

# Mechanisms of Legal Effect: Perspectives from Social Psychology

*A Methods Monograph*

**PHLR**

Making the Case for Laws that Improve Health

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A Methods Monograph  
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## Summary

Social psychology plays an important role in explicating mechanisms of legal effect. Social psychological theories offer theoretical constructs that help explain the web of psychological and social causes and mediators of intentions and behaviors that legal processes seek to modify. Social psychology pertains primarily to the “Changes in Behavior” mediator in model of public health law research, positing a number of possible causal pathways by which legal systems and policies may influence behavior. From a social psychological perspective, laws and regulations can be classified according to the type of causal pathway by which behaviors are modified, for example, through changing attitudes, normative beliefs or self-efficacy concerning a specific behavior. We outline plausible pathways for many types of laws/regulations, including: 1) prevention and safety laws; 2) environmental exposure regulations; 3) laws regulating availability of health-enhancing and health-inhibiting products and resources; and, 4) “soft” laws that prompt or inform rather than command the ultimate actor (for example, labeling laws).

Given the large number of social psychological theories and the need to structure disparate theories in relation to each other, the theory of triadic influence (TTI) is a comprehensive and integrative model that we use for describing relationships among various theoretical constructs. The TTI posits that laws and regulations influence behavior through multiple causal pathways, from ultimate causes, through distal influences and proximal predictors, all mediated by the proximal influences of attitudes toward, social normative beliefs about, and self-efficacy regarding a particular behavior. Reliable measures for these and other constructs are readily available.

## Introduction

Social psychology has played a central role in both describing and predicting health behaviors that, in turn, describe and predict a range of health outcomes (Flay, Snyder, & Petraitis, 2009; Glass & McAtee, 2006; Jolls, Sunstein, & Thaler, 1998; Petraitis, Flay, & Miller, 1995). Public health has increasingly acknowledged the important effects of laws and regulations in improving population health (Burriss et al., 2010). Laws and regulations affecting sanitation infrastructure, food safety, and immunizations have historically had dramatic positive effects on reducing communicable diseases (Cutler & Miller, 2004; Gostin, Burriss, & Lazzarini, 1999; Sperling, 2010; Stern & Markel, 2005). With the rise of chronic diseases as major public health issues (Anderson & Horvath, 2004), population behavior and sociocultural environmental exposures are crucial targets for prevention efforts (Brownson & Bright, 2004). The behavioral sciences have made enormous contributions in guiding public health efforts to address these modern-day issues, and social psychology is likely to play an increasingly important function in understanding the mechanisms by which legal systems influence health behaviors and outcomes.

This monograph first classifies laws and regulations according to the specific types of causal mechanisms by which they are believed to effect behavior change. We present relevant theories from the field of social psychology to illustrate how various behavioral mechanisms might facilitate specific behavioral changes. We offer the theory of triadic influence (Flay & Petraitis, 1994; Flay et al., 2009) as a comprehensive and integrative model for understanding the inter-connections between many social psychological and sociological theories. Finally, we discuss measurement of relevant constructs.

## **Types of Health Behavior-Changing Laws and Regulations: A Social Psychological Perspective**

From a social psychological perspective, laws and regulations that influence health behaviors can be differentiated by the distinctive mechanisms involved in changing specific behaviors. While the nature of laws and regulations may be different, the behavioral mechanisms will often be similar.

### **Prevention and Safety Laws**

Prevention and safety laws are some of the most common “interventional public health laws.” Immunization laws are aimed at preventing the spread of communicable diseases. Driver safety regulations aim to reduce death and disability among motorists and pedestrians. Safety regulations are also an important component of occupational health, intended to reduce harmful exposures and injuries in work settings. From a social psychological perspective, the most likely mechanism of action of safety laws is that they provide people with the information they need to understand the benefits (reduced chances of injury or death) of complying with a particular law and the costs (penalties or possibility of litigation/tort) if they choose to not comply.

### **Environmental Exposure Regulations**

Historically, environmental exposure regulation has been one of the legal foundations of public health. For example, sanitation laws ensured a standard for clean water and proper disposal of waste products. Such feats were accomplished by substantial funding for proper urban infrastructure (Perdue, Gostin, & Stone, 2003). In modern times, emergence of evidence that exposure to lead, historically used in many home and industrial products, was harmful to health, led regulators to set standards to ensure that lead would no longer be used in the manufacturing of most products (Lewis, 1985). Most recently, laws that prohibit smoking in public buildings have reduced toxic exposures and altered specific behaviors of those affected (Fichtenberg & Glantz, 2002).

Intuitively, most environmental regulations would seem to influence organizational or individual

behavior through the same informational and motivational mechanisms described above for prevention and safety laws. For example, motivations to comply with regulatory standards may be seen in light of the desire to avoid penalties and/or litigation. As information and awareness of environmental toxins increases, causal pathways are also likely to occur through changing social norms, thereby affecting the behavioral patterns of whole populations. For example, notable shifts in adults' attitudes and practices regarding childhood exposure to tobacco smoke have occurred with increased awareness of the harmful effects of second-hand smoke (McMillen et al., 2003).

### **Laws Regulating Availability of Health-Enhancing and Health-Inhibiting Products and Resources**

Laws and regulations affect access to and the availability of products and resources in multiple ways. For example, Wagenaar and Perry (Wagenaar & Perry, 1993) demonstrated how: 1) legal availability laws (that is, age limits), 2) economic availability laws (alcohol tax), and 3) physical availability regulations (zoning for liquor businesses), all affect youth access to alcohol. Similar types of laws influence access to healthcare (that is, health insurance parity laws), food choices (school and workplace vending rules), and exercise opportunities (land use laws promoting parks and trails). Laws against possession of tobacco or illicit drugs also come with penalties that are intended to deter the behavior itself.

From a social psychological perspective, access/availability and possession laws have their effects through two mechanisms. First, they change people's perceptions of the availability of, and expectancies about, the personal costs and benefits of using a product or service. Second, they influence people's motivation to comply or cooperate and one's expectancies about the social costs and benefits of adopting the behavior or not. Although personal vs. social costs/benefits are considered as two separate causal pathways in the social psychological theories (Fishbein & Ajzen, 1975), they have been considered as one pathway by other social scientists such as economists, as components of subjective expected utility theories (Bauman & Fisher, 1985; Savage, 1954; Starmer, 2000; Stigler, 1950). According to Tyler (1999), perception processes also involve evaluations that reflect pride and respect within the organizational (or cultural) system, and those

evaluations become strong influences of motivation to cooperate.

