Investigating the Influence of Self-Control on Rule-breaking: Advancing Empirical Tests on Situational Action Theory Through Rigorous Operationalizations and Experimental Designs

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Chapter 1

Introduction

1 Introduction

1.1 Background and aim of this dissertation

Self-control is a fundamental concept in the social sciences and aims to explain a multitude of different outcomes, including criminal behavior, psychological well-being, physical health, and academic achievement (Duckworth et al., 2019; Hay & Meldrum, 2016; Moffitt et al., 2011; Wiese et al., 2018). However, there are major differences in the theoretical and conceptual understanding of self-control between disciplines, creating substantial challenges for research integration and empirical validation (Burt, 2019; Inzlicht et al., 2021).

In psychological research, one definition of self-control is a finite capacity (or resource) that is depleted when used to alter or override dominant response tendencies and regulate behavior (Baumeister et al., 2007)[1]. Another perspective conceptualizes self-control as a dynamic regulatory process beyond impulse inhibition (Duckworth et al., 2016). It proposes a temporal sequence of strategies ranging from preventive approaches (situation selection or modification) to interventive methods (attentional deployment, cognitive change, response modulation) when conflicts arise between goals (Duckworth et al., 2016; Inzlicht et al., 2021).

In criminological research, Gottfredson and Hirschi's self-control theory (SCT) has been the predominant perspective, effectively conceptualizing self-control as a trait that distinguishes individuals. It is defined as "the tendency of individuals to pursue short-term gratification without consideration of the long-term consequences of their acts" (Gottfredson & Hirschi, 1990, p. 177; Hay & Meldrum, 2016; Vazsonyi et al., 2017). In contrast, Burt's (2019) alternative perspective on self-control emphasizes intrapsychic conflict, highlighting the incompatibility between temptation and higher-valued goals. It defines self-control as "the effortful inhibition of a prepotent, immediately rewarding response following a choice situation known as a self-control conflict" (Burt, 2019, p. 13). In contrast

1 However, the empirical evidence for this approach has been subject to considerable criticism (Inzlicht & Friese, 2019; Vohs et al., 2021).

to SCT, Situational Action Theory (SAT), which is the focus of this dissertation due to its unique integration of person-environment interactions with mechanism-based explanations, conceptualizes self-control as a situational “mental process by which people manage conflicting rule guidance“ (Wikström et al., 2024, p. 62). This process of self-control in SAT is conceptually different from the ability to exercise self-control that describes interindividual differences and is defined as the “capacity to withstand external pressure to act against one’s own personal morals” (Wikström et al., 2024, p. 58).

These divergent perspectives create what researchers call a 'jingle problem' or 'jingle fallacy'—using the same term ("self-control") to describe fundamentally different theoretical concepts (Block, 1995; Thorndike, 1904). This jingle problem is particularly relevant to SAT's conceptualization of self-control, which uniquely relates self-control to personal morality. Previous SAT research has operationalized self-control using Grasmick et al.’s Low Self-Control Scale (LSCS) based on Gottfredson and Hirschi's SCT rather than SAT's theoretical framework (Gottfredson & Hirschi, 1990; Grasmick et al., 1993; Hardie & Rose, 2025; Pauwels et al., 2018).

My main argument is that the LSCS does not adequately measure SAT’s self-control, resulting in a disconnection between the theoretical concept and its measurement, which creates three significant problems. First, empirical results based on this loose connection are, at best, only partially informative of the theory because sound measurements are a prerequisite for causal inference and may distort conclusions about SAT's validity (De Buck & Pauwels, 2022; Esterling et al., 2025; Kroneberg & Schulz, 2018). Second, these distorted research findings often lead to inappropriate theoretical adaptations. For example, Hirtenlehner and Leitgöb (2024) reviewed existing evidence and proposed an adapted version of SAT that changes the conceptualization of self-control to align with SCT and psychological trait models—an unsurprising outcome when the reviewed studies used operationalizations based on those very conceptualizations. Third, researchers from other disciplines may erroneously equate SAT's self-control with different conceptualizations, leading to blurred theoretical conclusions. For instance, Bader et al. (2024) employed SAT's self-control concept to propose a mechanism linking conscientiousness and honesty-humility (from the HEXACO personality model) to criminal behavior. However, their arguments were not based on SAT's unique conceptualization.

Collectively, as Block (1995) and others have noted, such jingle problems obscure empirical findings and hinder effective scientific communication among researchers (Burt, 2019; Gonzalez et al., 2021). To address this issue, a clear conceptualization of the theoretical concept under study must be tightly connected to its operationalization (Hanfstingl et al., 2024), along with studies that explicitly investigate the construct's validity (Marsh et al., 2019). In response to the jingle problem and the disconnect between theoretical concept and measurement in SAT research, this dissertation makes two primary contributions. First, it addresses the operationalization of self-control by developing a new, theory-driven measure tailored to SAT and provides evidence for its validity. Second, it empirically tests SAT's predictions regarding the role of self-control in rule-breaking behavior by using methods with high internal validity. Together, these contributions aim to clarify the conceptual foundations and improve the empirical testing of SAT.

The dissertation is structured as follows: The remaining chapters will discuss the theoretical foundations and propositions of SAT in detail, analyze the conceptual requirements for valid self-control measurement, outline the empirical validation criteria for the new scale, and summarize the overarching contributions. Chapter 2 examines the conditional influence of self-control on behavioral intentions, utilizing the dominant LSCS rooted in SCT. Chapter 3 outlines the development and validation of the novel Self-Control Ability Scale (SCAS). Building on this foundation, Chapters 4 and 5 will introduce two studies investigating the relationship between SAT's self-control and deviant intentions and behavior, one through a factorial survey experiment and the other through a behavioral experiment. Chapter 6 will review the earlier chapters and outline limitations and prospects for future research.

To maintain conceptual clarity throughout this dissertation, the term "self-control ability" will be used when referring to individual differences in the capacity to exercise self-control within the SAT framework. The term "self-control" will be reserved for discussions of Gottfredson and Hirschi's (1990) theoretical perspective.

1.2 Theoretical framework: Situational Action Theory

As described above, a theory requires clear definitions of theoretical concepts. Quantitative, deductive research typically begins with theory development at multiple levels (Adcock & Collier, 2001; Creswell, 2014). Background concepts encompass "diverse meanings associated with a given concept" (Adcock

& Collier, 2001, p. 530) and represent, in this context, the various perspectives on self-control. In contrast, systematized concepts, like self-control ability, are precisely defined within a specific theoretical framework. Conceptualization is the theoretically informed process of transitioning from background to systematized concepts by selecting specific meanings, dimensions, or attributes from the broader conceptual landscape (Adcock & Collier, 2001; Schnell et al., 2005; Wonka, 2007). This dissertation adopts the conceptualization provided by SAT, which offers a coherent framework for defining and operationalizing key constructs such as self-control ability.

SAT is based on the idea that all acts of deviant behavior (or crime) represent violations of (moral) rules of conduct (defined by law; Wikström et al., 2012). Rules of conduct indicate what is right or wrong to do in a particular situation. Although individuals exercise free will, all behaviors are guided by value-based and emotionally grounded rules of conduct (Wikström, 2019; Wikström et al., 2024).[2]

One central argument of SAT is that while individuals are the source of their actions, their behavior is influenced by situational factors (Wikström et al., 2024). Therefore, rule-breaking results from the interaction between personality characteristics and situational conditions. SAT formulates an action-generating mechanism and proposes that acts of rule-breaking are the outcome of a three-stage process: motivation to act, perception of action alternatives, and choice between perceived alternatives (Wikström, 2019).

The motivation process begins when the setting presents opportunities to fulfil needs or desires, opportunities to honor a commitment, or frictions (Wikström et al., 2024). Frictions are "unwanted external interferences" (Wikström, 2006, p. 89) usually caused by another person, such as being pushed or insulted (Barton-Crosby & Hirtenlehner, 2021). These circumstances do not create motivation (i.e., goal-directed attention) for all individuals, but instead depend on the individual's desires, commitments, or sensitivities to provocation. In SAT, motivation is further differentiated between temptation, when individuals are faced with an opportunity to satisfy a desire or an opportunity to honor a commitment, and provocation, when a particular friction activates particular sensitivities (Wikström, 2019; Wikström et al., 2024). Both temptation and provocation, as goal-directed attention, initiate actions (including

2 As rule-breaking is the common denominator of all deviant behavior and crime, I will use the term rule-breaking interchangeably with deviant behavior and crime throughout this dissertation.

inaction), but the specific (type of) action is decided later in the process. Therefore, motivation is necessary but not decisive for rule-breaking (Wikström, 2019).

