's consumption on others might invoke a sense of responsibility (De Cremer and Van Lange 2001) or moral obligation for others' well-being. Researchers have also identified some empirical evidence supporting a possible positive relationship between interdependence awareness and cooperation. For example, Rapoport and Chammah (1965) found that participants who viewed an outcome matrix in the prisoner's dilemma before decision making cooperated more than those who did not. In a similar vein, Gonzalez and colleagues (Gonzalez, et al. 2015; Martin, et al. 2012) demonstrated that increased information about the other interacting participants (e.g. seeing the other's action and outcomes) increases the likelihood of cooperation in the two-person prisoner's dilemma. Thus, having interdependence awareness may lead to a higher level of cooperation by offering relatively more information about the situation than lack of interdependence awareness.

In contrast, some literature suggests a negative relationship between interdependence awareness and cooperative consumption. According to the attribution

theory, people tend to overvalue dispositional explanations for a situation while undervaluing situational explanations (Sanderson 2010; Schwarz 2006). This fundamental attribution tendency suggests that when people are aware of the mutual impact of their consumption among all common resource users (i.e., high interdependence awareness), they are likely to attribute decreased availability of a common resource to the overconsumption of others (e.g., power blackout due to others' overreliance on air-conditioners), which is likely to escalate perceived conflict between oneself and others, leading to aggressive consumption of a common resource. In contrast, when people observe only their own consumptions and outcomes without realizing that they influence or are influenced by others (i.e., low interdependence awareness), they are apt to attribute decreased availability of a common resource to uncontrollable factors or random errors (e.g., power blackout due to malfunction of supply facilities). In this case, the possibility of escalating perceived conflict is minimized. Moreover, people engaged in real-world commons dilemmas involving large group size are vulnerable to the impact of noise. As reviewed in Chapter Two, noise has been found to have a detrimental effect on cooperation due to misunderstanding of others' intention in commons dilemmas (Kelley 1967; Ross 1977; Van Lange, et al. 2002). Specifically, not only does noise reduce overall cooperative consumption in the whole group, it also overrides the effects of some factors that have been found to promote cooperation. In a study conducted by Brucks and Van Lange (2007), they found that noise significantly discourages cooperation among people who are prosocial, probably because noise leads prosocials to consider their cooperative behavior ineffective or fruitless in preserving the common resources. Building on the attribution theory, when people have low, as compared to high,

interdependence awareness, they are more likely to ascribe occurrences of noise to situational errors rather than to the personality and interaction motivations of other common resource users, and hence, they are unlikely to behave more competitively. In other words, lacking interdependence awareness might overcome the negative impact of noise on cooperation in commons dilemmas. Finally, from a social comparison perspective, becoming aware of the existence of other common resource users is likely to generate a process of comparison between “me” and the others. This tendency to self-evaluate by comparing the self to others has been proven to be one of the fundamental acts in the psychological process of evaluation (e.g., Beach and Tesser 2000; Festinger 1954; Tesser 1988) and also an important source of competitive motivation, attitudes, and behavior (e.g., Argo, White, and Dahl 2006; Garcia, Tor, and Gonzalez 2006; Garcia, Tor, and Schiff 2013; Hoffman, Festinger, and Lawrence 1954). Thus, having interdependence awareness might lead to competitive consumption due to social comparison to other common resource users.

Building on the discussion above, we can see that high interdependence awareness will shift an individual’s attention from the self to the other common resource users, but two possibilities follow this attention shift: a) he or she might take others’ interests into consideration when making decisions and hence behave cooperatively; or b) he or she might put others’ interests against his or her own interest and hence behave competitively. In line with the appropriateness framework, I propose that whether an individual with high interdependence awareness sees a commons dilemma as a cooperative or competitive situation is likely to be determined by his or her identity. As discussed earlier, this identity is a multifaceted factor, including personality differences,

as well as social identity. The appropriateness framework further proposes that the aspect(s) of an individual's identity (e.g., a socialist vs. a poor student) activated in a given situation is influenced, sometimes even determined by, the characteristics of the situation. This complex interaction between identity and objective situational factors guides an individual's understanding of the situation which determines his or her decision making. However, as a first attempt to understand the impact of interdependence awareness in commons dilemma, rather than considering its interaction with all possible situation-activated identities, the current research focuses on gender identity exclusively. In order to achieve this purpose, gender identity is made salient in all of the studies in the current research. I next review relevant literature on gender identity, explain why the current research focuses on gender identity from both a theoretical and practical perspective, and then discuss the interaction between interdependence awareness and gender identity.

Gender Identity

It is now well established that gender identity underlies many of the differences in attitudes (e.g., Costa, Terracciano, and McCrae 2001; Prentice and Carranza 2002), behaviors (e.g., Kurt, Inman, and Argo 2011; Winterich, Mittal, and Ross Jr. 2009), cognition (Meyers-Levy 1989; Sengupta and Dahl 2008) and roles (e.g., Bem 1974) that have been attributed to biological sex. According to the social role theory, as a consequence of the historical division in social roles between genders, the expectancies of males and females diverge (Eagly 2013; Eagly and Wood 1999). Following the concepts introduced by Bakan (1966), most of these expectations can be summarized in two dimensions: agency versus communion. People with a masculine gender identity are

expected to demonstrate “agentic” qualities, such as competitiveness, self-assertiveness, and dominance; whereas people with a feminine gender identity are expected to demonstrate “communal” qualities, such as cooperativeness, modesty and a concern for others (Bakan 1966; Eagly and Karau 2002). These gender-stereotypical expectations shape people’s gender identity, as well as what they believe to be appropriate to do in social situations starting from early childhood to their adulthood (Deaux, et al. 1995; Eagly 2013). People who violate stereotypical expectations by engaging in gender-inappropriate behaviors are generally seen as less socially attractive (e.g., Prentice and Carranza 2002; Rudman 1998).

Empirically, studies consistently find evidence that when social elements are salient in a given situation (e.g., presence of another person, existence of a ranking system, etc.), people are likely to behave in a gender-stereotypically consistent way. For example, in a consumption context, Kurt and colleagues (Kurt et al. 2011) find that when shopping with a friend (vs. alone), masculine people will increase their spending during shopping to signal a “getting ahead” self-presentation, whereas feminine people tend to restrain their spending so as to be modest in front of a friend. Similarly, it is found that masculine people are more likely to engage in prosocial behaviors (e.g., contribution to a public good, donation etc.; Brunel and Nelson 2000) to promote their own social standing, whereas feminine people engage in prosocial behaviors due to concern for the well-being of others (Brunel and Nelson 2000; Winterich et al. 2009). Within the organization behavior literature, it is consistently found that masculine people often self-promote their accomplishments (Berg, et al. 1981; Miller, et al. 1992) and pursue leadership (Eagly and Johnson 1990), while feminine people tend to restrain themselves from doing so (e.g.,

Berg, et al. 1981). All these findings suggest that people with a masculine identity are likely to consider self-promoting behavior (i.e., competition) as expected and/or appropriate, while people with a feminine identity tend to view self-protective behavior (i.e., cooperation) as expected and/or appropriate in social interactions.

Interdependence Awareness and Gender Identity: Consumption of Common Resources

Building on the above discussions of interdependence awareness and gender identity, I propose that gender identity moderates the impact of interdependence awareness on consumption of common resources. Specifically, people with a masculine gender identity will increase their consumption of a common resource when having, as compared to lacking, interdependence awareness; while people with a feminine gender identity will restrain their consumption when their interdependence awareness is high versus low. My reasoning is as follows: while low interdependence awareness represents an individual-focused state, high interdependence awareness brings the salience of a “me versus others” state. When people are aware of the conflict between self-interest and the interests of others, they are faced with a tension between motives to compete and cooperate (Komorita and Parks 1995; Messick and Brewer 1983; Schelling 1960). As suggested by the appropriateness framework, situation interpretation is, in fact, a categorization process, which is shaped by repeated experiences with a specific configuration of abstract features of situations. Thus, when the salience of interdependence is heightened, consistent with their agent orientation, people with a masculine gender identity are likely to see this “me versus others” situation as a

competitive situation which further activates their preference for relative gains (i.e., competition orientation). As a result, with high, versus low, interdependence awareness, masculine individuals are likely to consume a common resource more aggressively, even when such behavior may lead to lower self-benefit (i.e., the common resource is more likely to be depleted). In contrast, for individuals with a feminine gender identity, driven by their communal orientation the salience of a “me versus others” situation is likely to shift their preference to maximize the joint well-being of the self and well-being of others (i.e., cooperation orientation). Driven by their cooperation motivation, feminine individuals are likely to restrain their consumption of a common resource. Although this suggests that people with a feminine gender identity will not increase their consumption, it does not mean that they will decrease their consumption of a common resource. First of all, because common resources by definition are rivalrous, once the existence of other consumers is heightened by interdependence awareness, feminine individuals are equally likely to see the competitive side of the situation as masculine individuals. As a result, they are unlikely to decrease their consumption for the fear that their cooperative behavior might be exploited by others. Secondly, it is argued that feminine individuals do not engage in prosocial behaviors indiscriminately (i.e., self-sacrificing for the benefits of other others; Gilligan 1987). Instead, they tend to seek a balance between the well-being of the self and the well-being of others (i.e., cooperation). In particular, when being aware of the conflict between self-interest and the interests of others, decreased consumption of common resources represent self-neglect (i.e., focus on others to the exclusion of the self; e.g., Helgeson and Fritz 1999, 2000), which is unlikely in the context of common dilemmas because satisfying immediate self-interest is more tempting

than pursuing the benefits of others. In short, it is expected that feminine individuals with high interdependence awareness are motivated to behave cooperatively due to their natural inclination to cooperate in social situations, and equally motivated to consume competitively in order to avoid being exploited by others. Therefore, as a result of these two competing forces, they will neither decrease nor increase their consumption of a common resource when having high interdependence awareness. Formally, I predict:

***H1a:** For people with a **masculine** gender identity, high, as compared to low, interdependence awareness leads to increased consumption of common resources.*

***H1b:** For people with a **feminine** gender identity, the level of interdependence awareness does not influence the amount of common resources they consume.*

***H2a:** For people with a **masculine** gender identity, **competition motivation** mediates the relationship between interdependence awareness and common resources consumption.*

***H2b:** For people with a **feminine** gender identity, both **competition and cooperation motivation** mediate the relationship between interdependence awareness and common resources consumption.*

One field study and three laboratory studies using diverse manipulations of interdependence awareness and different commons dilemma situations have been conducted to triangulate on all the hypotheses. Studies 1a (field experiment) and b (controlled lab experiment) employed a toilet paper consumption context and provided evidence that interdependence awareness and gender identity interactively influence the amount of the common resource (i.e., toilet paper) that people consume. Study 2 and

Study 3 (both are lab experiments) used a fishing context, with the former providing support to all hypotheses and the latter identifying boundary conditions for the interaction between interdependence awareness and gender identity.

CHAPTER FOUR

STUDY 1A

The objective of Study 1a was to find evidence in real-world commons dilemmas that interdependence awareness and gender identity interactively influence the amount of common resources that people consume (H1a and H1b). To do so, I carried out a field study that measured people's consumption of toilet paper at a public place. This setting represents a commons dilemma because: 1) all potential users of the toilet paper have free access to it; 2) one individual's consumption of the toilet paper decreases the amount available to other users; and 3) overconsumption of the toilet paper may result in the temporary depletion of it. In practical terms, the negative impact of toilet paper consumption on the environment is unneglectable. According to data from the Worldwide Fund for Nature, in 2005 the equivalent of almost 270,000 trees was either dumped in landfills or flushed every single day. And this number continues to increase. About 10% of that total is toilet paper consumption. The world average per-capita consumption of toilet paper was 3.8 kilograms per year, with North American per-capita consumption the highest at 23 kilograms. Thus, understanding factors influencing toilet paper consumption enables the development of marketing strategies that attempt to reduce consumer demand for toilet paper and similar common resources.