### **“Soft” Laws (Information and Labeling)**

“Soft” regulatory strategies rely on choice architecture, education and the provision of information without legal penalty to the ultimate targets of individual behavior change (although they are typically mandatory and penalty-based with respect to the parties providing the product or service to the consumer). These laws are used in many areas including food nutrition and calorie labeling, alcohol and tobacco warning labeling, and other product contents labeling. Laws/regulations are often linked to or require the dissemination of messages encouraging individuals to adopt a healthier behavior or to comply with an effective law. From a social psychological perspective, the causal pathway from regulation to behaviors passes through attitudes and norms. The ideas of “libertarian paternalism” (Jolls et al., 1998) and soft regulatory strategies “nudging” people to make the “right” decisions (Thaler & Sunstein, 2008) are interesting perspectives on this.

## **Social Psychological Causal Mechanisms**

This monograph focuses on the “Changes in Behavior” mediator in the Burris et al. (Burris et al., 2010) model of public health law research. Some effects of laws/legal practices on behavior are mediated (the upper C → D Path) by changes in environment (the physical environment as well as social structures and institutions). We also describe theory-based mediators of laws and legal practices on behavior (lower Path C) and of changes in environments on behavior (Path D). There are many possible mediators, as we will describe below.

To this point, we have suggested only two primary causal pathways by which laws related to prevention and safety, environmental exposure, access/availability and possession may have their effects. First, information about required behaviors and the costs of non-compliance informs attitudes toward a behavior and, second, compliance requires consideration of social norms (even those with a legal basis) and the motivation to comply or cooperate with them. We now introduce two more. To the extent that laws

change the behavior of specific individuals, we may also observe a secondary effect on the behavior of others that arises from people learning by observing others (Akers, 1977; Bandura, 1977b). A final causal pathway involves self-efficacy, or the confidence one has of being able to successfully engage in a specific behavior (Bandura, 1977a).

### **Theories that Explain how Costs and Benefits Predict Behavior**

The idea of the consequences of a behavior having costs and benefits is common to multiple social psychological theories, including expectancy-value, subjective-utility and decision-making theories.

**Expectancy-value theories** posit that people's choices are influenced by their beliefs and values regarding a specific behavior or activity (Feather, 1982; Wigfield, 1994; Wigfield & Eccles, 2000). For example, applied to alcohol consumption behavior, the positive expectations of feeling good and enhanced social interactions act as behavioral motivators and the negative expectations of acting stupid or having a hangover the next day act as behavioral restraints (Jones, Corbin, & Fromme, 2001). The value placed on the positive or negative expectations determines how strong the motivators or restraints will be. If one anticipates negative consequences, such as being fined for underage drinking, and sees that negative consequence as being serious, then that anticipation (expectation/expectancy) will play a key role in deciding whether or not to engage in that behavior.

**Subjective-expected utility theory** is a particular version of expectancy-value theory, developed to test probabilities of risky economic decision-making (Fishburn, 1981; Savage, 1954). Utility refers to one's satisfaction (or evaluation). Utility is combined with one's knowledge or belief in the likelihood (in statistical terms, probability) that an expected event will occur. In essence, much like expectancy-value theories, decisions regarding a behavior will ultimately depend on the relative evaluations and expectancies of the perceived consequences of a behavior (Bauman & Fisher, 1985).

**Theories of decision-making** formalize the use of utilities and their evaluations in reaching decisions (Simon, 1959). **Heuristics theory** is a relevant approach to understand how problem-solving and decision-making processes occur with experience-based information. In terms of behavioral mechanisms,



this approach helps explain how previous experiences can feed back into and “inform” other determinants of health behavior. In every-day human contexts, trial and error experiences help to inform future behavioral choices. Heuristics theory posits that hardwired or learned heuristic “rules” guide individual judgments, regardless of available relevant information or certainty (Kahneman, Slovic, & Tversky, 1982; Tversky & Kahneman, 1974).

Perhaps the most well-known social psychological theories that have applied expectancy-value concepts to health behaviors are the **theory of reasoned action** (Fishbein & Ajzen, 1975) and its derivative, the **theory of planned behavior** (Ajzen, 1985). In these theories, *information* influences one’s *beliefs* about the consequences of a behavior (*expectancies* or expectations) together with one’s *evaluation* (or valuing) of that behavior. Thus, expectancies and evaluations are derived from information and values, respectively. Information can be provided through laws and regulations (or, more accurately, by the publicity about them). Values are derived from one’s religious background, the educational system, one’s family, and other broader sociocultural factors (politics, laws, mass media, etc.). Laws and regulations may or may not be consistent with one’s values – and this judgment of their fairness or legitimacy has some effect on the resulting motivation to comply with them (Tyler, 2006). In the Theories of Reasoned Action and Planned Behavior, expectancies and evaluations combine to become *attitudes* toward the behavior (Fishbein & Ajzen, 1975). Aside from the costs or penalties of non-compliance, people’s motivation to comply with authority (here a component of social normative beliefs) also plays a role in their choices.

### **Interpersonal Theories of Social Control**

Theories of compliance with law derived from social psychology also help explain the effects of prevention and safety laws (Tyler, 1999). **Compliance theories** assume that people comply with laws because of the risk and fear of punishment. Recent research, however, suggests that perceived legitimacy of laws is a more important determinant of whether or not people obey laws (Tyler, 2006). Studies reviewed by Tyler support the argument that people’s motivation to cooperate with others, in this case legal authorities, is rooted in

social relationships and ethical judgments, and does not flow only (or primarily) from the desire to avoid punishments or gain rewards.