Motivation initiates the second process, the perception process, which determines what kind of action alternatives individuals perceive, being either rule-breaking or rule-abiding. During this process, an individual's personal morality and the moral norms of the setting interact and constitute a "moral filter". Personal morality refers to the internalization of moral rules of conduct, and the strength of these internalized rules is linked to the intensity of associated guilt and shame (Wikström et al., 2012). The moral norms of a setting reflect perceived expectations of appropriate behavior shared by others (Wikström et al., 2024). Both elements can either encourage rule-breaking or discourage rule-breaking (encourage rule-abiding).

The moral filter operates as follows: When both personal morality and the setting's moral norms discourage rule-breaking, only rule-abiding alternatives are perceived (cell D in Table 1.1). Conversely, if both elements encourage rule-breaking, only rule-breaking action alternatives are perceived (cell A in Table 1.1).[3] This alignment is referred to as the principle of moral correspondence. In both scenarios, strong moral rule-guidance leads to behavior being enacted without deliberation, rendering control mechanisms irrelevant in explaining rule-breaking behavior.

When personal morality and the moral norms of the setting do not correspond, individuals face conflicting rule-guidance. In these instances, both rule-abiding and rule-breaking action alternatives are perceived as viable (cells B and C in Table 1.1). Under such conditions, individuals enter the choice process, deliberating among perceived action alternatives. During this deliberation, individuals select what they perceive as the best alternative (Wikström, 2019; Wikström et al., 2024). Unlike rational choice theory, this "best" alternative does not represent utility maximization, but rather the option considered "most viable and acceptable in the circumstances to satisfy a specific motivation" (Wikström et al., 2024, p. 44). Only during deliberation do individuals exercise self-control and consider the deterrent qualities of the setting.

3 In what follows, the terms "rule-abiding" and "discouraging rule-breaking" are used interchangeably, as are "rule-breaking" and "encouraging rule-breaking".

The process of exercising self-control is the situational management of conflicting rule guidance. This process depends on, and is conceptually distinct from the ability to exercise self-control. Self-control ability is the capacity to resist external pressures that conflict with one's personal morality (Wikström, 2019). It depends on an individual's willpower and is rooted in the effectiveness of an individual's executive functions, based on previous experiences, natural stimulation, and practice (Wikström et al., 2024). However, it is also affected by momentary influences, like stress, strong emotions, or intoxication (Wikström & Treiber, 2007). Importantly, self-control ability does not reduce rule-breaking directly, but individuals with high self-control ability are more likely to act on their personal morality (Wikström et al., 2024).

The second form of control, deterrence, is characterized as an "outer-to-inner" process in which the deterrent qualities of an environment—specifically, an individual's fear or concern regarding the perceived threat of negative consequences—enable an individual to resist internal pressures to violate moral norms or rules of law (Wikström, 2019).

This conditional influence of self-control ability and deterrence on rule-breaking is called the (fundamental) principle of the conditional relevance of control. SAT further specifies a subsidiary argument that in certain combinations of individual and setting, some forms of control exert a relatively stronger influence than other forms of control. When the moral norms of the setting pressure rule-abiding individuals to break the moral rules, the ability to exercise self-control is of primary importance (cell C in Table 1.1). Conversely, when an individual's personal morality encourages rule-breaking but the setting's moral norms discourage it, deterrence is of primary importance in getting a person to act in accordance with the moral norms of the setting (cell B in Table 1.1).

Besides this standard SAT argumentation, the "double-edged sword" argument expands the possible effect of self-control ability on rule-breaking (Kroneberg & Schulz, 2018). Since self-control ability enhances adherence to one's personal morality, individuals whose personal morality strongly encourages rule-breaking may become more likely to break moral rules if they possess strong self-control ability.

Table 1.1 Interplay between moral norms of the setting, personal morality, and the conditional relevance of controls

		Moral norms of the setting	
		encourage rule-breaking (+)	discourage rule-breaking (-)
Personal morality	encourage rule-breaking (+)	[A] Perception of only rule-breaking action alternatives → No deliberation Controls are irrelevant	[B] Perception of both rule-breaking and rule-abiding action alternatives → Deliberation ❖ Prime influence of deterrence ❖ Secondary influence of self-control ability (double-edged sword: reverse influence)
	discourage rule-breaking (-)	[C] Perception of both rule-breaking and rule-abiding action alternatives → Deliberation ❖ Prime influence of self-control ability ❖ Secondary influence of deterrence	[D] Perception of only rule-abiding action alternatives → No deliberation Controls are irrelevant

Notes: The gray pattern indicates combinations of personal morality and the setting's moral norms in which only one type of action alternative is perceived. Letters in parentheses (e.g., [A]) declare cells for further reference.

Building on the principle of conditional relevance of controls, a further interplay between the two controls can be derived from SAT. One line of reasoning suggests a compensatory effect between self-control ability and deterrence. If individuals adhere to their morality due to strong self-control ability, they should be less responsive to deterrence. All else being equal, this would suggest that individuals with high self-control ability are less responsive to the deterrent qualities of the setting (Hirtenlehner, 2020; Hirtenlehner & Meško, 2019; Kroneberg & Schulz, 2018).

Another line of reasoning suggests that individuals differ in their sensitivity to deterrent qualities of the setting, which might be associated with stronger self-control ability, as both are based on executive capabilities. All else being equal, this would suggest that individuals with high self-control ability pay more attention to the deterrent qualities of the setting and are more responsive to deterrence (Kroneberg & Schulz, 2018; Wikström et al., 2024).

The theoretical considerations and arguments presented thus far describe the situational model of SAT. SAT also encompasses the Developmental Ecological Action model, which explains (self- and social-) selection processes and processes of emergence, illustrating why individuals and settings vary

in aspects relevant to rule-breaking (Wikström, 2019). While selection processes can confound action theory examination, and explaining individual differences in self-control ability through cognitive nurturing processes is important for policy intervention design, these considerations exceed the scope of this dissertation. Likewise, this dissertation will not further explore the compensatory effects of self-control ability and deterrence, as these remain secondary derivations from SAT's axioms and are not central to its explanatory core (cf. Hirtenlehner & Meško, 2019).

1.3 Requirements of a valid scale and its empirical application

Based on the clear conceptualization of self-control ability in SAT established earlier, this section addresses its operationalization—the critical process of developing indicators based on the systematized concept (Adcock & Collier, 2001; Steidl & Werum, 2019). This process results in instructions on assigning observable facts to theoretical attributes (Schnell et al., 2005). After reviewing current operationalization approaches in SAT research, three key aspects of measurement validity—content, construct, and criterion—will be discussed, and the adequacy of existing measures will be assessed. Finally, the research design requirements for investigating the influence of self-control ability on rule-breaking behavior will be outlined.

In the context of SAT, most empirical studies examining the conditional influence of self-control ability use (an adaptation of) the LSCS (Grasmick et al., 1993; Hardie & Rose, 2025; Pauwels et al., 2018)[4]. This scale is based on the premise that crime and deviant behavior result from a tendency to favor short-term benefits and not consider long-term consequences (Gottfredson & Hirschi, 1990). The measurement of self-control (Grasmick et al., 1993) is based on six personality traits (impulsivity, risk seeking, temper, self-centeredness, preference for simple tasks, preference for physical activities), because "people who lack self-control will tend to be impulsive, insensitive, physical (as opposed to mental), risk-taking, shortsighted, and nonverbal" (Gottfredson & Hirschi, 1990, p. 90). The selected items included statements like "I never think about what will happen to me in the future.", "Sometimes

4 Some exceptions include the usage of the Brief Self-Control Scale (Barton-Crosby & Hirtenlehner, 2021; Liu et al., 2022; Tangney et al., 2004) or the Weinberger Adjustment Inventory (Feldman & Weinberger, 1994; Ishoy & Blackwell, 2019). Although the LSCS serves as a basis for the following discussion of validity, the criticisms directed towards it are also applicable to these two measurement strategies.

I take risks just for fun.", "I lose my temper quite quickly." with the response options ranging from "strongly disagree" to "strongly agree". Wikström et al. (2012) adapted the LSCS for SAT, selecting two items each from the subdimensions of impulsivity, temper, and risk-seeking, while adding two additional items that should focus on future orientation "I get bored easily with things," and "I often act on the spur of the moment without stopping to think," resulting in a total of eight items.