Method

Study 1a was conducted in the summer at a public golf course in a large Canadian city. The dependent variable was the total amount of toilet paper used in the restrooms over a two-week period of time. Because it was infeasible to trace how many pieces of

toilet paper each individual used each time he or she accessed the restrooms, I measured the consumption of toilet paper by weight at the aggregate level. Specifically, a research assistant who was unaware of the manipulations and research purposes collected the information about toilet paper consumption at the end of each week over the course of the study.

The study employed a 2 (interdependence awareness: low vs. high) x 2 (gender identity: masculine vs. feminine) between-subjects design. Interdependence awareness was manipulated by displaying posters using different personal pronouns in their environmental appeals in the restroom stalls, with each one posted for two weeks. In the low interdependence awareness condition, the poster said “Please Protect Your Earth by Using Less Toilet Paper,” whereas in the high interdependence awareness condition, the poster said “Please Protect Our Earth by Using Less Toilet Paper” (see Appendix B). Prior research in language usage suggests that use of personal pronouns can effectively signal the central party in a social context (Gordon, Grosz, and Gilliom 1993; Pennebaker 2011). The gender of the restrooms represented participants’ biological sex, which was used as a proxy for their gender identity. Gender is a reasonable proxy for people’s gender identity, because as Bakan (1966) suggests and research has demonstrated (for a review, see Guimond, et al. 2006), female and male correspond to a feminine and masculine identity, respectively. Using gender also enhances practical implications, since measuring gender identity may not be feasible in many real-world commons dilemmas.

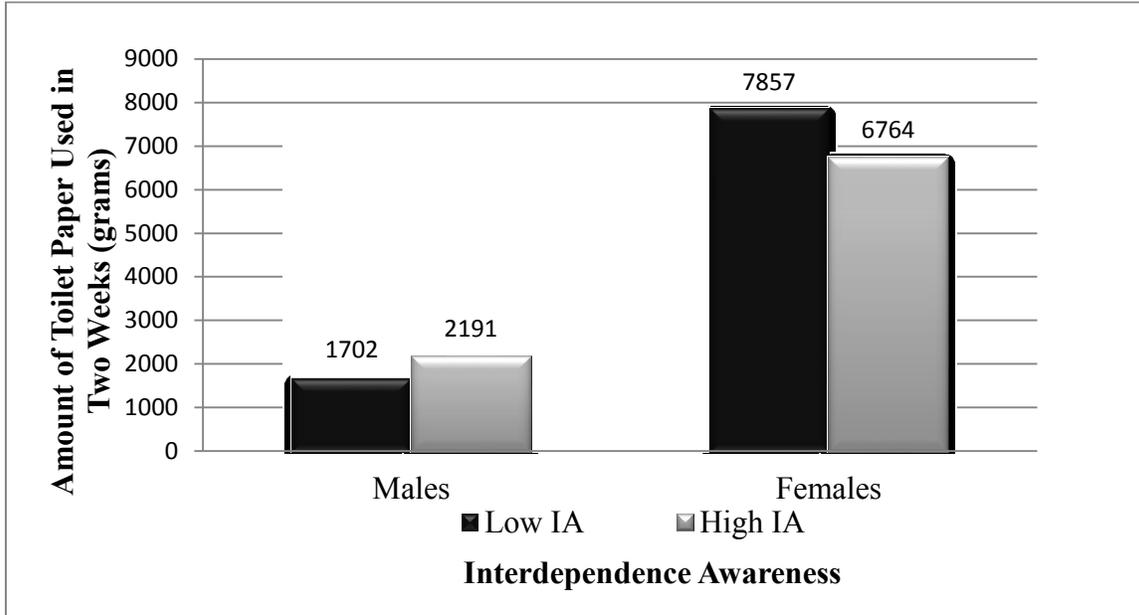
Results and Discussion

Toilet paper consumption. During the course of the study, the total amount of toilet paper used was 18,515 grams. Consistent with my predictions, males used 28%

more toilet paper in the high versus low interdependence awareness condition (2191 grams vs. 1702 grams). In contrast, females used 14% less toilet paper in the high versus low interdependence awareness condition (6764 grams vs. 7857 grams; see Figure 4-1).

Discussion. Results from this study provide initial support for the prediction that gender identity moderates the relationship between interdependence awareness and common resource (i.e., toilet paper) consumption. While the field study provides external validity for the findings, it is important to acknowledge its limitations. First, the results obtained are at the aggregate level, which limits the possibility of conducting any statistical test to see whether or not any of the differences between the experimental cells are statistically significant. Second, Study 1a lacks control for extraneous factors that might influence the results, such as the weather, the number of golfers visiting the restrooms, and the gender composition of the golfers during each of the two-week periods. In order to address these limitations, Study 1b used a laboratory study to replicate the findings. Last but not the least, another limitation of Study 1a is that the amount of toilet paper encountered by each restroom user was not controlled. Thus, it is possible that people might have different level of interdependence awareness based on the availability of the toilet paper (e.g., when the roll of the toilet paper was nearly done, people are very likely to think about how their use of the toilet paper might influence the next users), interfering the manipulation of interdependence awareness. Therefore, in order to resolve this limitation, in Study 1b, the amount of toilet paper available to each participant was strictly controlled by replacing used ones with full rolls before each session of the study, such that all participants received a full roll of toilet paper.

Figure 4-1 Toilet Paper Consumption



Note: IA = Interdependence awareness

CHAPTER FIVE

STUDY 1B

The purpose of Study 1b was to obtain statistical evidence that gender identity moderates the impact of interdependence awareness on common resource consumption. That is, masculine people consume a greater amount of a common resource when their interdependence awareness is high versus low, whereas the amount of a common resource consumed by feminine people does not vary as their level of interdependence awareness changes.

Method

Study 1b was conducted in a controlled laboratory setting, using the same commons dilemma context and experimental design as in Study 1a. Interdependence awareness was manipulated by displaying similar posters (see Appendix C)³ as in Study 1a, along with descriptions of the commons dilemma situation (see below for more details). Gender was used as a proxy for gender identity and was measured at the end of the study along with other demographic information. Two hundred and fourteen students (47% females) from a large North American university completed this study in exchange for partial course credit. Upon arrival, participants were each seated in a cubicle facing a computer. All instructions appeared on the computer screen. Conversation between participants was prohibited. Participants were first instructed to imagine a scenario of using a public restroom for a bowel movement. By specifying the use of the toilet paper,

³ Two slightly different posters were used in Study 1b than the ones used in Study 1a because the background image (water and earth) might have an impact on how people think about the natural resources and hence might influence their consumption of toilet paper. Although it is believed the background image would not lead to a systematic and significant impact on people's consumption, using posters of different background images in the two studies shows the robustness of the results.

this study eliminates gender differences in toilet paper uses resulting from physiological differences between males and females. In order to ensure that participants imagined themselves in the scenario and to control the amount of time that people spent reading the appeals, the descriptions of the scenario appeared automatically on the computer screen one sentence at a time in fifteen-second intervals and read as follows: *“You are at a public place with your friends, and feel like you have to have a bowel movement.”* *“You leave your friends.”* *“You head to a gender-appropriate washroom.”* *“Upon entering you notice no one else is in the washroom.”* *“You select a stall and sit down on the toilet.”* *“While sitting there, you notice a poster (see below) on the back of the stall’s wall.”* *“Now please break off the amount of toilet paper you think you would use in the scenario from the toilet paper roll provided.”* The posters intended to manipulate interdependence awareness appeared on the screen along with the second-to-last scenario description and stayed on the screen until participants moved on to the measurement part. Then participants tore off the amount of toilet paper that they imagined they would use in the scenario from a roll of double-ply regular-size toilet paper and put it into an empty envelope. A full roll of toilet paper and an envelope were placed on each desk before participants entered the laboratory. The number of toilet paper pieces that each participant tore off was used as the dependent variable. Participants then answered questions measuring their interdependence awareness. The measure consisted of two items on 7-point scales (1 = not at all, 7 = very much), including “To what extent do you feel your consumption of the natural resources (e.g., toilet paper, water, etc.) affects the well-being of others by influencing the environment?” and “To what extent do you feel your own well-being is affected by other people’s consumption of the natural resources

(e.g., toilet paper, water, etc.), which then influences the environment?” Their answers to these two questions were averaged to create an interdependence awareness index ($\alpha = .622$). Finally, participants answered demographic questions including gender, mother language, and nationality. Except for gender, which was one of the focal independent variables, the demographic variables did not directly predict or interact with the independent variables to predict significant variance in the dependent variable; thus, they will not be discussed further. A total of sixty-nine participants (51% females) did not tear off the toilet paper and thus were omitted from the data analyses⁴. Therefore, one hundred and forty-five participants were included in the data analysis (45% females; cell size ranges from thirty to forty-five).

Results and Discussion

Manipulation check. A 2 (interdependence awareness: low vs. high) x 2 (gender identity: masculine vs. feminine) analysis of variance (ANOVA) on the interdependence awareness index revealed only a main effect of interdependence awareness ($M_{\text{lowIA}} = 4.05$ vs. $M_{\text{highIA}} = 4.79$, $F(1, 142) = 11.349$, $p < .01$) (Table 5-1). Neither the main effect of gender identity nor the interactive effect of interdependence awareness and gender identity was significant ($ps > .15$). Thus, the manipulation of interdependence awareness was successful.

Toilet paper consumption. The average amount of toilet paper that participants tore off was 7.12 pieces with a minimum number of 2 pieces and a maximum number of

⁴ Post analysis of the participants who did not tear off any toilet paper shows that they distributed equally among the experimental cells, suggesting their behavior (i.e., not tearing off any toilet paper) was likely due to failure of following the instructions rather than affected by the experimental factors (i.e., interdependence awareness and gender identity).

33 pieces.⁵ A 2 (interdependence awareness: low vs. high) x 2 (gender identity: masculine vs. feminine) ANOVA on the amount of toilet paper consumed reveals a significant main effect of gender identity ($M_{\text{masculine}} = 8.11$ vs. $M_{\text{feminine}} = 5.91$, $F(1, 144) = 14.26$, $p < .001$; see Figure 5-1) (Table 5-2). More importantly, consistent with hypotheses H1a and H1b, results show that interdependence awareness and gender identity significantly interacted to influence the amount of toilet paper consumed ($F(1, 144) = 8.34$, $p < .01$). Results from planned contrast analysis show that male participants took significantly more pieces of toilet paper in the high, as compared to the low, interdependence awareness condition ($M_{\text{high}} = 9.66$ vs. $M_{\text{low}} = 6.91$, $t = -2.44$, $p < .05$); whereas the amounts of toilet paper taken by the female participants did not differ significantly as a function of their interdependence awareness level ($M_{\text{high}} = 5.40$ vs. $M_{\text{low}} = 6.34$; $t = 1.57$, $p = .12$)(Table 5-3).

Discussion. The results provide further support for my prediction that gender identity moderates the impact of interdependence awareness on the consumption of common resources. Specifically, people with a masculine gender identity (i.e., males) increased their consumption of toilet paper significantly when they became more aware of the mutual influences of their consumption, and such a pattern was not found among people with a feminine gender identity (i.e., females).

Post-test

Research on gender differences in information processing suggests that males and females may be differently persuaded by the conservation appeals in the posters because of processing fluency (e.g., Eagly and Chaiken 1993; Aaker and Lee 2001; Shavitt 1990).

⁵ The results hold after deleting the outliers (below and above one standard deviation from the mean) from the data.