One approach to how social relationships drive behavior, **social attachment theory**, suggests that individuals have an inherent need for close relations with others whether it is a child-parent relationship or an intimate or romantic relationship (Ainsworth & Bowlby, 1991). These close relationships almost always rely on a set of expectations whereby individuals within that relationship have varying expectations of each other and varying motivations to comply. Ryan and Deci's (2000) work on **intrinsic and extrinsic motivational factors** is also relevant for understanding compliance. For example, a child may be rewarded for good behavior or punished for bad behavior; or a child may wish to please her/his parents by performing a desirable behavior. Indeed, research has demonstrated that prosocial attachment and commitment is a strong predictor of behavior (Hirschi, 2002). Compliance motivations are directly affected by the degree and quality of attachment (interpersonal bonding) - people who are attached to conventional societal norms are more likely to be motivated to comply with laws and regulations that limit their behavioral choices (Gottfredson & Hirschi, 1990). Police and other authorities benefit from the more active cooperation of such people in the community (Sampson, Raudenbush, & Earls, 1997; Sunshine & Tyler, 2003; Tyler & Huo, 2002). Willingness to cooperate with authorities or comply with laws develops from the experience of fairness when dealing with authorities. This fairness leads to evaluations of legitimacy, a key precursor of motivation to comply or consent and results in voluntary acceptance (Tyler, 2006).

To the extent that laws change the behavior of some people, the behavior of others might follow. **Social learning theories** from both psychology (Bandura, 1977b) and sociology (Akers, 1977) describe this process. According to these theories, social learning is seen to take place in the context of social structures, whereby individuals learn through interactions with different people in multiple social contexts. Application of social learning theories for understanding deviant behavior (criminal or unhealthy) emphasizes how social influences serve as either protective or risk factors (Akers, 1998; Akers & Jensen, 2007). Social situations provide the contexts for social interactions, whereby perceived norms and compliance motivations mediate legal effects. This is more likely to be true when the others who change their behavior include individuals

within one's close social circle or family, as motivations to please or comply with them are much stronger.

An extension of social learning and other theories, **social cognitive theory** (Bandura, 1986b) describes how learning from social role models has multiple results. First, it can influence one's beliefs (expectancies) about the consequences of a behavior together with one's evaluation of the value of that behavior. Expectancies and evaluations combine to become attitudes (Fishbein & Ajzen, 1975). A second result is that it can help one learn new skills, which then influence self-efficacy. Third, to the extent that role models are important to you, you will be motivated to please them (or comply with them). Motivation to comply, combined with normative beliefs (how you think others want you to behave), produce social normative beliefs (Fishbein & Ajzen, 1975), which, in turn, influence intentions (or one's decision whether or not to engage in the behavior).

Social relationships and networks clearly play an important role in determining people's behaviors, including their reactions to public health laws. **Social network theories** constitute a broad set of theories describing the structural characteristics, functions, and types of social support that exist in an individual's social network (Borgatti et al., 2009). **Peer cluster theory** demonstrates how small groups of peers share similar beliefs, values and behaviors (Oetting & Beauvais, 1986). Similarly, from sociology, **differential association theory** (Sutherland, 1942) proposes individuals learn values, attitudes and motivations for behavior within small groups. Therefore, any behavior is more probable for those with intimate exposure to others performing that behavior. Observational learning illustrates how the adoption of a new behavior is facilitated through seeing others performing that behavior reinforced by reward systems within one's social system (Bandura, 1986a; Unger et al., 2003).

### **Intrapersonal Theories**

Individual predispositions and personality traits guide one's self-determination (will), skill development, and decision-making regarding a specific behavior. Important concepts within the intrapersonal dimension include self-regulation/control, social skills, and self-efficacy. One causal pathway suggested earlier involves

self-efficacy--the confidence one has to engage in a specific behavior successfully. According to **self-efficacy theory** (Bandura, 1977a, 1986a), compliance with a law or regulation about a specific behavior will improve to the extent the rule is accompanied with information about how to accomplish that behavior or, better still, training in how to do the new behavior. As people's skill to do the behavior (and, therefore, their confidence or self-efficacy about doing it) improves, they will be more likely to perform that specific behavior.

According to the theory of planned behavior, self-efficacy is the third leg directly affecting one's decision-making or intentions toward performing a behavior. Those with low self-efficacy are easily discouraged and less likely to trust their ability to perform a behavior, and, therefore, less likely to actually perform that behavior. In contrast, those with high self-efficacy regarding a specific behavior will likely utilize great effort to assure that they achieve their expected behavioral outcomes. Theoretically, self-efficacy potentially facilitates or buffers against compliance with laws and regulations. Self-efficacy could represent either confidence in one's ability to obey the law or confidence in one's ability to disregard or elude the law.

According to Bandura (Bandura, 1986a, 1986b), self-regulation is achieved by acquiring self-management skills and can be achieved a number of ways, including goal-setting, seeking social support, and self-rewards (to name a few). **Self-control theory** (Akers, 1991) posits that one's relative self-control forms during childhood, and tends to remain stable throughout adulthood. Lower levels of self-control are associated with ineffective or incomplete socialization. Those with low self-control are more likely to engage in delinquent behaviors, including health-related behaviors like drug use (Gottfredson & Hirschi, 1990). Therefore, legal penalties or punishments have varying degrees of effect, depending on one's level of self-control, and one's level of self-control thereby mediates effects of public health laws. In short, people with high levels of self-control are more likely to comply with legal restrictions than those with lower levels of self-control.

**Self-esteem** has been thought of as a component of self-concept by which individuals evaluate their competence and worth in their social environment (Cast & Burke, 2002). Thus, social competence and social skills are closely related to the concept of self-esteem. In general, research has shown associations of higher self-esteem with more positive outcomes, and a similar correlation of lower self-esteem with negative

outcomes. Self-esteem has been conceptualized in several ways: 1) as outcome; 2) as self-motivating; and 3) as a buffer from negative experiences. Cast and Burke (2002) attempted to integrate these three conceptualizations within the context of identity theory. DuBois and colleagues (2009) presented the **self-esteem enhancement theory** to help guide interventions related to self-esteem, where self-esteem and esteem formation and maintenance processes are depicted as moderators of well-being. In the context of legal effects, self-esteem likely plays a mediating role, whereby improved self-esteem strengthens one's capacity for appropriately handling negative pressures in a manner compliant with laws and regulations.