However, empirical studies using SAT vary substantially in operationalizing self-control ability beyond these eight items. In some cases, only one (Eifler, 2015; Schepers, 2017) or two sub-dimensions (Hirtenlehner & Hardie, 2016; Hirtenlehner & Meško, 2019; Pauwels & Svensson, 2017) are used. Other studies added the self-centeredness dimension (Hirtenlehner & Kunz, 2016; Kafafian et al., 2022), or the simple task dimension (Hirtenlehner, 2015), or included all sub-dimensions of the original LSCS (Craig, 2019; Miranda et al., 2023). As a result, the number of items varies between 4 and 24. In a similar vein, empirical studies on the interaction between personal morality and self-control ability yield conflicting findings on whether self-control is especially influential among individuals with lower or higher levels of personal morality (e.g., Choi & Yun, 2021; Ivert et al., 2018; Kroneberg & Schulz, 2018; Liu et al., 2022; Pauwels et al., 2018). The differing use of items and inconsistent findings may also be related to the ambiguous connection between theoretical concepts and empirical measurements.

How can researchers assess the accuracy of a particular operationalization of a theoretical concept in general, and specifically regarding the adaptation of the LSCS for measuring self-control ability in the SAT? To systematically address this question, researchers turn to measurement validity—a critical framework for evaluating how well an indicator captures a theoretical construct. Validity, in its most fundamental sense, concerns the degree to which an inference, knowledge claim, or proposition is true. A particular indicator should be a valid measurement of the specific concept it aims to represent. Establishing validity, therefore, involves rigorously evaluating the extent to which evidence supports a particular measurement (Shadish et al., 2002). The subsequent sections will explore this validation process, outlining how researchers can assess whether an indicator captures its intended theoretical concept.

1.3.1 Measurement validity

Measurement validity (also called construct validity in the broader sense) describes the extent to which

results derived from a particular indicator can be meaningfully interpreted in terms of the systematized concept that the indicator attempts to operationalize (Adcock & Collier, 2001). As Bollen (1989, p. 184) states, it is "concerned with whether a variable measures what it is supposed to measure." Without robust measurement validity, researchers risk inaccurately assessing concepts, undermining their ability to link results to underlying theories. This misalignment can lead to the mislabeling of empirical findings, creating barriers to effective communication among researchers and potentially resulting in incorrect conclusions (Shadish et al., 2002). Measurement validity can be assessed through three complementary approaches: content validity (1.3.1.1), criterion validity (1.3.1.2), and construct validity in the narrower sense (1.3.1.3). These approaches should not be viewed as independent but rather as different lines of evidence that support or contradict the correspondence between concept and indicator (Adcock & Collier, 2001; Boateng et al., 2018; Otte et al., 2023).

1.3.1.1 Content validity

Content validity addresses whether a given indicator adequately captures the full content or a representative part of a systematized concept (Adcock & Collier, 2001; Haynes et al., 1995; Moosbrugger & Kelava, 2012). This assessment is typically made by experts or sometimes by members of the target population (Allen & Yen, 2002; Haynes et al., 1995), for example, by evaluating whether key elements are omitted or inappropriate elements are included (Adcock & Collier, 2001). As a conceptually focused approach that does not directly reference specific outcomes, content validity is not subject to empirical testing but is established through logical and argumentative reasoning (Schnell et al., 2005).

A common challenge is the "trade-off between parsimony and completeness" (Adcock & Collier, 2001, p. 539). Systematized concepts with multiple dimensions may require a multitude of indicators, demanding substantial time and resources (Adcock & Collier, 2001; Otte et al., 2023). A pragmatic solution is to assess representative elements rather than all possible aspects (Haynes et al., 1995; Moosbrugger & Kelava, 2012).

What does this mean for the operationalization of self-control ability with the adaptation of the LSCS? Key elements of SAT's self-control ability are situational in nature: its role in adherence to personal morality, and its activation during moments of external challenges and deliberation. The

previously used LSCS items, as self-descriptions of stable personality traits, do not capture these core features and therefore lack content validity in this context. However, the traits assessed in the LSCS may be indirect indicators of underlying willpower or executive function and thus could be viewed as potential sources of self-control ability.

1.3.1.2 Construct validity

Construct validity assesses the extent to which the relationships between a systematized concept and related constructs, as derived from theory, are supported by empirical evidence (Schnell et al., 2005). Construct validity is divided into two subtypes: Convergent validity is indicated when high correlations are expected and observed between related constructs, while discriminant validity is demonstrated when low correlations are both expected and observed (Adcock & Collier, 2001). This gives evidence to the claim that the indicators are specific to the systematic construct and do not simply measure other, independent constructs.

A challenge arises when interpreting weak or high correlations: Weak correlations may result from multiple imperfect indicators, even if concepts are associated, while strong correlations may stem from shared bias, conceptual overlap, or causal relationships between indicators (Adcock & Collier, 2001). Structural Equation Modeling (SEM) helps to address some limitations of simple correlation-based validation by isolating systematic variance from bias or error, thus improving the assessment of construct validity (Bagozzi & Yi, 2012; Moosbrugger & Kelava, 2012). Good model fit and high standardized factor loadings indicate convergent validity, while the absence of cross-loadings supports discriminant validity (Anderson & Gerbing, 1988).

Applying construct validity principles to SAT's conceptual framework, self-control ability is most closely associated with personal morality, though conceptually distinct (Hirtenlehner & Kunz, 2016; Schepers & Reinecke, 2018). While conceptually different concepts imply a low correlation, some overlap is plausible given that both constructs emerge from psychoecological processes. These psychoecological processes are further influenced by the activity fields of individuals, which encompass the interactions they partake in a given setting. This suggests a substantial association between self-control ability and personal morality (Wikström et al., 2024). Thus, their empirical association may be moderate, complicating using one as a validation criterion for the other. Other relevant SAT individual-

level constructs that should be discriminant from self-control ability include provocation sensitivity and desires. However, these are rarely measured in current research (an exception is Barton-Crosby & Hirtenlehner, 2021), and valid measures of those do not yet exist. Beyond correlation-based expectations, distal personal traits may contribute to self-control ability as sources in the SEM framework. They could load on a single latent or higher-order latent factor.

While the construct validity of the adaptation of Wikström et al. (2012) has not yet been explicitly examined, there is some research on the LSCS. Some evidence supports a unidimensional structure (Piquero & Rosay, 1998), but most studies suggest a bifactorial structure comprising impulsivity and risk-seeking (Forrest et al., 2019; Ward et al., 2015). One potential reason for using different subdimensions and items is that alternative specifications may yield bi- or multidimensional structures. This multidimensionality is problematic in the context of SAT, as the theory conceptualizes self-control ability as a unidimensional construct. These findings, therefore, call into question the appropriateness of the LSCS for use in the context of SAT.

1.3.1.3 Criterion validity

Criterion validity examines whether an established causal hypothesis is reconfirmed when cases are evaluated using the proposed indicator for a concept within that hypothesis (Adcock & Collier, 2001). If the indicators validly measure the concept, it should be associated with another concept (criterion) to which it is theoretically linked. Criterion validity is divided into two subtypes: Predictive validity refers to associations with future outcomes, while concurrent validity applies when outcomes are measured simultaneously (Schnell et al., 2005).

Criterion validity faces two key challenges. First, in many disciplines, well-established hypotheses or criterion variables necessary for validation do not exist, limiting the usefulness of this validation approach (Otte et al., 2023; Schnell et al., 2005). Second, there is a risk of circular reasoning, where an indicator is validated using a hypothesis and then subsequently used to test the same hypothesis. This logical flaw can be avoided by using different hypotheses for testing other than validation (Adcock & Collier, 2001).

Validating self-control ability is especially challenging because external criterion variables are lacking, apart from rule-breaking behavior, which is both the predicted outcome and a potential

validation criterion. Using rule-breaking as a criterion would create a circular validation problem. Furthermore, SAT posits moderated, not direct, effects of self-control ability on rule-breaking, complicating the use of simple bivariate associations. Additionally, the "double-edged sword" argument indicates that self-control may reduce or increase rule-breaking depending on an individual's personal morality. Even if an actual effect exists, the bivariate empirical association may showcase a null effect, as reducing and increasing influences can counterbalance each other. Consequently, applying criterion validity meaningfully in this context is challenging.

Overall, a critical assessment reveals that the adapted LSCS lacks sufficient evidence of validity as a measure of self-control ability as conceptualized in SAT. Most fundamentally, it fails to demonstrate content validity: The items do not capture the situational nature of self-control, its relationship to personal morality, or its activation during deliberation when individuals face external challenges. While construct and criterion validity are difficult to establish in this context, the fundamental content mismatch between the scale items and the SAT conceptualization is problematic enough to warrant developing a new measurement approach. These findings align with recent calls in the literature for a scale specifically designed to measure SAT's self-control ability concept (Barton-Crosby & Hirtenlehner, 2021; Hirtenlehner et al., 2022; Kroneberg & Schulz, 2018; Pauwels et al., 2018).