Specifically, a considerable amount of research demonstrates that people are likely to evaluate a target more positively when the message it conveys is consistent with their beliefs, values, and opinions due to a feeling of fluency or ease of comprehension (e.g., Janiszewski 1993; Labroo and Lee 2006; Reber, Schwarz, and Winkielman 2004; Zajonc 1968). Within this stream of research, a couple of studies show that males are more likely to be persuaded by information emphasizing individuality, whereas females are more likely to be persuaded by information emphasizing social relationship (e.g., Brunel and Nelson 2000; Kemp, Kennett-Hensel, and Kees 2013). Thus, it is possible that the results might be driven by males and females being persuaded by different appeals rather than responding differently to interdependence awareness. In order to rule out this alternative explanation, a total of ninety-four undergraduates (42% females) from a large North American university were invited to evaluate the posters. Participants were randomly assigned to see either the low interdependence awareness poster (i.e., the “your earth” poster) or the high interdependence awareness poster (i.e., the “our earth” poster).

Participants’ evaluation of the poster was measured using four seven-point scales (1 = strongly disagree, 7 = strongly agree), including “I like the poster,” “The poster is persuasive,” “The poster is good,” and “It just ‘feels right’ reading the message.” The four items were averaged to form an evaluation score ($\alpha = .877$, $M = 3.39$, $SD = 1.32$). Participants’ gender was measured and used as a proxy for their gender identity. A 2 (interdependence awareness: low vs. high) x 2 (gender identity: masculine vs. feminine) ANOVA on the evaluation index (with mother language included as a controlled variable) revealed that neither the main effect of interdependence awareness or gender identity was significant, nor was the interaction between them ($ps > .15$) (Table 5-4), suggesting that

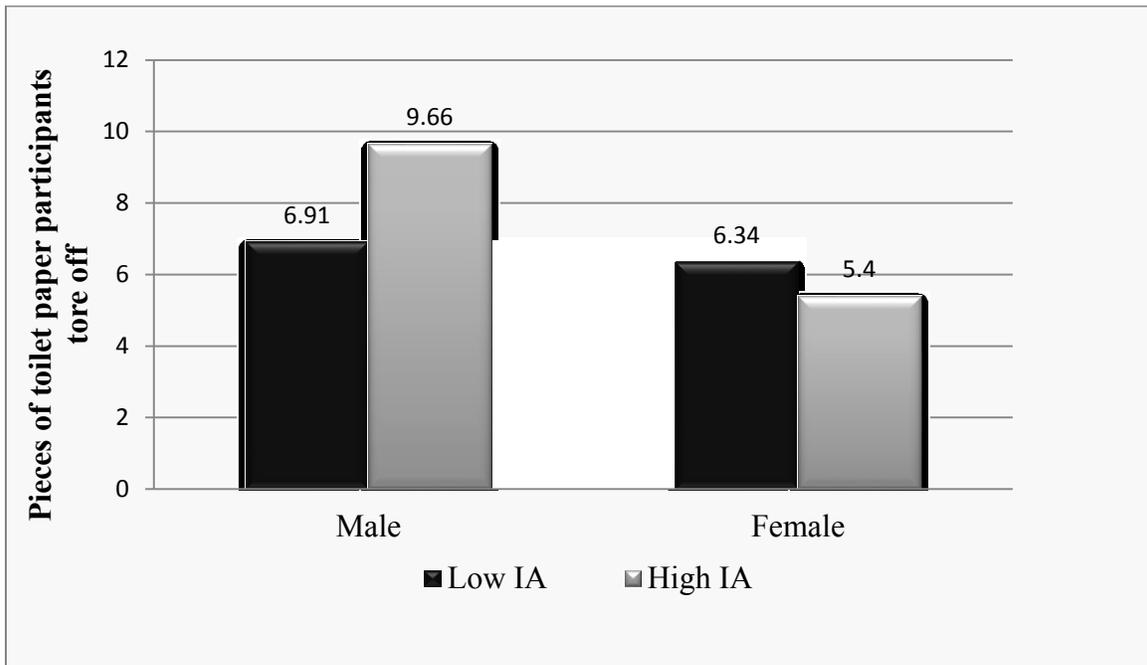
participants across the four conditions had equally favorable reactions to the posters (see Table 5-5 for the means). Thus, the findings from Study 1b were unlikely to have resulted from people of different gender identities being persuaded more by one poster than the other.

Table 5-1 Analysis of Variance for Interdependence Awareness Manipulation

Source	Sum of Squares	Degree of Freedom	Mean Square	F-Statistics	Sig.
Corrected Model	25.251 ^a	3	8.417	4.946	.003
Intercept	2729.779	1	2729.779	1603.984	.000
IA	19.314	1	19.314	11.349	.001
Gender	3.530	1	3.530	2.074	.152
IA * Gender	.604	1	.604	.355	.552
Error	236.561	139	1.702		
Total	2976.000	143			
Corrected Total	261.811	142			

Note: IA = Interdependence awareness

Figure 5-1 Toilet Paper Consumption



Note: IA = Interdependence awareness

Table 5-2 Analysis of Variance for Toilet Paper Consumption

Source	Sum of Squares	Degree of Freedom	Mean Square	F-Statistics	Sig.
Corrected Model	337.150 ^a	3	112.383	7.758	.000
Intercept	7112.070	1	7112.070	490.940	.000
IA	28.851	1	28.851	1.992	.160
Gender	206.609	1	206.609	14.262	.000
IA * Gender	120.746	1	120.746	8.335	.005
Error	2042.616	141	14.487		
Total	9739.000	145			
Corrected Total	2379.766	144			

Note: IA = Interdependence awareness

Table 5-3 Post-hoc Tests for Toilet Paper Consumption

Contrast	t	df	Sig. (2-tailed)
low vs. high IA male	-2.443	46.556	.018
low vs. high IA female	1.570	62.063	.121

Note: IA = Interdependence awareness

Table 5-4 Analysis of Variance for Poster Evaluation

Source	Sum of Squares	Degree of Freedom	Mean Square	F-Statistics	Sig.
Corrected Model	17.290 ^a	4	4.323	2.648	.038
Intercept	430.125	1	430.125	263.487	.000
Mother language	11.184	1	11.184	6.851	.010
IA	.624	1	.624	.382	.538
Gender	3.378	1	3.378	2.070	.154
IA * gender	2.385	1	2.385	1.461	.230
Error	145.287	89	1.632		
Total	1241.750	94			
Corrected Total	162.577	93			

Note: IA = Interdependence awareness

Table 5-5 Means for Poster Evaluation

Interdependence Awareness	Gender	Mean	Std. Deviation
low	female	3.6184	1.53290
	male	3.3966	1.25627
high	female	3.6500	1.45412
	male	3.0096	1.09197

CHAPTER SIX

STUDY 2

The purpose of Study 2 was multi-fold. First of all, since Studies 1a and b both used toilet paper consumption as the context of the commons dilemma, in order to enhance the generalizability of findings, Study 2 used a different commons dilemma context. Specifically, Study 2 adopted the fishing game that has been widely used in previous commons dilemma studies (e.g., Bargh et al. 2001; Knapp and Clark 1991). Using the fishing context shows that my findings are not limited to some idiosyncratic features of toilet paper consumption, and it also provides us with the opportunity to compare the results of the current research to the findings of those early studies that used the same fishing game. Another major objective of Study 2 was to obtain evidence for the proposed psychological processes underlying the interaction between interdependence awareness and gender identity. That is, competition (cooperation) motivation mediates the relationship between interdependence awareness and common resources consumption among people with a masculine (feminine) gender identity. In order to achieve this objective, I directly measured participants' competition and cooperation motivations in the process of the study. In addition, I used a different method than personal pronouns to manipulate interdependence awareness. Thus, I not only obtain further evidence that the interaction between interdependence awareness and gender identity goes beyond males and females reacting differently to persuasive messages (Brunel and Nelson 2000), I gain insights about how interdependence awareness can be affected by different situational

cues. Last but not least, I measured gender identity directly instead of using biological sex as a proxy for gender identity.

Method

Study 2 employed a 2 (interdependence awareness: low vs. high) x 2 (gender identity: masculine vs. feminine) between-subjects experimental design. Interdependence awareness was manipulated by the presence (vs. absence) of other fishing boats in the fishing game (see below for more details). Gender identity was measured at the end of the study. One hundred and twenty students from a large North American university (46% males) completed this study in exchange for partial course credit.

Upon arrival, participants were seated in individual cubicles facing a computer. The whole study was executed on computer. Conversation between participants was prohibited. As a cover story, participants learned that the purpose of the study was to understand people's strategic decision making in a fishing game. Participants were first asked to select their gender to activate their gender identity, as prior research suggests that making gender identity salient to people is necessary to elicit gender-typical responses (Gerber 2009; Sell and Kuipers 2009). Then participants were directed to the fishing game, where they were asked to play as a fisher at a lake that originally contained a total of one hundred tons of fish. In each fishing season, participants may choose to catch between 0% and 4% of the fish stock. In the low interdependence awareness condition, participants saw only one boat in the lake, named "Your boat," whereas in the high interdependence awareness condition, participants saw their boat among a total of twenty-four other boats presented in the lake as "other fishers" (see Appendix D). These numbers were selected for a purpose: unknown to the participants, the total amount of

fish caught by “the other twenty-four fishers” was set to be 48% across all fishing seasons, and the regeneration rate of the fish in the lake was set at two—i.e., what remained from the last season would double at the beginning of each season. Thus, catching 2% each season represents a proper consumption of the fish stock. In other words, because “the other twenty-four fishers” always caught a total quota of 48%, if the participant chooses to catch 2%, the total catch amount would be 50%, so that following regeneration, the original fish stock would be re-achieved. On the other hand, if the participant chooses more than 2% (i.e., 3% or 4%), the total amount caught by the group will exceed 50%, so that the total amount of fish would gradually decrease, indicating overconsumption. This algorithm was applied to both low and high interdependence awareness conditions. Thus, the objective interdependence in this commons dilemma game was held constant across conditions. Participants were not aware of this algorithm, but only informed that the fish stock would regenerate after each fishing season, and they were also informed about the amount of fish remaining after each season while playing the fishing game. It is believed that this level of uncertainty represents many real-world commons dilemma situations in which people don’t have full information about the situation encountered (De Kwaadsteniet et al. 2005).

Participants first played five trial seasons in order to familiarize themselves with the fishing game as well as to gain a sense of how the amount of fish they choose to catch might influence the total amount of fish in the lake. Then participants played fifteen formal fishing seasons, and their total fishing amount in these fifteen seasons was summed up to be the dependent variable. After the fishing game, I measured participants’ competition and cooperation motivations, interdependence awareness, gender identity,

perceived scarcity of the fish, and their first language. I measured their perceived scarcity because the presence of the other fishers might lead to perceived scarcity of the fish, which, in turn, enhances motivation to catch more fish (Eisend 2008; Lynn 1991). I determined participants' first language to use it as a proxy for their cultural background, as early research in commons dilemmas shows that culture might influence people's consumption of a common resource (e.g., Yamagishi 1988).

Measures

Interdependence awareness. Interdependence awareness was measured using four seven-point scales (1 = not at all, 7 = very much so), including “when making decisions about how many fish to catch, to what extent did you think about the other fishers in the fishing game/to what extent were you aware of the other fishers in the fishing game/to what extent did you think about how your catch of fish would influence the amount available to the other fishers in the fishing game/to what extent did you think about how the other fishers' catch of fish would influence the amount available to you in the fishing game?” The four items were averaged to form an interdependence awareness score ($\alpha = .89$, $M = 3.15$, $SD = 1.79$).

Competition motivation. Competition motivation was measured using three seven-point scales (1 = not at all, 7 = very much so), including “when making the decisions about how many fish to catch, to what extent did you focus on catching more fish than each of the other fishers in the fishing game/to what extent did you compete with the other fishers in the fishing game/to what extent did you think the other fishers were competitive in the fishing game?” The three items were averaged to form a competition motivation score ($\alpha = .83$, $M = 3.39$, $SD = 1.79$).