The self-motivation conceptualization of self-esteem is related to Deci and Ryan's (1985) **self-determination theory** (1985), by which intrinsic and extrinsic motivations vary in degrees according to one's goals or reasons. Intrinsic motivation is enhanced when three psychological needs – competence, autonomy, and relatedness – are met (Ryan & Deci, 2000). Levels of self-determination likely both moderate and mediate effects of laws. Those with higher levels of self-determination are more likely to comply with laws and regulations – unless such laws and regulations are regarded as illegitimate, in which case, self-determination may act as a buffer to compliance. Those with higher levels of self-determination are also more likely to vote and be otherwise engaged in their community, leading to a feedback effect on the development of laws and regulations and their perceived legitimacy.

### **Summary Comments on Social Psychological Theories**

We have described a variety of theories explaining various dimensions of behavior. These are collected in Table 1. These accounts of behavior can be organized within a **social ecological model** (Bronfenbrenner, 2005). In this model, behavior is influenced at three main levels: 1) within people themselves (that is, the individual's personality and predispositions), 2) with respect to the social relationships surrounding the individual, and 3) in the broad sociocultural environment. Laws and regulations, of course, are part of the sociocultural environment, along with economic and political systems, the mass media, religions and other cultural systems.

Table 1

*Social psychological theories informing mechanisms of legal effect*

<b>Evaluative Theories</b>	<b>Interpersonal Theories</b>	<b>Intrapersonal Theories</b>
Value-Expectancy theories:	Compliance theories	Self-efficacy theory
<ul style="list-style-type: none"> <li>• Subjective-expected utility theory</li> <li>• Theory of reasoned action</li> <li>• Theory of planned behavior</li> </ul>	<ul style="list-style-type: none"> <li>• Deterrence</li> <li>• Procedural justice</li> </ul>	Self-control theory
	Social attachment theory	Self-esteem theory
Theories of decision-making:	Intrinsic and extrinsic motivation	Self-esteem enhancement theory
<ul style="list-style-type: none"> <li>• Heuristics theory</li> </ul>	Social learning theories	Self-determination theory
	Social cognitive theory	Bounded rationality
	Social network theories	
	Peer cluster theory	
	Differential association theory	

We have described four major pathways through which laws and regulations can affect behavior, and summarized social psychological theories that elaborate those pathways. The first was that laws/regulations provide information that, in turn, informs expectancies/expectations about consequences that, together, form attitudes toward the behavior targeted by the law/regulation (laws/regulations → information → expectancies and evaluations → attitudes). A second causal path suggests that laws/regulations have their effects through the interpersonal pathway of influencing attachment to conventional norms leading to motivation to comply (laws/regulations → attachment to conventional norms → motivation to comply). Third, we described pathways through changes in the behavior of initial compliers, thereby changing social norms (laws/regulations → change behavioral norms → normative beliefs). A fourth pathway is through people learning new behaviors from others (laws/regulations → modeling/training → self-efficacy).

Note how each of these pathways moved from the ultimate (or root) cause of behavior, here the

laws/regulations, to a cause closer to behavior but still somewhat distal (for example, information, attachment to conventional norms, social norms, behavioral models), to causes even closer to or very proximal to behavior (that is, attitudes, social normative beliefs, and self-efficacy). It is immediately obvious that the proximal predictors of behavior are consistent with social cognitive theory (Bandura, 1986b) and the theories of reasoned action (Fishbein & Ajzen, 1975) and planned behavior (Ajzen, 1985)--all of these pathways are mediated by intentions or decisions to do the behavior. That is, changes in any one or all of attitudes (the result of expectancies and their value), social normative beliefs (the result of motivation to comply and normative beliefs) and self-efficacy (the result of will/opportunity and skill) related to a specific behavior are likely to lead to changes in one's intentions or decisions to perform that behavior; and intentions are a good predictor of actually doing (or at least initiating) the behavior. In the theory of planned behavior, behavioral control (one's perceived control over a specific behavior) replaces self-efficacy (one's actual or perceived ability to perform a specific behavior). Finally, note that the use of intentions to predict behavior has a practical advantage in public health law research: survey methods can be used to reliably measure intentions in those situations where direct observation of actual behavior is impossible.

All of these pathways sound rational, but there is wide recognition that rationality is limited. People exhibit bounded rationality, bounded self-interest, and bounded willpower (Jolls et al., 1998). Bounded rationality refers to cognitive limitations, so that information may be forgotten or habits formed that limit the acceptance of new information. Bounded self-interest refers to the fact that people care about others and what those others think about them, so they may act to please others or avoid negative judgments from others, rather than act in their own self-interests. Bounded willpower refers to the limited self-control or self-determination that we all experience with some behaviors such as smoking or eating. Notice the parallel of these three kinds of bounded rationality with the social-ecological levels in which the causes of behavior operate.

Many theories rely on intrapersonal concepts for understanding behavior, while social psychological theories posit that social contexts (interpersonal relationships) are just as important. Furthermore, **social ecological models** suggest that behaviors must be understood in the broader sociocultural contexts in which

they occur (Bronfenbrenner, 2005). Clearly, none of the proposed causal pathways toward behavior operate in a vacuum – all three are strongly affected by individual (intrapersonal) and social (interpersonal) factors. Each of these types of theories has offered important insights regarding the emergence of specific health behaviors. However, their contributions are limited to the extent that the scope of any specific single theory accounts for a limited set of influences on behavior. The **theory of triadic influence** was developed to integrate many of the above theories and others, and to provide a comprehensive explanation of the many causes of behavior. As will be seen below, each of the major pathways described above, and other related ones, can be unified in this integrated, comprehensive theory (Flay & Petraitis, 1994; Flay et al., 2009).

## **The Theory of Triadic Influence (TTI)**

The TTI represents an integration of many of the above theories, and others. It organizes them in a coherent way that explains health-related behaviors and guides interventions for health-behavior change. We find the framework useful for explaining the effects of laws and regulations on people's health behaviors and population-level public health. As a broad ecological model, the TTI provides a meta-theoretical approach to both explaining health-related behaviors and for guiding health behavior change. The TTI posits that theories and variables can be organized along two dimensions: social-ecological streams of influence and levels of causation (Petraitis et al., 1995).

### **The Basic Elements of the TTI**

The TTI proposes that causes of behavior operate through multiple pathways from ultimate to distal to proximal levels of causation; that these pathways flow through three ecological streams, each of which has two substreams; and that experience with a behavior feeds back to change the initial causes (see Figure 1). We discuss each of these elements in turn.