1.3.2 Reliability

A necessary yet insufficient condition for a valid measure is reliability. Reliability refers to the fact that the instrument measures the characteristic without any (random) measurement error (Hartig et al., 2020). One assumption of the underlying classical test theory[5] is that the measured values consist of the true value and a measurement error (Moosbrugger et al., 2020). Accordingly, reliability is high if the variance of the measured values is equal to that of the true values (Schnell et al., 2005). Although the true value cannot be observed, various estimates of reliability can be made based on different assumptions, such as Cronbach's α, test-retest correlations, or model-based estimates such as McDonald's omega (Gäde et al., 2020; Schermelleh-Engel & Gäde, 2020).

5 The classical test theory is most often discussed in contrast to the item response theory, which conceptualizes the probability of an individual's observed response to an item as a function of their unobservable latent trait and the specific characteristics of that item (De Champlain, 2010; Moosbrugger et al., 2020).

In research on SAT, the most common reliability measure for LSCS adaptation is Cronbach's α, which has shown varying reliability, with the lower end of Cronbach's α≈.60 (Hirtenlehner & Hardie, 2016; Hirtenlehner & Kunz, 2016) and the upper end of Cronbach's α<.90 (Barton-Crosby & Hirtenlehner, 2021; Choi & Yun, 2021; Craig, 2019; De Buck & Pauwels, 2022; Fujino, 2023; Kammigan, 2022; Kroneberg & Schulz, 2018). However, the assumptions underlying Cronbach's α are often not tested (or reported), despite being fundamental to the interpretation of the metric (Flora, 2020; Schermelleh-Engel & Gäde, 2020; Sijtsma, 2009; Viladrich et al., 2017). These findings support the aforementioned claim that a new measurement approach is warranted.

1.3.3 Internal and external validity

So far, we have established the requirements for a measurement instrument and its relationship to the LSCS. Once a researcher has established the validity of a measurement instrument—understanding its ability to accurately capture the intended theoretical construct—the next crucial step is to design a research approach that can effectively utilize this measurement to test theoretical propositions.

In the context of this dissertation, which aims to investigate the influence of self-control ability on rule-breaking with a focus on the principle of conditional relevance of controls, this means selecting a research design that can examine its complex, context-dependent role in understanding rule-breaking behavior. A well-rounded empirical study needs to account for nuanced interactions among individual traits, situational contexts, and behavioral outcomes, as proposed by SAT. This involves assessing individual differences in self-control ability and personal morality, the moral norms of the settings, and actual or intended acts of rule-breaking. In this context, a critical feature of the research design is spatiotemporal convergence—the alignment of behavior, setting, and actor in both time and space. An ideal design would assess specific rule-breaking acts, measure or manipulate the situational context, and capture individual characteristics within that context (Hardie & Rose, 2025; Wikström & Kroneberg, 2022). Without spatiotemporal convergence, researchers cannot determine whether the interaction between individuals and settings contributes to rule-breaking, as it remains uncertain whether the reported acts occurred within the criminogenic contexts described (Wikström & Kroneberg, 2022). Additionally, an ideal research design would remove the influence of selection processes on the

characteristics of the setting and outcome, ensuring that the results exclusively reflect the situational model of SAT.

Furthermore, the choice of research design is central to ensuring the internal validity of causal inferences. Internal validity refers to whether a covariation between outcome and cause (two indicators) can be attributed to a causal relationship between them and not to confounding factors (Frank and Li 2020, Shadish et al. 2002). Several research designs are available, such as experiments, factorial survey experiments, or survey designs including panel studies. To evaluate the suitability of various research strategies for examining the role of self-control within SAT, the following section considers how these approaches differ in their ability to achieve internal (and external) validity.

1.3.3.1 Experiments

Experiments typically involve placing individuals in a controlled setting, randomly assigning them to two or more groups, and exposing them to experimental stimuli (Berger & Wolbring, 2015; Diekmann, 2007). This design offers high internal validity as all individuals in a group receive identical treatment conditions. The controlled setting and randomization eliminate systematic bias from observed or unobserved confounding factors (Diekmann, 2007; Jackson & Cox, 2013). Consequently, observed changes in outcomes can be causally attributed to the treatment (Diekmann, 2007; Horne & Rauhut, 2013).

Experiments face several challenges. They require significant effort and resources for complex designs and may prove impractical or unethical in certain contexts (Diekmann, 2007). Experiments focusing solely on average setting effects miss person-environment convergence and should therefore explore the variability of treatment effects based on individual characteristics (Deaton & Cartwright, 2018; Wikström & Kroneberg, 2022). Additionally, reactivity during outcome measurement and the artificial nature of experimental situations may introduce demand characteristics that compromise external validity (Gërxhani & Miller, 2022; Nagin & Sampson, 2019; Schnell et al., 2005).

External validity refers to the generalizability of research findings to different populations, settings, and outcomes (Shadish et al., 2002). The relationship between external and internal validity is debated in empirical social research, particularly regarding experimental methods (Dezember et al., 2021; Gërxhani & Miller, 2022). A central question is whether there exists a trade-off between internal

validity (greater experimental control) and external validity (generalizability beyond the experiment). Some researchers favor field experiments over laboratory experiments to balance these validity concerns (Farrington et al., 2020; Gërxhani & Miller, 2022). Others argue that no inherent trade-off exists, as theoretically-driven experiments aim to test "a theory that, if validated, could later be applied to a real-world context to explain human behavior" (Jackson & Cox, 2013, p. 38). From this perspective, generalization stems not from a single empirical result but from the tested theoretical construct (Gërxhani & Miller, 2022; Horne & Rauhut, 2013). Consequently, meaningful generalization primarily results from triangulation—"replication of particular experiments across diverse populations and different settings, using a variety of methods and measures" (Diekmann, 2007; McDermott, 2011, p. 34).

Despite the potential value of experiments that investigate person-setting interaction in terms of their ability to provide high internal validity and spatiotemporal convergence, no such studies have been conducted in the context of SAT to date (Wikström & Kroneberg, 2022).

1.3.3.2 Survey

Survey research offers greater external validity and is frequently used in SAT studies (Hardie & Rose, 2025; Pauwels et al., 2018; Wikström et al., 2012). Survey design is generally defined as the systematic implementation of surveys to collect data on attitudes, intentions, or past behaviors from individuals to describe a larger population. (Crano et al., 2014; Groves et al., 2011).

However, making causal inferences from survey designs is challenging because surveys tend to be descriptive or correlational (Horne & Rauhut, 2013). Certain conditions must be met to establish causal relationships, such as controlling for confounding variables and establishing a temporal sequence of cause and outcome. Both the survey design and statistical analysis need to account for external factors that could confound the results. To establish temporal sequence, longitudinal survey designs can capture changes over time and thus document the sequential ordering of variables.

A significant challenge in testing SAT through surveys is the lack of situational data (no spatiotemporal convergence). Surveys typically ask about crimes or deviant behavior committed within a specific time period alongside questions about generalized circumstances over that same period. This approach assumes that crime and deviant behavior occur in the same contexts as the reported general

circumstances, despite these contexts varying considerably across time and space (Ernst & Gerth, 2023; Wikström et al., 2024; Wikström & Kroneberg, 2022).

1.3.3.3 Vignettes

Factorial survey designs combine experimental components with survey research to achieve higher external validity. These designs present participants with hypothetical scenarios (vignettes) that systematically vary between groups (Auspurg & Hinz, 2015; Diekmann, 2007). When integrated into representative surveys, factorial designs allow access to more diverse samples, improving generalizability to broader populations (Atzmüller & Steiner, 2010; Auspurg & Hinz, 2015; Berger & Wolbring, 2015). This approach is particularly valuable for investigating ethically sensitive topics that would be difficult to study through traditional experiments (Aguinis & Bradley, 2014a).

However, factorial surveys face several limitations. First, they rely on scenario-based assessments that may not fully capture actual behavioral patterns. The correspondence between intentions expressed in hypothetical scenarios and real-world rule-breaking behavior remains questionable (Forster & Neugebauer, 2024, 2025; Hainmueller et al., 2015; Petzold & Wolbring, 2019; Pickett, 2025; Pogarsky, 2004). Second, these designs may inadequately represent the complex influence of individual characteristics, such as personal morality and self-control, on behavior in authentic settings (Hainmueller et al., 2015; Petzold & Wolbring, 2019). Third, the external validity of vignettes depends on their realism and relevance to participants' lived experiences (Treischl & Wolbring, 2022).