Cooperation motivation. Cooperation motivation was measured using three seven-point scales (1 = not at all, 7 = very much so), including “when making the decisions about how many fish to catch, to what extent did you focus on catching the same amount of fish for yourself and each of the other fishers in the fishing game/to what extent did you cooperate with the other fishers in the fishing game/to what extent did you think the other fishers were cooperative in the fishing game?” The three items were averaged to form a cooperation score ($\alpha = .78$, $M = 2.99$, $SD = 1.50$).

Gender identity. Gender identity was measured using 16 seven-point (1 = low, 7 = high) bipolar adjective scales from the extended version of the Personal Attributes Questionnaire (Spence, Helmreich, and Holahan 1979). The reliability and validity of these widely used scales have been well documented (e.g., Helgeson 1994). Examples of the eight masculine items include “not at all independent/very independent” and “have difficulty making decisions/can make decisions easily.” Examples of the eight feminine items include “not at all emotional/very emotional” and “not at all aware of others’ feelings/very aware of others’ feelings.” The responses were averaged to create their respective gender identities ($\alpha_{\text{masculine}} = .74$, $M = 5.07$, $SD = .61$; and $\alpha_{\text{feminine}} = .69$, $M = 5.09$, $SD = .71$). Early research indicates that an individual can embody both masculine and feminine identity (c.f., Kurt et al. 2010), such that a high score on one gender identity does not necessarily suggest a low score on the other identity. Thus, I created a measure to capture the difference between these two dimensions by subtracting each respondent’s feminine score from his or her masculine score. As a result of such transformation, I obtained a new measure to assess relative masculine identity that was referred to as

MFDI. Low MFDI scores indicate feminine gender identity, and high MFDI scores indicate masculine gender identity.

Perceived scarcity. Perceived scarcity of the fish stock was measured using two seven-point scales (1 = not at all, 7 = very much so), including “To what extent did you feel the fish stock in the lake was abundant during the fishing game?” (reverse-coded) and “To what extent did you feel the fish stock in the lake was scarce during the fishing game?” The two items were averaged to form a perceived scarcity score ($\alpha = .66$, $M = 2.98$, $SD = 1.30$).

Results and Discussion

Manipulation check. Ordinary least square regression was used to analyze the data. The regression model included a contrast-coded variable for interdependence awareness (1 if interdependence awareness is high, -1 if low), MFDI as a continuous variable, their two-way interaction, gender, and whether the participant’s first language is English as control variables⁶, and interdependence-awareness score as the dependent variable. In order to minimize the possibility of multicollinearity, all continuous variables were standardized (Aiken and West 1991). The regression results indicate that the overall model was significant ($F(5, 114) = 7.413$, $p < .001$), and the model adjusted R-square is 24.5% (see Table 6-1). In addition, all variance inflation factors are less than 1.51, suggesting that the model does not suffer from multicollinearity⁷. The main effect of interdependence awareness on interdependence awareness score is both positive and significant ($t = 4.87$, $p < .001$). Neither the main effect of gender identity nor the

⁶ Language does not influence the main effect of interdependence awareness manipulation and gender identity or their interactive effect on interdependence awareness or fish harvest.

⁷ Results from a separate correlation analysis show that participants’ gender identity and their biological sex are significantly positively correlated (see Table 6-6), indicating the validity of using biological sex as a proxy for people’s gender identity in other studies.

interactive effect of interdependence awareness and gender identity is significant. Thus, the interdependence awareness manipulation was successful.

Fish harvest. My hypothesis predicts that gender identity would moderate the effect of interdependence awareness on the amount of fish that people catch. To test this hypothesis, an ordinary least square analysis was conducted. The regression model specification was the same as in the manipulation check, except the dependent variable was replaced by the total amount of fish that participants caught in the fishing game. Results from the regression model indicate that the overall model is significant ($F(5, 114) = 5.434, p < .001$), and the model R-square is 19.2% (Table 6-2). The main effect of gender identity is positive and significant ($\beta = .29, p < .01$), indicating that masculine participants, on average, caught more fish than feminine participants did. As H1a and H1b predict, only for participants with a masculine identity, but not for people with a feminine identity, their fish catch increases as interdependence awareness increases. Thus, the two-way interaction was further examined. I first calculated high (low) values for MFDI by adding (subtracting) the standard deviation to (from) the mean, and then conducted simple slope analysis (Aiken and West 1991). Consistent with my predictions, for those with a masculine gender identity, the relationship between interdependence awareness and fish consumption is positive and significant ($\beta = 3.45, t = 2.20, p < .03$), suggesting that high interdependence awareness led to a significant increase in fish consumption for them. On the other hand, for those with a feminine gender identity, the relationship between interdependence awareness and fish catch is not significant ($\beta = .05, t = 0.03, p > .98$), indicating that feminine participants' consumption of fish was not influenced by their interdependence awareness. Figure 6-1 visually depicts the

moderating effect of gender identity for interdependence awareness effects. Finally, the results show that whether the participant's first language is English or not had a significant main effect on their use of toilet paper. Further analyses show that this factor does not influence the interactive effect of interdependence awareness and gender identity, nor does it interact with either of them. Because the impact of first language on common resource consumption is beyond the scope of this research, it will not be discussed further.

Mediation analysis. I proposed that the competition motivation mediates the relationship between interdependence awareness and common resource consumption for both individuals with a masculine and a feminine gender identity, while cooperation motivation only mediates the relationship for people with a feminine gender identity. To test these hypotheses, I performed a bootstrap analysis using 5000 iterations and 95% bias-corrected confidence intervals (CIs) in PROCESS Model 7 (Hayes 2013). Because the moderator, gender identity, was a continuous variable, in order to facilitate the interpretation of the mediation analysis results, I looked at the results at high (low) values of MFDI, which were calculated by adding (subtracting) the standard deviation to (from) the mean. Thus, high MFDI represents masculine gender identity, while low MFDI represents feminine gender identity. Findings relevant to the mediating roles of competition and cooperation motivations are shown in Figures 6-2 and 6-3, and Tables 6-3 and 6-4.

Consistent with my hypotheses, results indicate that the indirect effect of interdependence awareness through competition motivation was significant for fish consumption at both high MFDI (i.e., masculine gender identity; indirect effect = .12; CI

[.0248, .2814]) and low MFDI (i.e., feminine gender identity; indirect effect = $-.10$; CI [.0388, .2108]) (i.e., CI does not contain zero; see Hayes 2013; Zhao, Lynch, and Chen 2010). In addition, results show that the indirect effect of interdependence awareness through cooperation motivation was significant for fish consumption at low MFDI (i.e., feminine gender identity; indirect effect = $-.14$; CI [-.2922, -.0503]). These findings formally indicate the mediating roles of competition and cooperation motivations for the relationship between interdependence awareness and common resource consumption among masculine and feminine people, respectively.

Rule out perceived scarcity as the alternative explanation. As discussed earlier, an alternative explanation for the current findings is that the social presence of other fishers increased perceived scarcity of the fish (Eisend 2008; Franke and Schreier 2007), which led to enhanced consumption intentions, especially for the masculine identity (Eisend 2008; Lynn 1991; Nichols 2012). Thus, to rule out this possible explanation, I ran another mediation analysis with the same model specification as above, with competition/cooperation motivation replaced by perceived scarcity index as the potential mediator. Results show that perceived scarcity does not mediate the relationship between interdependence awareness and fish consumption at either level of gender identity, as all CI contained zero (Table 6-5), suggesting that perceived scarcity is unlikely to be the explanation.

Discussion. By measuring gender identity directly, results from Study 2 provide further support to my hypothesis that gender identity moderates the impact of interdependence awareness on common resource consumption. Specifically, the positive relationship between interdependence awareness and consumption was observed only for

those with a masculine identity. Additionally, results show that competition (competition and cooperation) motivation mediates the relationship between interdependence awareness and consumption for people with a masculine (feminine) gender identity. These results support an appropriateness framework perspective of the situation by demonstrating that high interdependence awareness draws both masculine and feminine people's attention to the interdependency aspects of the situation, yet they construe the situation differently—in a way that is consistent with their own identity.

Figure 6-1 Fish Harvest

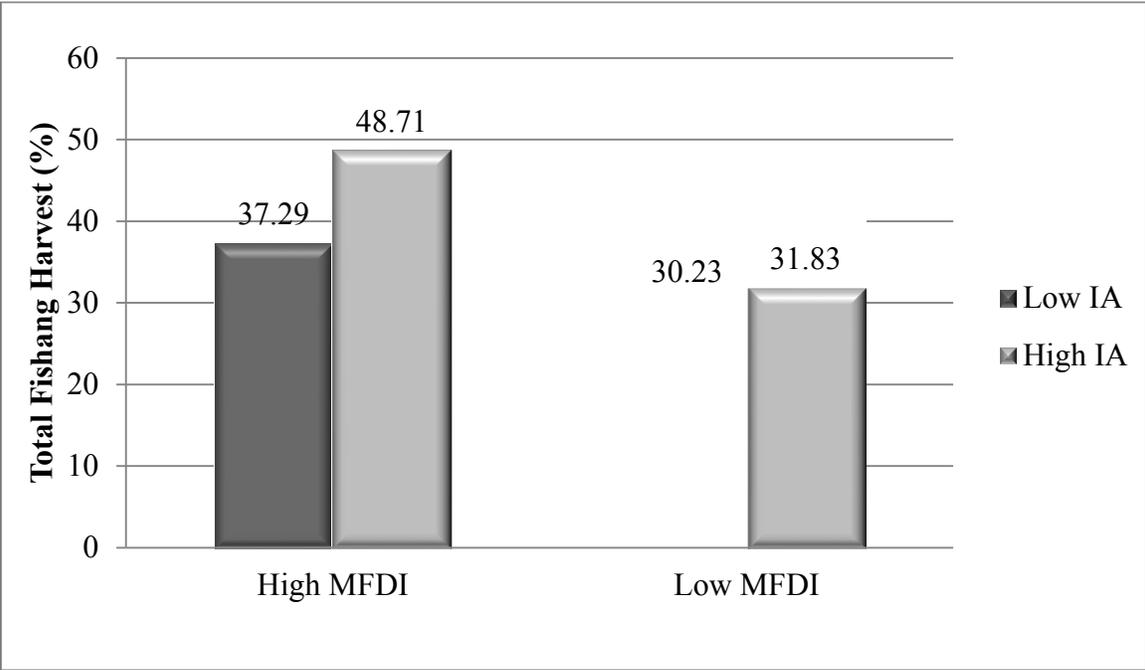


Table 6-1 Regression Results for Interdependence Awareness Manipulation

Equation: interdependence awareness score

	Parameter Estimation	t-Value	Sig.
Intercept	.179	1.279	.204
IA	.408	4.873	.000
MFDI	.067	.675	.501
IA x MFDI	.064	.766	.445
Gender	.140	1.454	.149
Language	-.280	-1.577	.117
R ²	24.5%		

Note: IA = Interdependence awareness

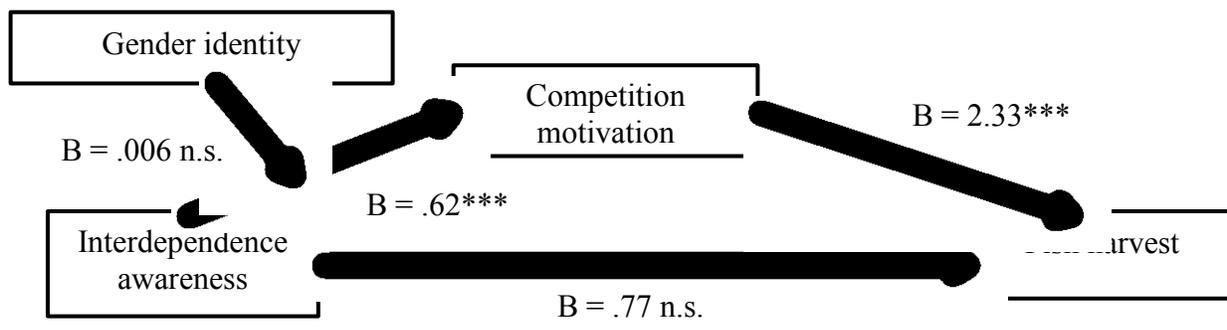
Table 6-2 Regression Results for Fish Harvest