**Streams of Influence.** The TTI proposes that causes emanate from and flow through three streams of influence. The intrapersonal stream flows from genetic predispositions and personality through self-control/determination (will) and skills to self-efficacy. The interpersonal, or social-normative stream, flows from one's social contexts and relationships (community, peer networks, family) through others' behaviors (and one's perceived norms about these behaviors) and one's level of attachment to (bonding with) and motivation to comply with (or desire to please) those others, through social normative beliefs. The sociocultural or cultural-attitudinal stream flows from broad sociocultural factors (political, economic, legal, mass media, religion), through one's interactions with these social systems and how that interaction influences (controls) one's values (and evaluations of consequences); and the information these institutions provide and how that information influences one's expectations (also known as expectancies) about the consequences of a behavior. Together, these determine one's attitudes toward a specific behavior. All three streams end at one's intentions (or decisions), which ideally provide a reliable prediction of actual behavior.

Within each stream, two sub-streams represent distinct processes leading to decisions, one that is more cognitive and rational (the right-hand, or multi-lined, sub-stream within each stream in Figure 1), and one that is more affective or emotional (the left-hand or solid sub-stream within each stream in Figure 1).

Psychologists tend to emphasize the affective or emotional aspect of the second sub-stream; sociologists are more likely to emphasize the self- or social-control aspect (Gottfredson & Hirschi, 1990).

**Levels of Causation.** The TTI arranges these variables affecting behavior along multiple levels of causation – from ultimate causes, to distal influences, to proximal predictors (Flay et al., 2009). Some variables, such as attitudes toward the behavior, social normative beliefs about the behavior, and self-efficacy/behavioral control (confidence in doing a specific behavior), can have direct effects on intentions about that specific behavior and are, therefore, proximal causes of that behavior. Other variables are causally distal, influencing factors that can be mediated by other variables. These include the individual's social competence, attitudes and behaviors of others, and the individual's interactions with social institutions. Finally, many variables -- such as law, poverty, neighborhood characteristics, and personality -- represent underlying or ultimate causes

of behavior over which individuals generally have little control.

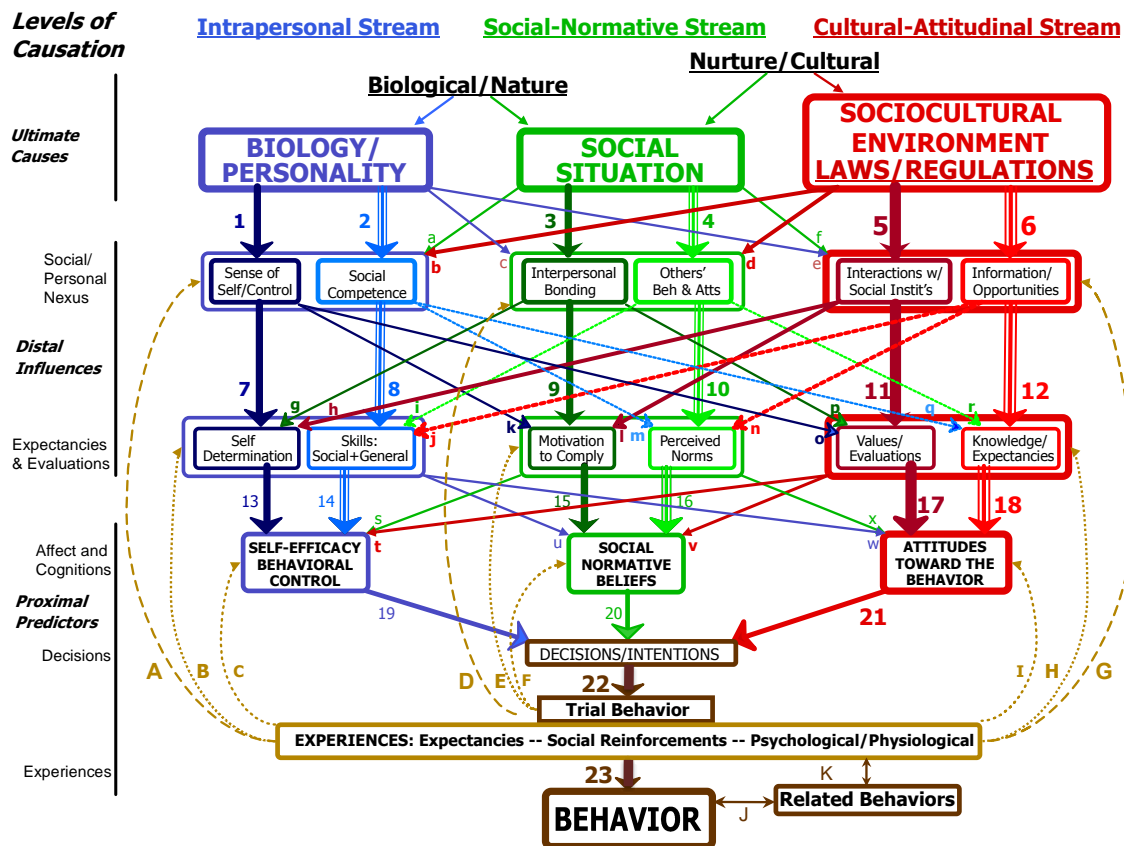


Figure 1. The Theory of Triadic Influence highlighting pathways of influence of public health laws and regulations

Note. **Blue** = intrapersonal influences; green = interpersonal/social-normative influences; **Red** = sociocultural/cultural-attitudinal influences. **Red boxes and arrows** are larger/thicker to demote the primacy of variables and pathways for the effects of laws/regulations. **Within blue, green and red, darker colors** = affective/control substreams/influences; lighter multi-lines or dashed lines = cognitive substreams/influences. **Brown** = outcomes and final behavior. **Gold** = immediate experiences and feedback. **Within gold lines, longer dashes** = feedback to higher (more distal) levels, shorter dashes = feedback to lower (more proximal) levels.

The TII proposes that causal mechanisms generally flow from ultimate to proximal causes within each of the three streams of influence. Yet, while the general flow of causation occurs predominantly within each stream, variables may also interact across streams. Thus, multiple ultimate and distal moderating and mediating factors may work together to increase or decrease the probability of a behavior occurring. For

example, one's personality may moderate the effects of a law on one's values.