While some factorial surveys have examined the conditional relevance of self-control, the literature remains limited. Pauwels (2018b) and De Buck and Pauwels (2022) found that self-control ability is associated with the willingness to break moral rules across individuals and settings, with the strongest effects observed for individuals with rule-breaking morality in rule-breaking contexts. However, their operationalization of moral norms within settings—manipulating the presence or absence of third parties—overlaps with deterrence concepts rather than corresponding to SAT's theoretical construct. Consequently, these findings cannot be fully applied to the conditional relevance of self-control as conceptualized in SAT.

Overall, the previous investigations on the conditional relevance of controls can only be partially related to the theory. Based on the prior discussion, it becomes clear that a sound design is necessary for a meaningful test of whether the new instrument operates as intended. The following section explains why certain types of research design are emphasized in this dissertation.

1.4 Approach, dissertation framework, and chapter overview

This dissertation makes two primary contributions to the literature: (1) the development and validation of a novel instrument for measuring self-control ability, and (2) the application of this instrument to investigate the conditional relevance of controls within SAT. In light of the aforementioned discussions, the validation of the measurement instrument prioritizes content validity, with a secondary emphasis on construct and criterion validity.

Based on the theoretical understanding of self-control ability in SAT, the new instrument should incorporate five key elements essential to the SAT framework: (a) situational focus, (b) relation to external challenges, (c) part of the deliberation process rather than the perception process, (d) adherence to personal morality, and (e) recognition of subjective contents during deliberation, since individuals must navigate not only conflicting rules but also temptations and provocations during deliberation. All these aspects are incorporated into the new instrument to ensure content validity. Regarding criterion validity, using rule-breaking behavior as a criterion presents a potential circularity problem, as noted above. Therefore, different samples and research designs for validation and hypothesis testing are employed over different chapters of this dissertation to investigate criterion validity and assess derived hypotheses in order to address this issue.

The newly developed instrument allows for a more precise empirical test of the conditional relevance of controls compared to prior research, thanks to its rigorous alignment with the theoretical concept. Recognizing the trade-off between external and internal validity, this dissertation adopts a theoretically driven experimental approach to test hypotheses derived from SAT. The research design prioritizes internal validity, particularly when investigating action-generating mechanisms, while recognizing the complementary value of externally valid designs such as surveys. However, SAT suggests that individuals do not enter situations randomly, but rather through processes of self-selection and social selection, which sort "kinds of people in kinds of settings" (Wikström, 2019, p. 264). These

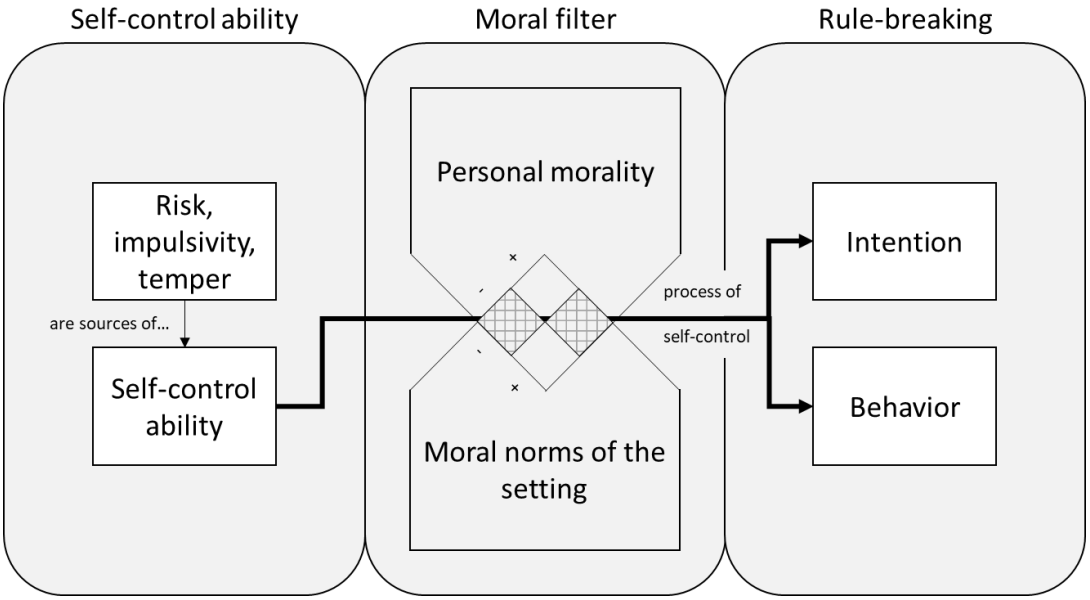
non-random activity fields subsequently lead to selective changes in personal characteristics, thereby confounding the measurements of both situational characteristics and personality traits (Ernst, 2021). However, surveys, with the exception of space-time budgets, are unable to distinguish these processes, which diminishes their informative value (Wikström et al., 2024). Therefore, this dissertation will employ a factorial survey experiment alongside a newly developed behavioral experiment to investigate the conditional influence of self-control abilities. This approach will ensure high internal validity and eliminate selection processes by design. It is consequently a suitable test of whether the scale functions as anticipated in the situational model.

Unlike previous studies (e.g., De Buck & Pauwels, 2022; Pauwels, 2018b), the designs presented in this dissertation manipulate the moral norms of the settings in a manner less likely to evoke deterrence effects. This allows for a more direct test of the moral filter and the conditional relevance of controls. While this issue is discussed in Chapters 2, 4, and 5, and aligns with the overarching approach of the dissertation, it is addressed here solely to examine the impact of self-control abilities on rule-breaking behavior.

The two primary contributions of this dissertation are closely interrelated. On the one hand, the newly developed instrument aims to explain rule-breaking behavior by establishing a causal relationship. However, the instrument's validity should not depend on its congruence with theoretical predictions, as this would render the theory unfalsifiable. That said, a null finding—i.e., the absence of a bivariate, multivariate, or moderated association between self-control ability and rule-breaking—would raise serious concerns about the instrument's methodological adequacy or indicate a significant misspecification of the theoretical relationship, despite existing empirical literature (Hardie & Rose, 2025; Kroneberg & Schulz, 2018; Pauwels et al., 2018).

As Esterling et al. (2025) argue, developing and validating a sound measurement instrument for self-control is a prerequisite for making deductive causal inferences. Without confidence that the instrument accurately captures the theoretical construct (i.e., measurement validity), there is a substantial risk of misinterpreting the results due to potential mislabeling of causes and effects. Consequently, developing a valid instrument is not just a methodological advancement but a necessary condition for rigorously testing SAT's causal hypotheses about self-control and rule-breaking behavior.

Figure 1.1 Dissertation Framework



Notes: The figure illustrates how self-control ability influences rule-breaking through the moral filtering process. The moral filter in the center incorporates a schematic version of Table 1.1. This framework presents the dissertation's dual aim: to discuss the operationalization of self-control ability while testing the conditional relevance of SAT.

1.4.1 Short outline of empirical studies

As stated in the introduction, the objective of this dissertation is to provide a rigorous test of the conditional relevance of self-control ability and its underlying operationalizations. Figure 1.1 illustrates that the theoretical framework remains consistent throughout the dissertation, while the operationalizations and research designs are refined incrementally across the chapters. The subsequent four chapters each present an independent empirical study and are summarized in Table 1.2. Chapter 2 begins with the existing LSCS operationalization of self-control ability but advances prior research by employing a factorial survey experiment. This design achieves high internal validity and spatiotemporal convergence while manipulating moral norms without confounding it with deterrence. Chapter 3 introduces SCAS and validates the newly developed and improved measurement instrument. Chapter 4 applies the SCAS in a refined factorial survey experiment that integrates the manipulation of moral norms directly into the decision-making context. Chapter 5 features a behavioral experiment that examines actual rule-breaking behavior using the SCAS.