Equation: fish harvest

	Parameter Estimation	t-Value	Sig.
Intercept	.369	2.543	.012
IA	.136	1.564	.121
MFDI	.285	2.754	.007
IA x MFDI	.132	1.521	.131
Gender	.060	.597	.552
Language	-.625	-3.406	.001
R ²	19.2%		

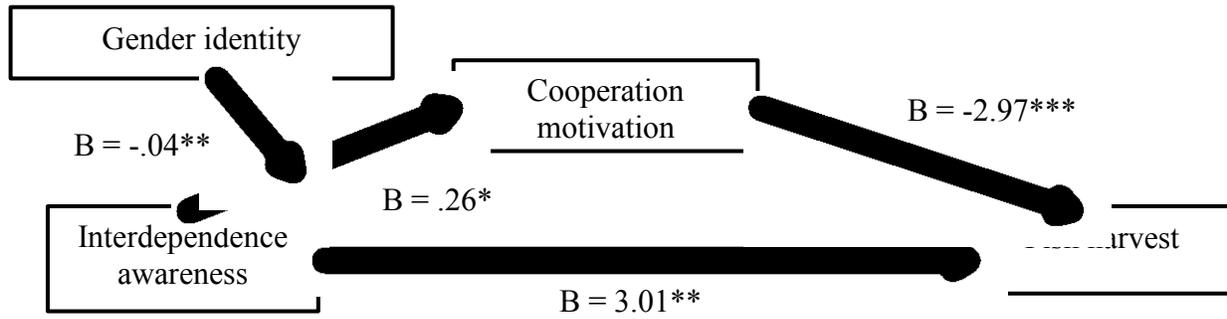
Note: IA = Interdependence awareness

Figure 6-2 Mediation Analysis Results for Competition Motivation



*** $p < .001$

Figure 6-3 Mediation Analysis Results for Cooperation Motivation



* $p < .01$, ** $p < .05$, *** $p < .001$

Table 6-3 Mediation Analysis Results for Competition Motivation

	MFDI	Effect	Boot SE	BootLLCI	BootULCI
Competition motivation	-1.0000	.1028	.0417	.0388	.2108
Competition motivation	-.0000	.1116	.0445	.0399	.2172
Competition motivation	1.0000	.1205	.0635	.0248	.2814

Note: Values for quantitative moderators are the mean and plus/minus one SD from mean

Table 6-4 Mediation Analysis Results for Cooperation Motivation

	MFDI	Effect	Boot SE	BootLLCI	BootULCI
Cooperation motivation	-1.0000	-.1448	.0606	-.2922	-.0503
Cooperation motivation	-.0000	-.0681	.0375	-.1609	-.0106
Cooperation motivation	1.0000	.0087	.0421	-.0673	.1043

Note: Values for quantitative moderators are the mean and plus/minus one SD from mean

Table 6-5 Mediation Analysis Results for Perceived Scarcity

	MFDI	Effect	Boot SE	BootLLCI	BootULCI
Perceived scarcity	-8.6456	.0114	.2153	-.3981	.5313
Perceived scarcity	-.8333	-.2227	.2404	-.9535	.0922
Perceived scarcity	6.9789	-.4568	.4293	-1.6095	.1838

Note: Values for quantitative moderators are the mean and plus/minus one SD from mean

Table 6-6 Correlation Analysis Results for Gender Identity and Biological Sex

		Biological sex
MFDI	Pearson Correlation	.529**
	Sig. (2-tailed)	.000
	N	120

** . Correlation is significant at the 0.01 level (2-tailed).

CHAPTER SEVEN

STUDY 3

Selective Attention as a Boundary Condition

A basic premise of the current research is that people with a masculine (feminine) gender identity are motivated to increase (control) one's consumption because high interdependence awareness shifts their attention to the social aspects of the dilemma encountered, which results in a competitive (both competitive and cooperative) construal of the situation. As discussed in Chapter Two, the appropriateness framework views situation recognition as a categorization process that depends on certain key features in the environment that people pay attention to. Indeed, a variety of research shows that manipulating the direction of people's attention can effectively influence product evaluation (Mogilner, Rudnick, and Iyengar 2008), purchasing behavior (Bertini and Wathieu 2008), consumption enjoyment (Redden 2008), and environment understanding (Endsley 1995). Thus, if situation recognition is the underlying mechanism for the interactive effect of interdependence awareness and gender identity, then directly manipulating people's attention (i.e., individual vs. social focus) should eliminate the interdependence awareness effect. That is, people with a masculine (feminine) gender identity should increase (control) their consumption of a common resource when socially, as compared to individually, focused, regardless of the level of interdependence awareness. Study 3 directly tested this possibility.

Method

A 2 (attention focus: individual vs. social) x 2 (gender identity: masculine vs. feminine) between-subjects experimental design was employed. Attention focus was manipulated by a sentence-unscrambling task adopted from Kühnen and Hannover (2000). Gender was again used as a proxy for gender identity. The same fishing game was used as in Study 2 as the commons dilemma context for this study. Eighty-two students (51% males) from a large Canadian university completed this study in exchange for either partial course credit or ten dollars. Statistical analysis showed that whether people participated for monetary payment or for course credit did not influence their performance in the study ($p > .60$), so it will not be discussed further.

The procedure was similar to Study 2 except that all participants were informed that they would be asked to play an online fishing game with 24 other participants (who in fact were simulated by the fishing game program), connected through the Internet, and they all saw the other 24 boats in the lake while playing the fishing game (i.e., the high interdependence awareness condition in Study 2). To manipulate their attention focus, participants were first instructed to carry out a sentence-unscrambling task while the program was “connecting” them with the twenty-four other players. In particular, participants were presented with a set of five words each time and asked to make a grammatical and meaningful four-word sentence. The task involved a total of fifteen sets of words with two filter sets and twelve priming sets (adopted from Kühnen and Hannover 2000). Examples of self-focus priming include “my, singular, asserted, individuality, I” (correct sentence: I asserted my individuality) and “unconnected, fear, I, argument, no” (correct sentence: I fear no argument), while examples of social-focus

priming include “in, feel, others, I, sync” (correct sentence: I feel in sync) and “I, react, people, other, support” (correct sentence: I support other people).

After completing the sentence-unscrambling task, participants were directed to the fishing game. In order to enhance the robustness of the results, different levels of environmental uncertainty were executed than in Study 2. In particular, in this study, participants were informed that there were fifteen fishing seasons in total, and the fish in the lake would regenerate—what remained from the last season would double at the beginning of each season. While playing the fishing game, at the beginning of each season, all participants were given information about the total catch quota of last season and the total amount of fish remaining after regeneration. However, I added variations to the amount of fish the other players took. That is, the total amount of fish caught by the other twenty-four players was always a random integer from 46% to 50% with the mean of fifteen seasons set at 48%. After the fishing game, participants’ environmental consciousness was assessed using the New Environmental Paradigm (NEP) scale (Dunlap et al. 2000), because it is possible that people’s environmental consciousness may influence their pro-environmental behaviors. Then participants rated the extent to which they perceived fish as a shared resource and how scarce the fish in the lake was, each on a scale ranging from 1 (not at all) to 7 (very much). Finally, participants indicated their gender, age, education, and the extent to which they took the study seriously on a seven-point scale (1 = not at all; 7 = very seriously). Three participants were omitted from the data analyses because they indicated low seriousness when completing the study (rated lower than 3 on the seriousness measure). Therefore, seventy-nine participants were included for the data analysis (cell size ranges from 18 to 22). Except for gender, which

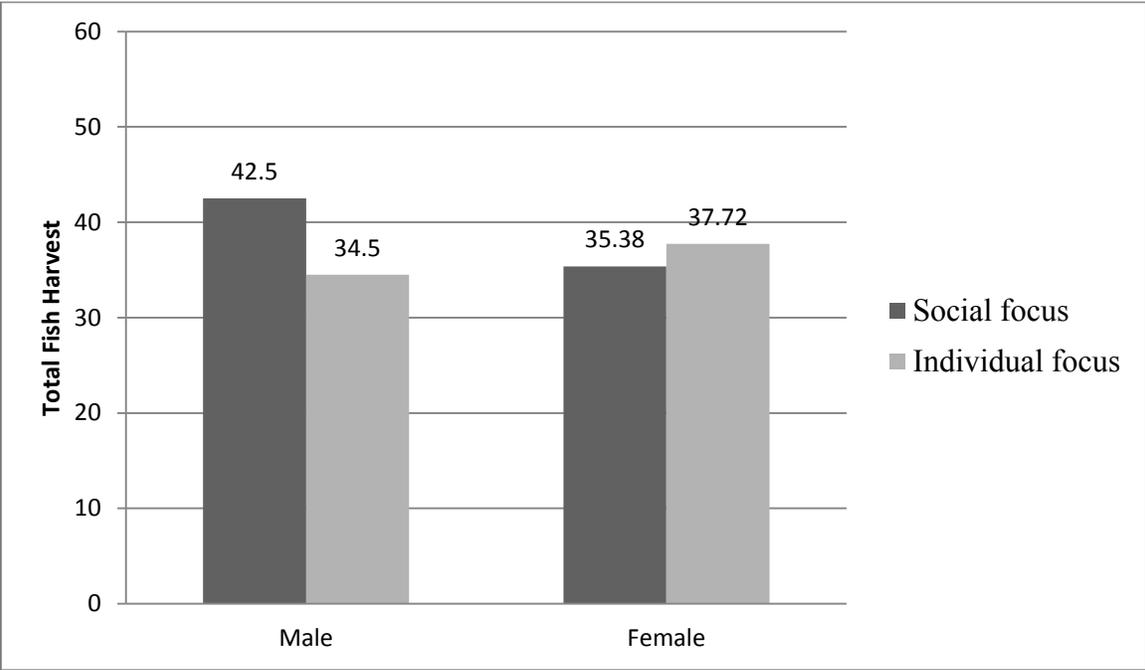
was the independent variable, the other demographic measures as well as participants' environmental consciousness did not have any significant impact on fish consumption, nor did any of them interact with attention focus or gender identity ($ps > .20$), thus they will not be discussed further.

Results and Discussion

Fish harvest. The catch quotas of the fifteen seasons were summed up to be the dependent variable. Using attention focus and gender identity as the independent variables, an ANOVA revealed that neither of the main effects was significant ($ps: >.17$), and only the interactive effect was marginally significant ($F(1, 75), p = .066$). More importantly, planned contrasts show that masculine participants with a social focus caught much more fish than those with an individual focus ($M_{\text{social}} = 42.50\%$ vs. $M_{\text{individual}} = 34.50\%$, $t = -2.06$, $p < .05$), whereas the fish caught by females did not differ as a function of the self-construal ($M_{\text{social}} = 35.38\%$ vs. $M_{\text{individual}} = 37.72\%$, $t = -.33$, $p > .50$) (Figure 7-1).

Discussion. Study 3 demonstrates that attention focus and gender identity interact to influence consumption of a common resource (i.e., fish stock). More importantly, results show that when masculine individuals are self-focused, they behave less competitively even in an environment that is likely to elicit high interdependence awareness. In other words, when attention focus is directly manipulated, the interdependence awareness effect is attenuated. Thus, Studies 2 and 3 together provide evidence for the appropriateness framework account that interdependence awareness impacts consumption by influencing attention focus and, hence, understanding of the situation encountered.