**Feedback and Reciprocal Determinism.** Experience with a behavior may produce physiological, social or psychological reinforcements that feed back into many of the upstream variables that originally led to the behavior. Systems theories (Leischow et al., 2008; Serman, 2006; Wiese, Vallacher, & Strawinska, 2010) describe this as forming feedback loops, while social cognitive theory (Bandura, 1986b) describes it as reciprocal determinism. The key concept of reciprocal determinism suggests that any type of environmental influence may affect the behavior of individuals and groups, and that the behavior of individuals and groups may, in turn, affect the environment.

### **Application to Public Health Laws**

The TTI sociocultural stream illustrates how public policies and laws affect individual health behaviors primarily by shaping social and institutional practices and structures. Institutional structures and practices influence one's opportunities and access to products and information, and affects capacities for interacting with that institution. Drawing on theories reviewed above, the TTI proposes that attitudes toward a specific behavior are determined by expectancies and evaluations about that specific behavior. One's attitudes toward a specific behavior are one of the key proximal predictors affecting intentions and behavioral adoption.

Besides interactions of individuals with institutions and popular cultural milieu, social psychologists also recognize the important role of interactions that occur within one's social context. Core concepts in the interpersonal or social-normative stream of the TTI include bonding with or attachment to important others (Ainsworth & Bowlby, 1991), other's behaviors (role modeling) (Bandura, 1977a, 1986a), motivation to comply (or desire to please) and social normative beliefs (Fishbein & Ajzen, 1975). The TTI suggests that family structures/dynamics and peer relations are ultimate causes within social contexts that lead to one's social normative beliefs. Laws and policies may influence individual perceptions and decisions toward behavioral adoption or restraint by affecting one's beliefs about social norms.

Intrapersonal concepts are also important to consider when implementing laws and policies.

Individual predispositions and traits guide one's decision-making regarding a specific behavior. Important concepts within the intrapersonal dimension include social skills, self-control/regulation, and self-efficacy. In the intrapersonal stream of the TTI, one's personality determines one's levels of self-control/regulation, which, in turn, moderates the influence of policies or laws. One's levels of self-esteem and self-determination not only moderate effects of existing policies and laws, but also may help in the development of new policies and laws.

The TTI takes a step beyond other integrative theories, such as social cognitive theory, in that it integrates a wider range of psychological and sociological theories of behavioral development and change. The TTI organizes many of the key concepts from these theories, and others, in a coherent way that explains health-related behaviors and guides interventions for health behavior change. Furthermore, the TTI provides a systems perspective that includes development, feedback, control systems, and a systematic view of how multiple causes influence multiple behaviors either directly, through mediated pathways, by moderating other causes, or through feedback systems.

Feedback from behavior can be to any causal level, proximal, distal or ultimate (see dashed gold arrows A-G in Figure 1). A developmental perspective is incorporated into the TTI, in that all of the causal paths may be moderated by different developmental stages (ages), and changes in behavior may influence developmental trajectories. The TTI also makes it clear that distal and ultimate causes influence multiple behaviors (for example, one's personality influences all manner of behaviors).

**Pathways of Influence.** We propose that public health laws have their primary causal action through the cultural-attitudinal stream (shown in red in Figure 1). Laws primarily alter access to or availability of goods and information related to knowledge or expectancies of consequences (Paths 6 and 12 in Figure 1). Laws give rise to and structure interactions with government institutions (Path 5); these experiences in turn influence one's view of the legitimacy of authorities or one's evaluations of the expected consequences of a specific behavior (Path 11). Both of these paths influence attitudes toward the behavior (Paths 17 & 18), which, in turn, influences decisions (Path 21) and trial behavior (Path 22). A positive experience with the

behavior will feed back to influence expectancies and evaluations (and information and relationships with social institutions, including the legal system) to determine future behavior. Ultimately, repeated trial behavior that is repeatedly reinforced will lead to regular (habitual) behavior (Path 23).

The paths through the cultural-attitudinal stream are similar to many rational theories of decision-making and utility theories in economics (Starmer, 2000; Stigler, 1950) and to procedural justice and deterrence theories of compliance (see Methods Monographs by [Jennings](#); [Tyler](#)). Public health laws may also have their effects through less rational pathways that involve social relationships and emotions. For example, laws may have influence through the diagonal red pathways (Paths B, D, H, J, L, N, T, and V) on social and intrapersonal factors. For example, a law may lead others to change their behavior (path d). This will lead to changes in perceived norms. Then, to the extent that one is bonded with and desires to please (comply/cooperate with) others, one's social normative beliefs will be altered, leading to changed intentions (Path 20) and behavior. Laws may also have a direct influence on one's sense of control or social competence (Path B). Disability discrimination law, for example, may validate a person with a disability in her efforts to get accommodations at work (Engle & Munger, 2003), which will lead to changes through the intrapersonal stream down to self-efficacy and intentions (Path 19).

Aspects of the other streams may affect (moderate) how one responds to laws. Poor self-regulation or impulsiveness (sense of self/self-control), for example, may reduce effects of a law on one's behavior by moderating the pathway from information to attitudes (Path Q) or the path to values (Path O). Or, if everyone in one's immediate social context is not following a new rule, then one's perceived norm will be that the new behavior the regulation is intended to influence is not expected by one's associates; the resulting social normative belief will be against the new regulation as will the resulting intentions and behavior and attitudes towards the behavior (via Path X) – at least until enforcement imposes some costs – and/or changes the norms.

Tyler (1999, 2006) suggests that innate human desire to cooperate is the product of an array of inter- and intra-personal components, including trust, legitimacy, emotions, attitudes, and norms. De Cremer and Tyler (2005) have posited the importance of the “sense of social self” to the production of cooperative

behavior. These views actually combine aspects from all three streams of the TTI: self-esteem and sense of self-control from the intrapersonal stream; interpersonal bonding (attachment) and motivation to comply from the social stream; and interactions with or involvement in social institutions and attitudes from the sociocultural stream. If compliance with law is seen as a form of social cooperation, sense of social self will determine, to a large degree, one's degree of compliance with a new law or regulation. If the law is seen as having legitimacy, as having been created in a fair way by trustworthy authorities, then compliance will be high among those with a strong sense of social self. In contrast, if the law lacks legitimacy in the eyes of the public, then compliance will be low, especially by those with a strong sense of social self.