Table 1.2 Overview of the studies included in this dissertation

	Study 1 (Chapter 2)	Study 2 (Chapter 3)	Study 3 (Chapter 4)	Study 4 (Chapter 5)
Title	An experimental test of Situational Action Theory of crime causation: Investigating the perception-choice process	The Self-Control Ability Scale: Measuring a Key Construct of Situational Action Theory	Self-Control Ability and Moral Norms: Testing Situational Action Theory with Refined Operationalizations	Towards the experimental study of behavior in testing Situational Action Theory: Deterrence, moral norms of the setting, and cheating
Author(s)	Sebastian Sattler, Floris van Veen, Fabian Hasselhorn, Guido Mehlkop, Carsten Sauer	Fabian Hasselhorn, Sebastian Sattler, Clemens Kroneberg, Daniel Seddig	Fabian Hasselhorn	Fabian Hasselhorn, Sebastian Sattler, Clemens Kroneberg
Research questions(s)	Do personal morality and moral norms of the setting reduce the perception of rule-breaking action alternatives, but not the willingness to break rules? Do self-control, deterrence, and benefits have no association with the perception of rule-breaking action alternatives, but decrease the willingness to break rules?	How should self-control ability be measured according to the conceptualization of Situational Action Theory?	Does the effect of self-control ability depend on the interplay between personal morality and moral norms of the setting as specified by SAT's conditional relevance of controls?	Does the effect of self-control ability and deterrence depend on the interplay between personal morality and moral norms of the setting as specified by SAT's conditional relevance of controls?
Dependent variable(s)	Willingness to sell prescription drugs illegally	Self-control ability	Willingness to take prescription drugs to enhance cognitive performance	Cheating
Core independent variables	Self-control, personal morality, moral norms of the setting, deterrence, and benefits	Other self-control scales, personal morality, criminal versatility, and deviant intention	Self-control ability, personal morality, and moral norms of the setting	Self-control ability, personal morality, moral norms of the setting, deterrence, and benefits
Data	ENHANCE Wave 1	Four self-conducted studies	ENHANCE Wave 3	One self-conducted study
Statistical Method	Double-Hurdle model	exploratory and confirmatory factor analysis, measurement invariance, and reliability	Ordinary least squares regression, negative binomial regression	Ordinary least squares regression
Current status	Published in: Social Science Research	Published in: Justice Quarterly	Submitted to: European Journal of Criminology	Submitted to: European Journal of Criminology

Notes: The ENHANCE study is a four-wave web-based study with an offline-recruited nationwide sample of adult residents in Germany who have internet access (forsa omni.net). Self-conducted studies are convenience samples using a crowdworker platform.

1.4.1.1 Chapter 2

Chapter 2 ‘An experimental test of Situational Action Theory of crime causation: Investigating the perception-choice process’ investigates SAT’s proposition of the conditional relevance of controls using a vignette-based experiment with a Germany-wide representative sample of adults. The scenario focuses on the illegal sale of prescription drugs. The moral norms of the setting, deterrence (sanctions and risk of detection), and potential gain were orthogonally manipulated, while personal morality and self-control (using three items from the LSCS) were measured. Assumptions underlying Cronbach’s alpha were tested and rejected; consequently, McDonald’s omega was used to assess reliability.

The data were analyzed using double-hurdle models, reflecting SAT’s two-stage perception-choice process. The first hurdle (participation equation) models the perception process using a probit model, which indicates whether the criminal act is considered an option. The second hurdle (quantity equation) models the deliberative choice process among those who perceive the act as an option, estimating the degree of willingness to engage in the behavior using a Tobit model (García, 2013; Jones, 2000). The study found that lower self-control increased the likelihood of perceiving illegal behavior as an option, contradicting a strict interpretation of SAT’s moral filter. However, this association disappeared after controlling for personal morality, suggesting confounding between self-control and personal morality on rule-breaking. In the second part of the model, low self-control was associated with a higher willingness to sell drugs, aligning with SAT’s premise that low self-control increases rule-breaking when individuals deliberate.

Contribution Chapter 2: As a Co-author, I designed the experimental setup, prepared the data for analysis, conducted the analysis, prepared the first draft of the manuscript, and reviewed and edited it together with my co-authors Sebastian Sattler (University of Cologne), Floris van Veen (University of Bielefeld), Guido Mehlkop (University of Erfurt), and Carsten Sauer (University of Bielefeld).

1.4.1.2 Chapter 3

Chapter 3, ‘The Self-Control Ability Scale: Measuring a Key Construct of Situational Action Theory’ presents the development and validation of the SCAS. The construct of self-control ability is reviewed

in depth, and a 15-item scale is developed, comprising three sub-dimensions: temptation, social pressure, and provocation (five items each). To validate the scale, four studies (three in German and one in English) with different focuses are presented. Study 1 assessed the dimensional structure and reliability, confirming the three-factor model and high internal consistency. Study 2 confirmed the factor structure, examined correlations with other constructs (e.g., self-control scales, personal morality, self-reported crime), and tested measurement invariance across gender and age. The SCAS was negatively associated with deviant behavior and displayed scalar invariance. Study 3 demonstrated test–retest reliability of the SCAS over one week. Study 4 tested the English version of the SCAS, and showed that dimensionality and reliability were preserved, with metric or residual invariance established across languages. Collectively, the results confirmed that the SCAS is a valid and reliable measure of self-control ability.

Contribution Chapter 3: As the lead author, I prepared the data for analysis and wrote the first draft of the manuscript. I developed the study idea and designed the surveys together with my co-authors Sebastian Sattler (University of Bielefeld) and Clemens Kroneberg (University of Cologne, Germany). I conducted the analysis together with my co-author Daniel Seddig (Criminological Research Institute of Lower Saxony). I reviewed and edited the first draft of the manuscript with all the mentioned co-authors.

1.4.1.3 Chapter 4

Chapter 4, titled "Self-Control Ability and Moral Norms: Testing Situational Action Theory with Refined Operationalizations' investigates SAT's conditional relevance of controls on the intake of prescription drugs to enhance cognitive performance using the third wave of the survey employed in Chapter 2. Moral norms of the setting were randomly manipulated via the behavior and moral evaluations of other individuals in the scenario. A brief temporal separation was introduced between the manipulation and the decision to mitigate the potential confounding of the treatment with deterrence. Personal morality and self-control ability (six items of the SCAS) were measured. Due to the skewed dependent variable, ordinary least squares and negative binomial regressions, supplemented with conditional marginal effects, were used for analysis. Results showed that self-control ability exerts a more pronounced influence on individuals with a more rule-breaking personal morality, particularly in

settings characterized by rule-abiding moral norms. This observation is consistent with the principle of conditional relevance of controls in SAT. However, in contexts characterized by rule-breaking moral norms, the influence of self-control ability is relatively consistent among individuals with varying personal morality.

Contribution Chapter 4: I am the sole author of this paper.

1.4.1.4 Chapter 5

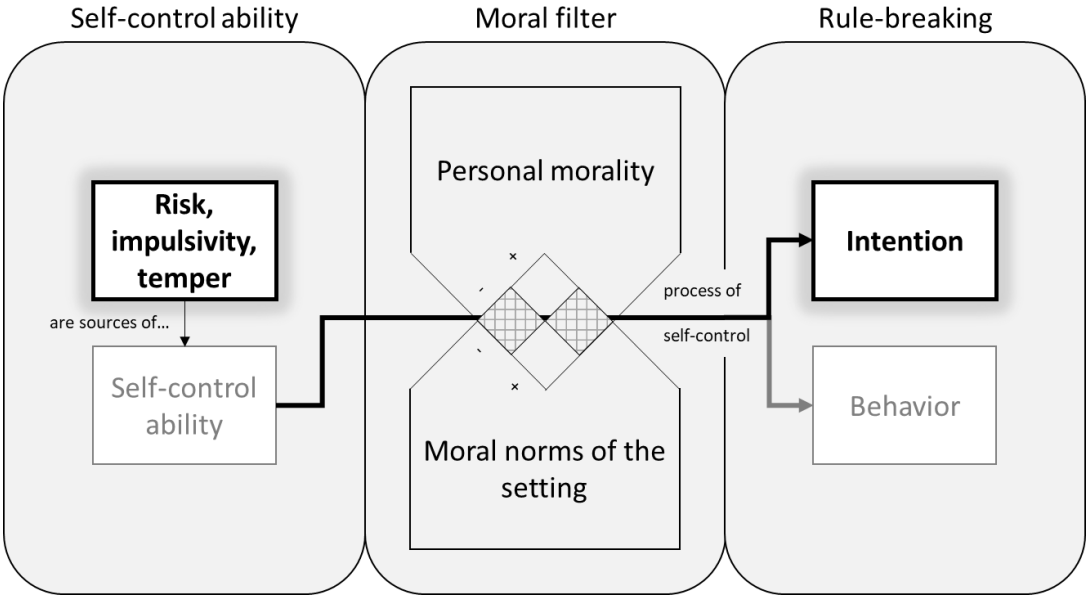
Chapter 5 presents the first experimental study on the SAT, utilizing situational data and actual behavior. Adult participants on a crowdsourcing platform took part in an online music quiz. The experimental manipulation involved varying platform descriptions to create rule-breaking versus rule-abiding moral settings. Cheating behavior was measured via the number of correct responses to highly difficult questions, where using external resources was explicitly forbidden. Personal morality and self-control ability (five items of the SCAS) were measured. Ordinary least squares regressions indicated mixed evidence for SAT's predictions. In a rule-abiding setting, higher personal morality weakened the negative association between self-control ability and cheating, suggesting reduced deliberation when moral norms and personal morality align. However, in a rule-breaking setting, self-control ability was not significantly associated with cheating behavior, regardless of personal morality.