Figure 7-1 Fish Harvest



CHAPTER EIGHT

GENERAL DISCUSSION

One of the most critical emergent challenges today is how to cope with an enlarging gap between the demand for and supply of scarce natural resources such as land, water, clean air, etc. Consumption of these shared resources creates a dilemma in which each individual needs to make a trade-off between the interest of the self and the interests of the other common resource users. I argue that many of the most daunting real-world commons dilemmas are not generated by small, face-to-face groups like the prisoner's dilemma paradigm, but by very large and often faceless groups. Examples of the latter include use of large-scale public facilities (e.g., highways, national parks) and consumption of environmental resources (e.g., energy, atmosphere). One limitation of using simplified representations of commons dilemmas to study consumer decision making is the neglect of an important factor—namely, interdependence awareness—that varies across real-world commons dilemmas. To address this limitation, the present research conducted one field and three lab studies and found consistent evidence that the impact of low versus high interdependence awareness on common resource consumption is contingent on people's gender identity. Specifically, results show that under high interdependence awareness, people with a masculine gender identity are likely to consider the commons dilemma encountered as competitive, and hence, they will consume the common resource more aggressively than under low interdependence awareness. On the other hand, for people with a feminine gender identity, high, as compared to low, interdependence awareness makes them to see both the competitive and

cooperative sides of the commons dilemmas, resulting in controlled consumption of the common resource. It is important to acknowledge here the differences between interdependence awareness and externality awareness, which has received adequate attention from previous studies in commons dilemmas. Specifically, externality awareness is defined as being aware of the negative effects of one's overconsumption of a common resource on the well-being of others (e.g., Dhont et al. 2012; Rapport 1988; Schwartz 1970). While the definition of externality awareness seems to be similar to my definition of interdependence awareness, they are fundamentally two different constructs. Externality in the commons dilemma context refers to a negative impact of one's consumption imposed on another person/party (Dhont et al. 2012), who could be a common resource user or not. Light pollution is a typical example of an externality in which consumers of the light impose a negative impact on bystanders who might not necessarily need the light. In other words, a negative externality in commons dilemmas can be thought of as a negative side effect to the public produced by one's consumption of a common resource. It implies that emphasizing the negative consequences of people's overconsumption (i.e., increasing externality awareness) not only affects people's perception of the dilemma, it also "pushes" them to be morally convinced that cooperation is the only right thing to pursue.

Interdependence awareness, on the other hand, stresses people's recognition of the "mutual" influences on each other, thereby highlighting two critical aspects that distinguish interdependence awareness from externality awareness. First, given the emphasis on the "reciprocal" negative impact of people's consumption in interdependence awareness, the possibility is minimized that an individual feels obligated

for the well-being of others because of having a unilateral impact on others. Second, the definition of interdependence awareness suggests that all the people involved need to be consumers of the same common resource, which allows us to obtain an exclusive understanding about the dynamics among common-resource users. In contrast, the definition of externality awareness implies that an individual who is affected by the externality of others' consumption can either be a consumer who shares the consumption of the same resource or an unrelated third party. Thus, it is unclear how decision making is affected by whether people perceive this "affected other" as a co-consumer or a bystander.

Theoretical Implications

My investigation of interdependence awareness makes important theoretical and practical contributions. First, findings from the current research add to our understanding about decision making in situations involving social conflict by showing that within the context of a commons dilemma, whether or not people are aware of the interpersonal interdependence significantly changes the way they understand the situation and the action they take. While previous research has primarily focused on what happens when people already have knowledge about the interdependence structure, this research provides the first comparison between situations when people ignore versus recognize such interdependence. Importantly, I manipulated interdependence awareness through the nuances of situational cues (i.e., personal pronouns and presence of others), suggesting the malleability of this construct. Finally, results show that the impact of interdependence awareness on common resource consumption is qualified by people's gender identity.

Second, traditional research in commons dilemmas has tended to focus on identifying explicit interventions that promote cooperative behavior, such as incentives (e.g., Balliet et al. 2011; Komorita and Parks 1994), institutions (Ostrom 1999; Wade 1988), and communication (Dawes, et al. 1977; Hackett, Schlager, and Walker 1994), and little research has explored the impact of situational cues (for exceptions, please see Utz 2004a, 2004b). Meanwhile, a vast body of research in social psychology and consumer behavior has shown that people are susceptible to the non-conscious effects of subtle situational cues (Bargh 2002; Dijksterhuis et al. 2005). The present work demonstrates that in the context of commons dilemmas, decision making is also sensitive to situational cues such as different personal pronouns in conservation appeals.

Practical Implications

The current investigation provides important practical implications for marketers and policy makers regarding design of effective and successful management strategies for common resources. In many real-world commons dilemmas, or similar situations, strategies that highlight the existence of other resource users are often used to encourage people to be cooperative. As one example, kids at school are often told that the toys are not theirs but common properties to be shared with others. As another example, drivers are often reminded to share the road with motorcycle and bicycle riders. Findings from the current research suggest that these strategies might not be as effective as expected, and sometimes may even produce the opposite influence than intended. I offer a few possible solutions that are likely to eliminate this negative impact of increased interdependence awareness. One direct solution is instead of stressing the “sharedness” of a common resource, emphasize the individual benefits of conservative consumption. This

not only reduces the possibility that a commons dilemma is perceived as a competitive situation, it also matches conservation with people's egocentric motivation, which should be particularly effective for people with a masculine gender identity. Indeed, studies show that using charitable appeals that emphasize benefits to the self are more likely to persuade males than those emphasizing benefits to others (e.g., Brunel and Nelson 2000, 2003).

Another possible solution is to complement information that signals interdependence awareness with additional social cues. I suggest there are two types of social cues that are likely to encourage cooperation: 1) social cues suggesting cooperative aspects of the situation and 2) social norms. Commons dilemmas, in simple words, are mixed-motive situations in which an individual can choose to compete for self-interest or to cooperate for the interest of the whole group (Dawes 1980). As discussed earlier, situation recognition is a categorization process depending on which situational cues people pay attention to. Thus, highlighting cooperative cues, such as others' cooperative intention and shared identity, is likely to result in a cooperative perception of the situation, thereby increasing cooperative behavior. Provision of social norms is also likely to encourage cooperation. As suggested by the appropriateness framework, people make decisions based on what seems to be appropriate to do in the situation. A number of studies show that providing information about the behavior of others in the social situation can effectively motivate actions by informing individuals about what is likely to be appropriate in that situation (Bearden and Etzel 1982; Cialdini, et al 1991; Goldstein, Cialdini, and Griskevicius 2008; Park and Lessign 1977).

Limitations

The current research also comes with a couple of limitations. One is that instead of allowing interdependence awareness to determine which aspect(s) of people's gender identity will interact with it, I either used a context where gender identity is highly likely to be activated by the environment (i.e., selection of gender-appropriate restroom), or activated gender identity directly (i.e., having participants answer the question measuring their gender prior to the commons-dilemma task). On the other hand, the appropriateness framework suggests that objective situational cues can trigger certain aspects of an individual's identity, and the complex interaction between situational cues and identity yields an understanding of the situation. Thus, it is possible that different levels of interdependence awareness might activate different aspects of an individual's identity (e.g., need to belong, a student, an American, etc.). Future research might explore the dynamic interactive effect between interdependence awareness and identity activated by interdependence awareness.

Another limitation of the current research is that none of the studies conducted assessed/controlled participants' dispositional competition/cooperation intentions (Messick and McClintock 1968; Van Lange 1999). It has been well documented in the literature of commons dilemmas that some people are more dispositionally competitive or cooperative (Van Lange, et al. 1997), and such individual differences may override the interdependence awareness effect. For example, people who are highly competitive (cooperative) are likely to be more sensitive to social situational cues than those who are less competitive (cooperative) (e.g., individualists). Thus, they may become aware of the interdependency even when social cues do not highlight it. Individual differences in

dispositional competition/cooperation may also override the moderating role of gender identity. That is, there are likely to be males with dispositional cooperation intention who reduce their consumption of a common resource under high interdependence awareness, and females with dispositional competition intention who increase their consumption with high interdependence awareness. Future studies need to control for the possible effects of individual differences in dispositional competition/cooperation intentions.

A third limitation with the current study is that except for the field study, I used undergraduate students as the participants for all the lab studies. This group of individuals is likely to have relatively limited resources (e.g., financial resources, materials; Ailawadi, Neslin, and Gedenk 2001; Dunlap and Van Liere 1978; Scott and Willits 1994). Because conservation means taking fewer resources, people who lack resources are likely to be less motivated to do so than people who have abundant resources. On the other hand, some studies (e.g., Aaker and Bagozzi 1982; Roberts and Bacon 1997; Straughan and Roberts 1999) suggest that younger individuals, as compared to the older generations, are likely to be more cooperative in commons dilemmas because they have grown up in a time period in which environmental concerns are a salient issue, and hence they are likely to be more sensitive to such issues. In sum, to enhance the generalizability of the current research findings, future studies need to recruit a wider population than university students.

A final limitation is that all lab studies were not consequential. In other words, participants' choices did not influence their actual well-being. Consequential situations should lead to more attention, elaboration, and critical evaluation of the situation than nonconsequential situations (Arriaga 2013). While it is unclear whether or not the amount

of attention would impact the interdependence awareness effect, there is a possibility that different levels of attention will lead to different routes of decision making processes (Petty and Cacioppo 1986) and hence different actions. Consequentiality might also moderate the interaction between interdependence awareness and gender identity. In particular, when behavior is consequential, people with a masculine gender identity might further increase their consumption to avoid being outperformed by others, whereas people with a feminine gender identity might decrease their consumption of a common resource in order to avoid “hurting” others (Baumeister and Sommer 1997; Schwartz and Rubel 2005). A future study should explore these possible influences of consequentiality.

Future Directions

I believe there are several relevant research questions worthy of further investigation. It was argued earlier that for people with a feminine gender identity, high interdependence awareness elicits both competition and cooperation motivations, and as a result of these two competing motivations, the amount of a common resource they consume remain unchanged as when they have low interdependence awareness. Thus, it is reasonable to expect that in certain situations, one of these two motivations will dominate the other, leading to motivation consistent consumption (i.e., increased consumption driven by competition motivation and decreased consumption driven by cooperation motivation). One such moderator might be the type of the common resource involved. Research on female competition consistently found that females compete with each other for male attraction (Walker, Wilson, and Gordon 1983; Wallen 1995), and they are more likely to buy appearance-enhancing products to outdo other females (Durante et al., 2011). Therefore, it is very likely that for feminine common resources

(e.g., free fashion magazines, male attention, etc.), high interdependence awareness might lead to competition among females by highlighting the existence of other female rivalries. Future research can explore this possibility.

A natural follow-up question is whether the results from the current research can be generalized to other types of social dilemmas, such as a public goods dilemma (i.e., people are faced with a decision about whether to contribute to the provision of a public good; Dawes 1980). I expect the findings from the current research are likely to hold and may even be bolstered in a public goods dilemma. My logic is as follows: what distinguishes commons dilemmas from public goods dilemmas is the idea that losses loom larger than gains (Kahneman and Tversky 1979). In public goods dilemmas, people need to make a contribution and, hence, experience a loss, whereas in commons dilemmas people consume a common resource and, hence, experience a gain. In other words, in both public goods and commons dilemmas people need to make a trade-off between self-interest and others' interests, but the same context in a public goods dilemma sense (i.e., loss) should entail a larger trade-off than in a commons dilemma sense (i.e., gain). Therefore, as interdependence awareness increases, people with a masculine identity are even more likely to engage in non-cooperative behavior (i.e., not contribute to the provision of public goods) due to their emphasis on self-interest over others' interests. Future research is needed to investigate these possibilities.