## Practical Measures

The TTI helps identify key constructs that explain variance in behavior that can be measured to inform how laws change health-related behavior. We discuss measures of 11 variables that are central to understanding how legal institutions and practices affect behavior. Many resources exist for measurement development besides those we reference below (Dillman, 1991, 2007), including government resources (General Accounting Office, 1993; Houston, 1997). We provide brief considerations for measure development and identify some examples of measures of constructs from the TTI and other theories that have demonstrated good reliability and validity.

### The Sociocultural Stream

**Knowledge and beliefs about expected consequences.** Knowledge of laws and beliefs about expected consequences is a distal factor in the cognitive sub-stream of the sociocultural stream of the TTI.

Knowledge about laws includes the important issue of comprehension of those laws and their intent.

Opinion polls often contain items to assess such knowledge/beliefs. Tidwell and Doyle (1995) developed a survey to assess driver and pedestrian comprehension of pedestrian law and traffic control devices. An

example of a survey to assess beliefs is a 16-item measure of beliefs regarding physical activity that has shown

good internal consistency (Saunders et al., 1997). Leading from an item stem of “If I were to be physically active most days it would:” sample items include: “Get or keep me in shape,” “Make me tired,” “Be fun” and “Be boring.”

**Values.** Values are a distal component of the TTP’s sociocultural stream flowing directly towards one’s attitudes towards a behavior. A popular measure of general values is the Rokeach Value Survey (Rokeach, 1973; Rokeach & Ball-Rokeach, 1989). This self-administered value inventory is divided into two parts, with each part measuring different but complementary types of personal values. The first part consists of eighteen terminal value items, which are designed to measure the relative importance of end states of existence (that is, personal goals such as freedom, equality, health, national security, a world at peace). The second part consists of eighteen instrumental value items, which measure basic characteristics an individual might see as helpful to reaching end-state values (for example, ambitious, responsible, honest, obedient). The scale has been used widely with Likert scales (for example, a 5-point agreement scale) so that conventional statistical tests can be performed (Rokeach, 1973; Rokeach & Ball-Rokeach, 1989). Many other measures of specialized values are available (Gibbins & Walker, 1993). The [Culture and Media Institute](#) conducts the National Cultural Values Survey (Fitzpatrick, 2007), which assesses cultural values such as morality, thrift, charity, honesty/integrity (including willingness to break the law, cheat on unemployment benefits, or tolerate illegal drug use).

**Attitudes toward the behavior.** This is the proximal predictor of behavior within TTP’s cultural-attitudinal stream of influence. Ajzen (2003) provides guidance on the construction of attitude scale items specific to any particular behavior. The simplest attitudes items are of the form, “It would be bad for me to drive after drinking” answered on a scale of “completely agree” to “completely disagree.” Fishbein and colleagues (2001) also suggest utilizing an expectancy-value index to indirectly measure attitudes. For example, two questions would be asked regarding a specific consequence of a particular behavior: one about one’s beliefs about the probability of the consequence (expectancy); the other about one’s values towards (evaluation of) the consequence. The product of those two items could be summed with other paired items to create the

attitude index.

Examples of valid and reliable attitude scales include Brand and Anastasio's (2006) 50-item Violence-Related Attitudes and Beliefs Scale (V-RABS) and Polaschek and colleagues' (2004) 20-item Criminal Attitudes to Violence Scale (CAVS). Using a 7-point agreement scale, example items from the V-RABS include: "Trying to prevent violent behavior is a waste of time and money;" "People become violent because of their family environment;" and "The majority of violent crimes are committed by people who have mental illness."

### **The Social-Normative Stream**

**Social attachment (bonding) with family, friends, school.** The interpersonal bonding component of the TTP's social-normative stream is suggestive of Hirschi's (2002) theoretical constructs of attachment, commitment, and belief. Libbey (2004) provides a review of school attachment, bonding, and connectedness measures and items used to assess student attachment. Another example of a somewhat reliable measure of bonding (Jenkins, 1997) includes items such as: "Do you care a lot about what your teachers think of you?" "Do most of your teachers like you?" and "Most teachers are not interested in anything I say or do."

**Observed (modeled) behaviors & attitudes.** Others' behavior and attitudes is also a distal component of TTP's social-normative stream, directly influencing perceived norms. An 8-item measure that has shown good reliability was tested by Saunders and colleagues (1997) to measure social modeling for physical activity. Using the item stem "A friend/someone in the family . . .," sample items include: "Thinks I should be physically active;" "Encourages me to be physically active;" and "Has been physically active with me."

**Social normative beliefs.** As a proximal predictor of behavior, social normative beliefs concern one's perception of the social influences on one's behavior. Consensus among theorists suggests that, because this measure is concerned with judging the degree to which one is motivated to comply with a particular person



or social group, specific behaviors should be measured in paired items assessing both perceptions of norms (what others expect of me) and motivation to comply with those others. Ajzen (2003) provides guidelines for constructing such scales.

We could not identify any developed and tested scales for social normative beliefs using the paired-item format. However, Huesmann & Guerra (1997) provide an example of a reliable 20-item scale measuring normative beliefs about aggression. We found that an 8-item version of this scale (Huesmann & Guerra, 1997) had high reliability with elementary and middle school students (Schure et al., 2011). Using a 4-point response scale, example items include: “It is wrong to hit other people;” “If you’re angry, it is OK to say mean things to other people;” and “It is wrong to get into physical fights with others.” Another example concerns normative beliefs about water conservation laws (Corral-Verdugo & Frías-Armenta, 2006). Items include: “The government should pass laws banning the settlement of industries around dams, rivers, lakes, and aquifers” and “The state should impose fines on people who waste water.”

## **The Intrapersonal Stream**

**Self-control/regulation.** In the TTI framework, self-control/regulation is seen as a distal-level variable within the intrapersonal stream. Two measures demonstrating good reliability assessing self-control are the 36-item Self-Control Schedule (Facione & Facione, 1992) and the Total and Brief Self-Control Scales (Rosenbaum, 1980) with 36 and 13 items, respectively. Sample items from the Self-Control Schedule include: “When I have to do something that is anxiety arousing for me, I try to visualize how I will overcome my anxieties while doing it;” “When I am depressed, I try to keep myself busy with things that I like;” and “When I plan to work, I remove all the things that are not relevant to my work.” Response items are on a 6-point scale indicating the degree to which each statement is characteristic of the respondent.