Contribution Chapter 5: As the lead author, I prepared the data for analysis, conducted the analysis, and wrote the first draft of the manuscript. I also developed the study idea, research question, and theoretical framework, designed the experimental setup, and refined the manuscript together with my co-authors Sebastian Sattler (University of Bielefeld) and Clemens Kroneberg (University of Cologne, Germany).

Chapter 2

An experimental test of Situational Action Theory of crime causation: Investigating the perception-choice process

Figure 1.2. Theoretical framework of study 1



2 An Experimental Test of Situational Action Theory of Crime Causation: Investigating the Perception-Choice Process

Published as: Sattler, S., van Veen, F., Hasselhorn, F., Mehlkop, G., & Sauer, C. (2022). An experimental test of Situational Action Theory of crime causation: Investigating the perception-choice process. *Social Science Research*, *106*, 102693.

Chapter 3

The Self-Control Ability Scale: Measuring a Key Construct of Situational Action Theory

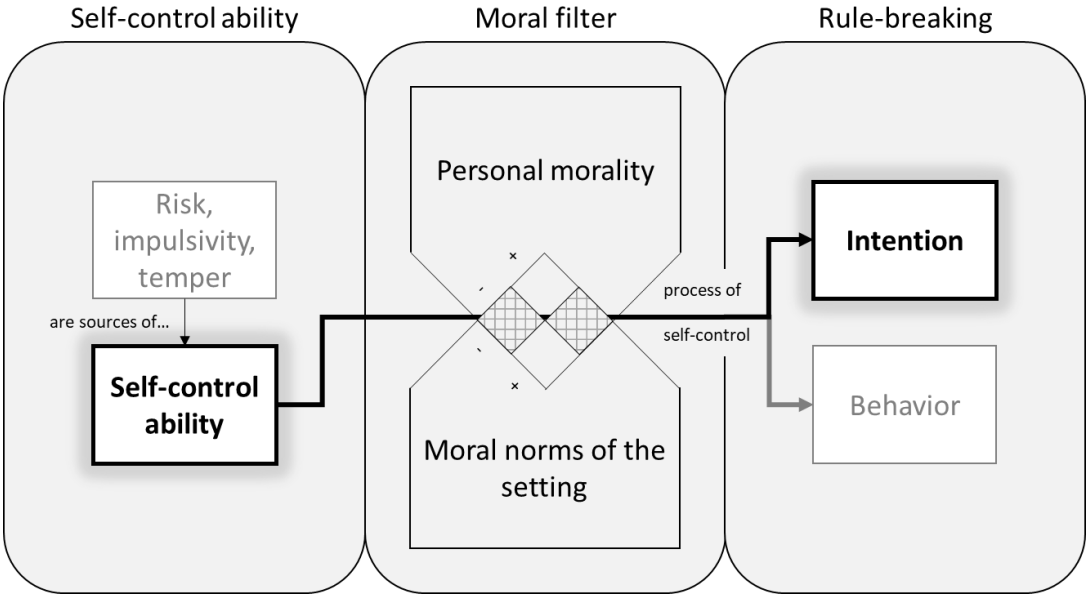
3 The Self-Control Ability Scale: Measuring a Key Construct of Situational Action Theory

Published as: Hasselhorn, F. A., Sattler, S., Kroneberg, C., & Seddig, D. (2025). The self-control ability scale: Measuring a key construct of situational action theory. *Justice Quarterly*, *42*(7), 1321-1348.

Chapter 4

Self-Control Ability and Moral Norms: Testing Situational Action Theory with Refined Operationalizations

Figure 3.1. Theoretical framework of study 3



4 Self-Control Ability and Moral Norms: Testing Situational Action Theory with Refined Operationalizations

Abstract

Situational Action Theory (SAT) posits a perception-choice process to explain rule-breaking behavior, emphasizing that the influence of self-control depends on the action alternatives perceived. These perceptions are shaped by the interplay of personal morality and the moral norms of the setting. However, empirical inconsistencies regarding the role of self-control highlight the need for explicit discussions on the operationalization of SAT's key constructs, particularly self-control and moral norms.
This study employs a large, nationally representative survey and scenario-based experiment to examine how moral norms shape rule-breaking behavior, while explicitly addressing measurement choices. Specifically, we utilize the newly developed Self-Control Ability Scale (SCAS) to test the interaction between personal morality, moral norms, and self-control ability in explaining rule-breaking behavior. Our findings confirm that self-control ability, personal morality, and rule-abiding moral norms each independently reduce rule-breaking willingness. Furthermore, we show that self-control ability has a more substantial influence among individuals with rule-breaking personal morality, especially in settings with rule-abiding moral norms, consistent with SAT's principle of conditional relevance. These results emphasize the importance of clearly articulated and explicitly discussed operationalization of moral norms to ensure interpretability and comparability across studies. By explicitly addressing measurement choices, this study strengthens the empirical foundation and theoretical framework of the SAT, thereby improving our understanding of the role of self-control in rule-breaking behavior.

4.1 Introduction

Self-control is a pivotal concept in criminology, particularly within Situational Action Theory (SAT), where its influence is considered situational rather than universal. According to SAT, self-control ability affects crime and rule-breaking behavior conditionally, emerging only when individuals deliberate between rule-breaking and rule-abiding actions. This deliberation depends on an individual's personal morality and the moral norms present in the immediate setting.

Research on the conditional influence of self-control ability has produced conflicting results. Several studies indicate that self-control ability is particularly influential among individuals with weak rule-abiding morality (e.g., Ivert et al., 2018; Kroneberg & Schulz, 2018; Pauwels et al., 2018), especially in situations where rule-breaking is prevalent (De Buck & Pauwels, 2022; Hirtenlehner & Leitgöb, 2021, 2024). Conversely, other research suggests that self-control ability is most relevant for individuals with strong rule-abiding morality (e.g., Choi & Yun, 2021; Liu et al., 2022), particularly where rules are frequently violated (Ernst & Gerth, 2023). These conflicting findings underscore the need for refined investigation of how self-control ability interacts with personal morality and moral norms of the setting.

A key challenge in testing SAT (and any theory) is the need for clearly operationalized theoretical concepts (Hardie & Rose, 2025). The conflicting results may stem partly from imperfect operationalization of two concepts: self-control ability and moral norms of the setting.

The first challenge involves operationalizing moral norms within settings, which has been inconsistent across studies and often fails to capture the situational nature of moral norms outlined in SAT. Moral norms refer to perceived shared rules of conduct in specific settings. In surveys, moral norms are typically measured as generalizations over periods, using peer behavior or peer perceptions. Wikström et al. (2024) noted that such methods lack spatial and temporal alignment with behavior, which is crucial because individuals encounter diverse environments beyond their immediate home or school settings. Scenario experiments offer a valuable alternative, allowing for the direct manipulation of moral norms and the testing of behavioral intentions in spatiotemporally linked settings. However, past studies using this design have sometimes conflated moral norms with deterrent factors and

motivations (De Buck & Pauwels, 2022; Pauwels, 2018b), or have employed norms relevant to the general population rather than those specific to the immediate choice context (Sattler et al., 2022). Prior work therefore only partially captures the moral filtering of action alternatives proposed by SAT.

The second challenge involves measuring self-control ability. According to SAT, self-control ability reflects an individual's capacity to resist acting against personal moral beliefs when externally challenged (Wikström, 2019). Grasmick et al.'s Low Self-Control Scale (LSCS; Grasmick et al., 1993), widely used in criminological research generally and SAT specifically, focuses on traits such as impulsivity, risk-taking, and temper that emphasize long-term consequences of actions. These traits are considered rooted in a person's executive functions and are thought to be *sources* of self-control ability (Wikström et al., 2012). However, while related to self-control, they only indirectly measure self-control ability as understood in SAT and may be prone to systematic measurement error. To address this limitation, the *Self-Control Ability Scale* (SCAS) offers a novel measure of SAT's self-control ability that directly assesses an individual's perceived capacity to resist temptations, provocations, and social pressure when externally challenged (Hasselhorn et al., 2024). This scale diverges from the LSCS and focuses instead on internal control in morally conflicting scenarios. Hasselhorn et al. (2024) found that the SCAS correlates only weakly with the LSCS, suggesting that the latter may be insufficient for capturing self-control ability as defined by SAT.