An interesting finding implied from this research is the fact that decision making occurred in a private setting in all studies. That is, participants did not know the amount of a resource consumed by others. Such an anonymous setting implies that people's gender-typical behavior is not driven by stereotypical expectations imposed externally

(Miller et al. 1992; Rudman 1998), but by their self-stereotyping, which is likely to occur when a social identity is made contextually salient (e.g., Turner, et al. 1987). On the other hand, I expect the interaction between interdependence awareness and gender identity to be more complex in situations where behavior is not anonymous. Specifically, it is possible that when the situation is public rather than private, masculine people with high interdependence awareness are motivated to further increase their consumption of a common resource in order to conform to stereotypical expectations of being aggressive and competitive. However, it is equally possible that they will behave cooperatively in order to earn social status and reputation when they know their behavior will be observed by others (Griskevicius, Tybur, and van den Bergh 2010; Van Vugt et al. 2007). For people with a feminine gender identity, the picture is less complex: both stereotype expectation fulfillment and reputation/status earning predict them to be more cooperative when consumption is public than private. Future research that investigates the possible moderating role of anonymity will be fruitful.

It is also worth noting that the current research implies that increasing structural information about a commons dilemma situation from none (i.e., when people lack interdependence awareness) to minimal (i.e., when people are aware of the existence of the other common resource users) leads to more competitive consumption, which is counter to early studies finding that cooperation increases as the amount of structural information increases (e.g., Gonzalez et al. 2014; Martin et al. 2013). Specifically, these studies document that offering explicit information about an interacting party's actions and outcomes and/or information about the payoff matrix of the dilemma game leads to a higher level of cooperation than when no interdependency information is provided (e.g.,

Gonzalez et al. 2014; Martin et al. 2013). One possible explanation is that minimum information (i.e., when people are aware of the existence of an interacting party only, but have no information about the structural information of their interdependence) ironically highlights uncertainty about the social situation: who are the others; how much do they consume; how is my well-being affected by them? Thus, such uncertainty leads to more competitive consumption than when people have zero information about the social aspect of the situation. When more information is provided as in early studies, uncertainty decreases, and so does competitive consumption. Further research is needed to obtain a deeper understanding about the relationship between available information and cooperative consumption in commons dilemmas.

It has long been recognized that a commons dilemma entails a self-control experience as a) similar to a self-control situation, an individual in a commons dilemma is faced with a conflict between short-term and long-term self-interest (one's long-term self-interest depends on the long-term collective interest); and b) an immediately more rewarding outcome (e.g., a tasty dessert, catch more fish today) is often more tempting than an outcome that is less rewarding in the short term but more valuable over the long term (e.g., a healthy salad contributing to an attractive figure, and restraint in one's fish catch today sustaining the industry into the future). Therefore, some researchers have investigated decision making in commons dilemmas from a self-control dilemma perspective, and argued that the tragedy of the commons would be prevented if everyone successfully engages in self-control consumption of a common resource (Brown and Rachlin 1999; Dewitte and De Cremer 2001). One major difference between commons dilemmas and self-control dilemmas is that commons dilemmas involve both a social (me

vs. others) and a temporal (now vs. future) conflicts, whereas self-control dilemmas only involve the latter. Results from the current research imply that when the social conflict is salient (i.e., when people have high interdependence awareness), self-promoting consumption (i.e., having more than others) is more likely than self-control consumption (i.e., saving more for future consumption), particularly for people with a masculine gender identity. Further investigation is needed to obtain deeper understanding about role of self-control in commons dilemmas, especially when both social and temporal conflicts are salient. While the current research focuses exclusively on the self-interest to oneself, some research suggests that individuals may also consume common resources strategically for future generations. According to the kin selection theory (Kenrick 1991), individuals may pursue a seemingly selfish strategy in commons dilemmas if it benefits the survival of their relatives and future generations (i.e., those who share their genes). Specifically, for the purpose of enhancing the survival and replication of one's genes, strategic consumption of common resources could arise as a consequence of attachment-related cues (kinship, friendship, familiarity) that signaled the potential for relatively high genetic commonality (e.g., Hamilton 1964; Burnstein, Crandall, and Kitayama 1994). Consistent with the kin selection theory, several studies found that people are more likely to help kin (e.g., siblings, friends) than non-kin (e.g., strangers; Kruger 2003; Stewart-Williams 2007). Therefore, it might be interesting to explore consumption of commons resources from a kin selection perspective in future research.

Another interesting research question that worth future investigation is that does high interdependence awareness introduces a high level of empathy (i.e., taking the others' perspective; De Vignemont and Singer 2006), which affects decision making in

commons dilemmas. Research on empathy and prosocial behavior suggests that since empathy is an other-focused state, having high empathy is likely to induce cooperative consumption of common resources by enhancing the weight assigned to other's well-being. For example, using prisoner's dilemma games, Batson and colleagues found that high empathy can promote more cooperative behavior than low empathy (Batson and Ahmad 2001; Batson and Moran 1999). However, results from the current research contradict this line of reasoning. That is if high interdependence awareness introduces perspective-taking and high empathy, people are expected to consume less, rather than more, of a common resource under high interdependence awareness, compared to low interdependence awareness. One possible explanation is that in symmetric commons dilemmas, an individual is faced with the same conflict (compete or cooperate) even when taking the perspective of the others, thus, the motivation to emphasize the interests of others is lacking. Future research is needed to explore the possibly interacting effect between interdependence awareness and empathy in commons dilemmas. Last but not least, the current research operationalized interdependence awareness through situational cues. Future studies can explore other antecedents of interdependence awareness, including individual differences and characteristics of commons dilemmas. For example, according to the self-construal theory (Triandis 1995), people with an independent self-construal emphasize the idea that individuals are autonomous and the basic unit of analysis, whereas people with an interdependent self-construal stress the notion that individuals are highly connected parts of social groups, and groups are the unit of analysis. Therefore, people with an interdependence self-construal are likely to have a higher level of interdependence awareness compared to those with an independent self-

construal. More studies are needed to explore the relationship between interdependence awareness and various situational, individual, and structural factors, as well as how they interactively influence consumption in commons dilemmas.

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Appendix A: Interdependence Awareness Measures (Pilot Study)

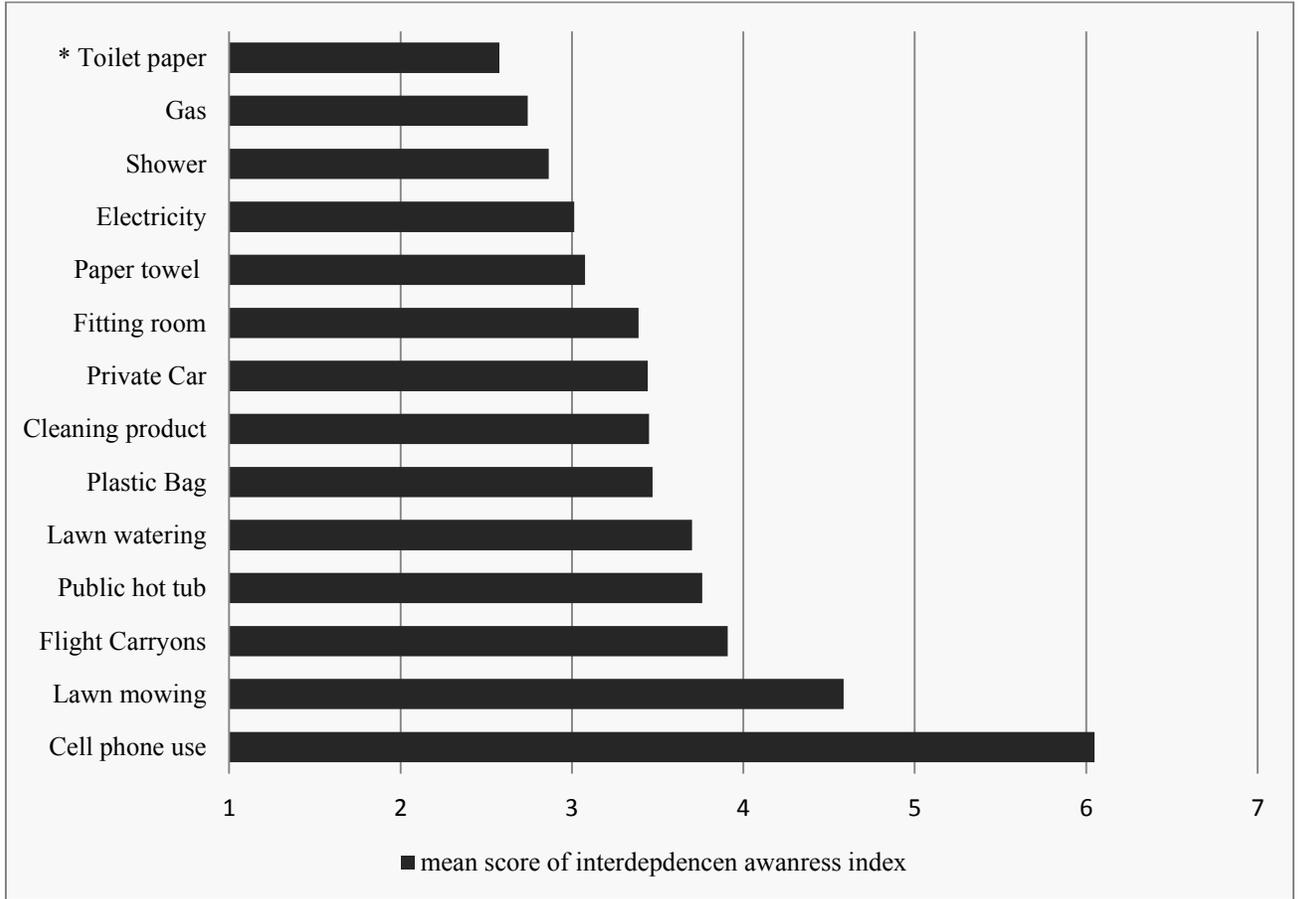
In the pilot study, I tested people's interdependence awareness in a total of 14 real-world commons dilemma contexts. Two hundred and two Amazon Mechanical Turk (Mturk) participants in United States answered questions for 14 commons dilemma situations (e.g., how long to stay in a shower, what temperature to set at home during winter, etc.). In each situation, they were asked to answer two questions on a 7-point scale (1 = not at all, 7 = very much) regarding their interdependence awareness. Participants' answers to the two interdependence awareness questions were averaged to create an interdependence awareness index for each of the situations (α s ranging from .725 to .930; see Table A1). If the participant has never been involved in the situation presented, s/he can select a corresponding option (e.g., "I don't do grocery shopping.") without answering the two interdependence awareness questions. Thus, among the 14 commons dilemma situations, the number of people who indicated having been involved in the situation and thus answered the interdependence awareness questions ranges from one hundred and thirty-five to two hundred and two (see Table A1). As Figure A1 indicates, interdependence awareness is low in the majority of the situations.

Table A1 Sample Sizes and Interdependence Awareness Scale Reliabilities

Study	N	α
shower	202	0.85
lawn watering	135	0.88
gas	186	0.88
electricity	183	0.84
toilet paper	202	0.92
paper towel	196	0.90
cell phone	196	0.73
lawn mowing	142	0.73
flight carryons	179	0.80
public hot tub	131	0.78
fitting room	192	0.85
private car	173	0.83
cleaning product	190	0.89
plastic bags	199	0.93

Note: *“shower” represents decision making about how long to stay in a shower; “lawn watering” represents decision making about how often to water the lawn; “gas” represents decision making about what temperature to set at home in the winter; “electricity” represents decision making about what temperature to set at home in the summer; “Toilet paper” represents decision making about how much toilet paper to use at a public restroom; “paper towel” represents decision making about how much paper towel to use at a public restroom; “cell phone use” represents decision making about how much volume to turn down on one’s cell phone at the theater; “lawn mowing” represents decision making about what time of a day to mow the lawn; “flight carryons” represents decision making about how much carry-on luggage to take onto a plane; “public hot tub” represents decision making about how long to stay in a public hot tub; “fitting room” represents decision making about how long to use a public fitting room; “private car” represents decision making about how often to drive to work; “cleaning product” represents decision making about how many eco-friendly cleaning products to use at home; and “plastic bag” represents decision making about how many plastic bags to use at the grocery store.