**Social Competence/Skills.** In the framework of the TTI, skills are the distal cognitive component that flows directly into self-efficacy. This variable is important to assess, as the development of general and

behavior-specific skills can be instrumental in determining one's likelihood of adopting a behavior. The 131-item Connors Teacher Rating Scale (CTRS-R), measuring six behavioral domains (Connors et al., 1998), is a reliable social skills scale. Teachers rate specific behavioral items related to cognition (forgets things, avoids mental effort), perfectionism (neat, over-focused), and impulsivity (restless, excitable).

Critical thinking is an important skill domain that can affect many types of behavior. The 80-item Watson-Glaser Critical Thinking Appraisal (Connors et al., 1998) and the 40-item California Critical Thinking Skills Test (Watson & Glaser, 1980) have both shown good internal reliability. Subscale items measure five specific constructs: the ability to make inferences, recognize assumptions, make deductions, evaluate arguments, and make interpretation (Gadzella et al., 2005)

**Self-efficacy.** Self-efficacy derives from self-control/regulation (through self-determination or will) and social competence (through skills) in the intrapersonal stream. Fishbein and colleagues (2001) recommend that items measuring self-efficacy should be behavior-specific, phrased in the present tense, and utilize wording from identified internal or external demands that may impose difficulty on one's ability to perform the behavior. For example, Resnick and Jenkin's Self-Efficacy for Exercise (SEE) Scale is a 9-item scale, developed for adults, and measures perceived confidence that one could continue to exercise despite various barriers. Items were prefaced with "How confident are you right now that you could exercise three times per week for 20 minutes if ...," followed by items such as "the weather was bothering you;" "you were bored by the program or activity;" and "you felt pain when exercising." Usually, these measures use a 0 to 100 scale, suggesting the degree to which a person feels confident enough to perform that behavior. Bandura (2006) offers a clear guide on how to construct domain-specific self-efficacy scales depending on the context of research.

## Intentions and Feedback

**Intentions.** As the key proximal mediating variable of the TTI, behavioral intentions/decisions provides the most strongly correlated predictor of a future behavior and can be assessed with measures of likelihood or probability of occurrence. For the development of a fixed measure, it is recommended that it be treated as a continuous variable along a response scale of likely to unlikely (Polaschek et al., 2004), although there have been issues raised as to how many points should be included for a validated measure (Davis & Warshaw, 1992). It is recommended that if respondents' answers are more reliable with a shorter response scale that they then be offered a two-part question (Fishbein et al., 2001). Thus, as should be noted for all types of measures, it is important to take into consideration the specific population for which the measure is being developed. The 19-item Scale for Suicide Ideation (SSI) designed to measure suicidal intention has shown high internal consistency and construct validity (Beck, Kovacs, & Weissman, 1979). A developed and tested intention measure towards physical activity (Godin & Shephard, 1986) was used by Saunders and colleagues (1997) and includes a selection of 5 response items indicating a range of intention to be physically active during one's free time. Such statements range from "I am sure I will not be physically active" to "I am sure I will be physically active".

**Emotional reaction to the behavior.** Hedonic theory focuses on affective responses to behavior as determinants of future behavior (Kahneman, 1999). Hedonic responses or emotional reactions (that is, good/pleasure versus bad/displeasure) can provide an index of the usefulness of behavior and its immediate outcomes that may influence decisions regarding whether or not to repeat the behavior (Cabanac, 1992; Kahneman et al., 1993). This tendency for humans to maximize pleasure and minimize displeasure has been examined extensively as a mechanism for various behaviors. It is a basic underlying mechanism of learning (Bandura, 1986a, 1986b).

Feedback from experience with a behavior is mostly captured through emotional reactions to the behavior. Emotional reactions could be related to any stream of influence: in the cultural-attitudinal stream it

would feed back to attitudes, particularly evaluation of consequences and values; in the social-normative stream it would feed back to normative beliefs, particularly motivation to comply or social bonding/attachment; and in the intrapersonal stream, it would feed back to self-efficacy, particularly self-control/regulation and competence/skills. Fishbein and colleagues (2001) suggest that while no standardized measures have yet been developed, one could explore potential semantic differential terms that elicit more gut-like emotional reactions. Another approach would be to assess changes in attitudes, social normative beliefs and self-efficacy after experiencing a behavior. For example, after first trying an illegal substance, an adolescent might have more positive or negative attitudes about drug use, depending on their physiological reactions; their relationship with peers, parents or the law/authority is likely to change and, therefore, their motivation to comply with (or please) them; and their sense of self-efficacy to do the behavior (or to resist it) will have changed.

## Conclusions

Many social psychological theories inform our understanding of the effects of public health laws and regulations on behavior. In this monograph, we provided a review of many of these theories that contribute understanding the effects of public health laws. We also provided an integrative theoretical framework, the theory of triadic influence, to help guide future research on effects of public health laws. These theoretical perspectives make clear that laws have their effects on behavior through many pathways. The most obvious path is directly through knowledge and values → expectancies and how they are evaluated → attitudes toward the behavior. However, many other pathways through social contexts or interpersonal relationships are also possible, involving role models (social learning) and perceived norms → attachment to or bonding with conventional values or others and motivation to comply with them → social normative beliefs. Yet other pathways occur through intrapersonal constructs, including social competence and sense of self control → skill plus will (self-determination) → self-efficacy. Attitudes, social normative beliefs and self-efficacy each have cognitive and affective (control) components and each contributes to the prediction of intentions to try

or adopt a particular behavior. Once a behavior is tried, the experience with that behavior can feed back in the personal, social and cultural domains and change the original causes/predictors. All of this occurs during life-long human development over time. Clearly, the prediction of behavior is complex, and any new law or regulation should be evaluated rigorously to assess both expected and unexpected (positive or negative) effects.

## List of Tables and Figures

- Table 1      Social psychological theories informing mechanisms of legal effect
- Figure 1     The Theory of Triadic Influence highlighting pathways of influence of public health laws and regulations

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