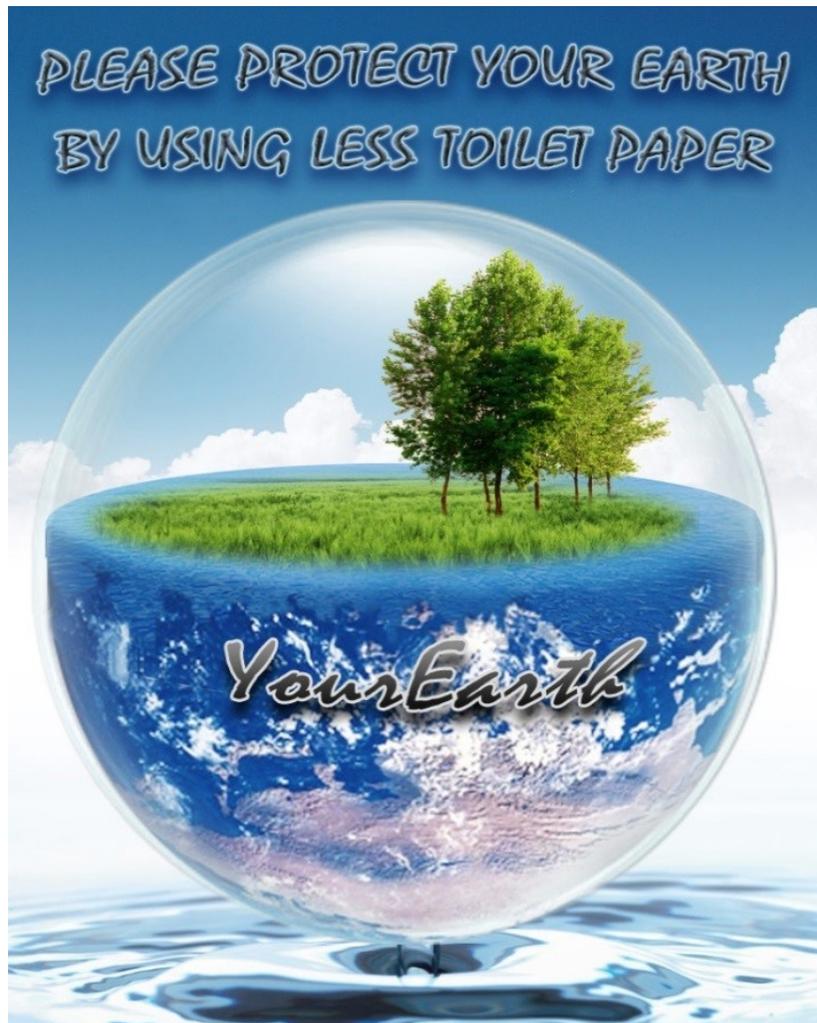
Figure A1 Interdependence Awareness Scores



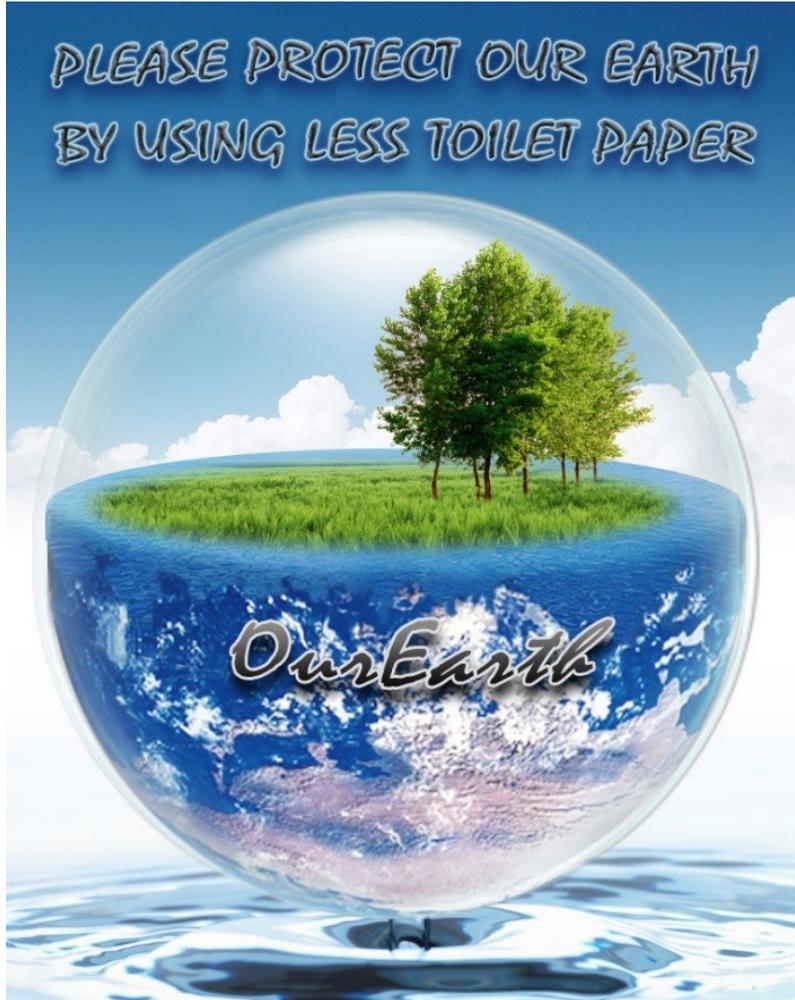
Note: * “Toilet paper” represents decision making about how much toilet paper to use at a public restroom; “gas” represents decision making about what temperature to set at home in the winter; “shower” represents decision making about how long to stay in a shower; “electricity” represents decision making about what temperature to set at home in the summer; “paper towel” represents decision making about how much paper towel to use at a public restroom; “fitting room” represents decision making about how long to use a public fitting room; “private car” represents decision making about how often to drive to work; “cleaning product” represents decision making about how many eco-friendly cleaning products to use at home; “plastic bag” represents decision making about how many plastic bags to use at the grocery store; “lawn watering” represents decision making about how often to water the lawn; “public hot tub” represents decision making about how long to stay in a public hot tub; “flight carryons” represents decision making about how much carry-on luggage to take onto a plane; “lawn mowing” represents decision making about what time of a day to mow the lawn; and “cell phone use” represents decision making about how much volume to turn down on one’s cell phone at the theater.

Appendix B: Posters Used in Study 1A

Low Interdependence Awareness:



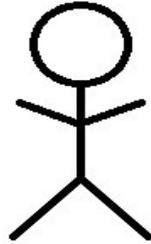
High Interdependence Awareness:



Appendix C: Posters Used in Study 1B

Low interdependence awareness:

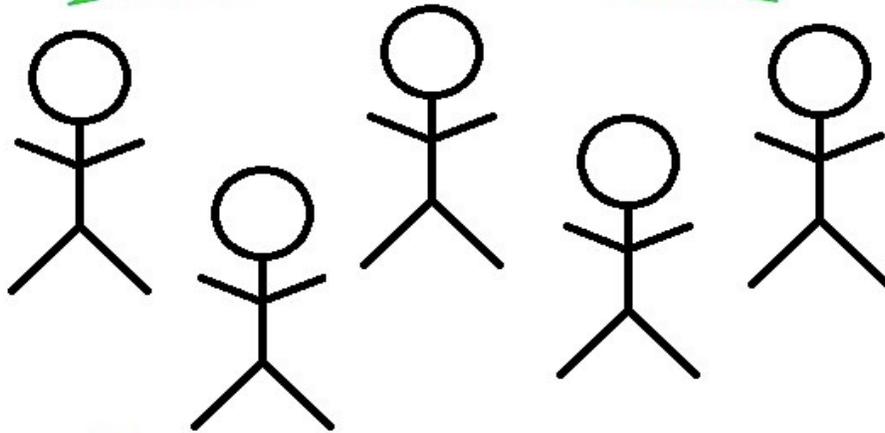
Protect Your Earth



Using Less Toilet Paper

High Interdependence awareness:

Protect Our Earth



Using Less Toilet Paper

Appendix D: Interface of the Fishing Game

Low interdependence awareness:

Now, this is the fishing game. Please make a decision for how many fish you want to catch each session. There are a total of 15 sessions.



Session 1: The lake now contains 100 tons of fish.

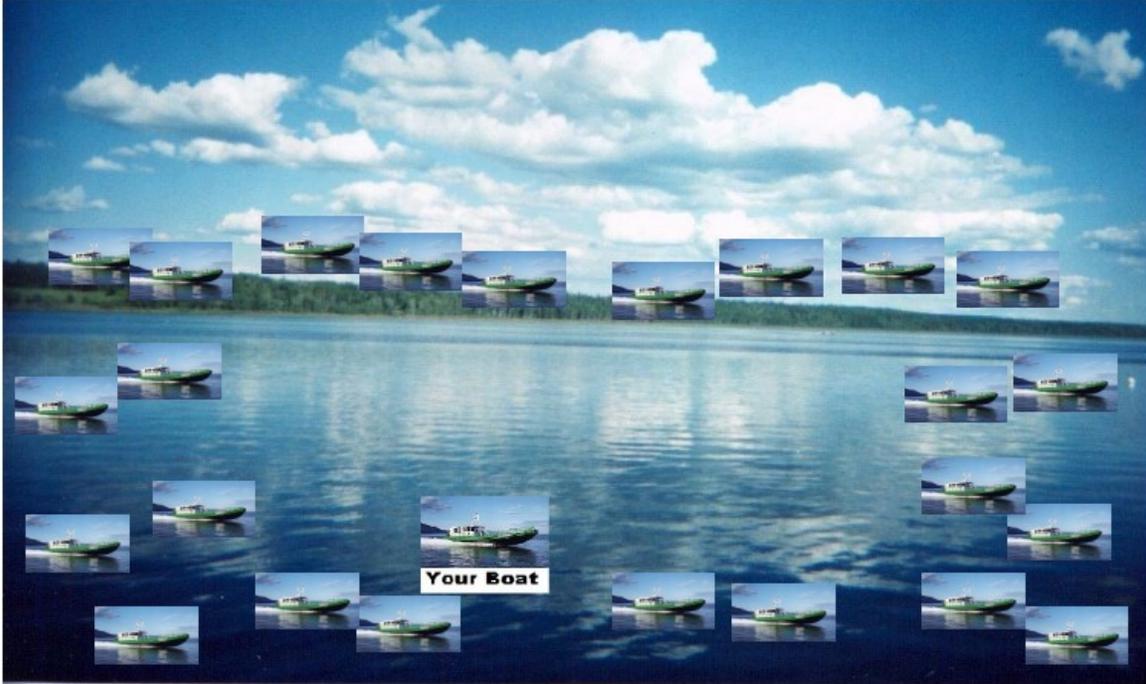
Please select the amount of fish you want to catch this session.

0% 1% 2% 3% 4%

Confirm

High interdependence awareness:

Now, this is the fishing game. Please make a decision for how many fish you want to catch each session. There are a total of 15 sessions.



Session 1: The lake now contains 100 tons of fish.

Please select the amount of fish you want to catch this session.

0% 1% 2% 3% 4%

Confirm