These two challenges should be addressed jointly, as in SAT, the influence of self-control ability depends on the interaction between personal morality and moral norms of the setting. Reassessing the operationalization of these constructs will enable a more rigorous test of SAT's predictions.

This study addresses these operationalization challenges by investigating how individuals perceive and respond to moral norms of the setting, manipulated using scenario experiments based on jointly adjusted descriptive and injunctive norms (Cialdini et al., 1991b). This method reduces the overlap with deterrence and motivation factors, offering a clearer view of the moral filtering process. Additionally, this study utilized the SCAS to capture self-control ability, aligning with the SAT framework precisely. Addressing these measurement issues is critical for advancing SAT's theoretical foundations and enhancing its empirical validity. By explicitly discussing and refining measurements of

moral norms of the setting and self-control ability, and employing experimental treatment, this research aims to provide a clearer test of SAT's predictions and bridge the existing gaps. Finally, unlike many criminology studies that focused on youth or student samples, this research involved an adult sample, providing an opportunity to assess SAT's assumptions among individuals at different life stages.

4.2 Situational Action Theory

SAT begins with the premise that rule-breaking acts (or crimes) represent violations of moral rules (defined by law; Wikström et al., 2012) and result from situational interactions between personality characteristics and situational factors. The theory posits that decisions to engage in rule-breaking emerge through a three-stage process. The first stage begins when a setting presents opportunities to fulfill needs or creates frictions that, combined with desires or sensitivities to provocation, generate motivation, that is, focused attention on specific goal-oriented behaviors (Wikström, 2019; Wikström et al., 2024). While such motivators are necessary for rule-breaking, they are insufficient (Wikström, 2019).

In the second process, that is, the perception process, a "moral filter" consisting of the actor´s personal morality and the moral norms of the setting determines whether individuals perceive rule-breaking as an alternative (Wikström, 2019). Personal morality refers to the internalization of moral rules, and the strength of these internalized rules is linked to the intensity of associated guilt and shame (Wikström et al., 2012). The moral norms of a setting reflect the perceived shared rules of conduct held by others regarding morally appropriate and expected behavior (Wikström et al., 2024). The principle of moral correspondence, also known as the 'moral filter hypothesis' (Wikström, 2010b), proposes that only rule-abiding alternatives are perceived when both personal morality and the moral rules of the setting align (Wikström & Treiber, 2007). Conversely, when both elements encourage rule-breaking, only rule-breaking actions are perceived as viable. In both scenarios, corresponding behaviors are enacted habitually without deliberation, rendering control mechanisms irrelevant for explaining rule-breaking behavior. However, when the moral filter's elements diverge, both rule-abiding and rule-breaking actions are perceived as possible. Only in these situations do individuals engage in the third stage, known as the "choice process," where they deliberate over perceived action alternatives, and both internal (i.e., self-control ability) and external controls (i.e., deterrence) influence their actions.

Consequently, individuals with high self-control ability are less likely to act on perceived rule-breaking opportunities. Deterrence, conversely, is described as an 'outer-to-inner' process whereby "(perceived) threats of sanctions in a setting makes a person withstand internal pressure to act against a moral norm (or a rule of law) due to her or his fear (or worry) about (immediate or future) negative consequences" (Wikström, 2019, p. 270). Deterrence is expected to be the primary control when individuals face actions that conflict with the moral norms of the setting, while self-control ability should be the primary control when individuals face external pressures to commit acts that conflict with their moral beliefs.

4.3 Prior research

Accurately measuring moral norms within SAT requires understanding how individuals experience moral expectations. Although SAT provides clear theoretical definitions of moral norms, empirically measuring these perceptions remains challenging (Hardie & Rose, 2025).

Some empirical studies simplify the moral filter by using personal morality alone as a proxy, focusing on personal morality and self-control ability. These studies support SAT's hypothesis that self-control ability is particularly influential among individuals with lower levels of rule-abiding morality (e.g., Ivert et al., 2018; Kroneberg & Schulz, 2018; Pauwels et al., 2018). However, other studies have found that self-control may be most relevant for individuals with high levels of rule-abiding morality (Choi & Yun, 2021; Liu et al., 2022).

Several studies emphasize examining both personal morality and moral norms of the setting, considering how these factors condition the effects of self-control ability. The expectation is that self-control ability becomes relevant primarily when these factors misalign. Supporting this, Ernst and Gerth (2023) found that self-control ability reduced cheating in schools for individuals with rule-abiding personal morality in rule-breaking settings, which they operationalized through school-based aggregation of rule-breaking behaviors.

Conversely, most studies using self-reported crime data have observed stronger effects of self-control ability in rule-breaking settings among individuals with rule-breaking personal morality (Hirtenlehner & Leitgöb, 2021, 2024; Kabiri et al., 2022; Schepers & Reinecke, 2018). These studies

employed various individual-level proxy measures, such as measuring individuals' perceptions of peers' morality (Hirtenlehner & Leitgöb, 2021; Kabiri et al., 2022) or perceptions of peers' actual behavior (Schepers & Reinecke, 2018), or a combination of peers' morality and behaviors (Hirtenlehner & Leitgöb, 2024). In contrast, Kafafian et al. (2022) did not find that the weakening effect of personal morality on self-control changed between varying levels of moral norms of the setting assessed by school attachment. Similarly, Brauer and Tittle (2017b) measured moral norms using a combination of moral beliefs and behaviors and found no interaction between personal morality and moral norms on crime contemplation.

A central challenge associated with these measurement approaches is the concept of exposure (Wikström et al., 2024). Because individuals navigate multiple environments beyond their immediate homes or schools, they encounter diverse moral contexts. Thus, most measures of moral norms rely on auxiliary assumptions about a spatio-temporal link between the moral norms and the behavior assessed (Wikström et al., 2024).[6]

SAT's situational model seeks to explain specific acts of rule-breaking (or rule-abiding) behavior instead of aggregated behaviors, such as crime rates. Therefore, an ideal measurement of moral norms should allow for situational-level analyses and target one or multiple specific situations (i.e., immediate behavioral contexts) rather than generalized circumstances. Since scenario studies focus on a single-choice situation in a controlled setting, they are particularly well suited for examining the influence of moral norms of the setting. Studies using factorial survey designs, such as Pauwels (2018b) and De Buck and Pauwels (2022), found that self-control ability was linked to the willingness to break rules across individuals and settings. The strongest effects were observed among individuals with rule-breaking morality in rule-breaking contexts.

[6] A promising approach is described by Wikström et al. (2024) and offers an alternative method by combining peer crime involvement measures with exposure to criminogenic settings via space-time budgets, focusing on time spent in unstructured peer-oriented activities in environments with low collective efficacy. However, this method assumes that the peers measured are the same ones present in each hour, and it primarily applies to youth in unstructured settings, making it less suitable for adult offenders or white-collar crimes.

However, these studies face challenges in operationalizing moral norms. Pauwels (2018) manipulated provocation and the presence or absence of a third person. The empirical comparison primarily focused on the provocation dimension, making the results more indicative of the motivation process than the perception process. Similarly, De Buck and Pauwels (2022) manipulated criminological inducements rather than moral norms, using the presence or absence of a third person, a feature also indicative of a deterrent effect. Criminological inducement is a broader category and refers to the setting's ability to provoke criminal acts, including the setting's moral norms and deterrent qualities. Thus, the results cannot be fully applied to the theoretical concept of the conditional relevance of self-control. The authors acknowledge a key methodological limitation: "The lack of variation in terms of contextual morality is an important methodological limitation' (De Buck & Pauwels, 2022, p. 140).

Additional studies have explored alternative measurement approaches. Using a double-hurdle model, which differentiates between the perception and choice processes, Sattler et al. (2022) examined the willingness to sell prescription drugs illegally. They found that moral norms did not influence the perception process. However, the operationalization of moral norms by information from an opinion pool referencing the moral acceptability of the behavior within the general population was not temporally or spatially linked to the decision-making context. While not examining the conditional relevance of self-control ability, Kleinewiese (2022) explored theft-by-finding in the SAT framework and manipulated two moral norms. One moral norm was tied to the general setting, measured by the rate at which lost objects were returned, and the other to the group setting, measured by the cheating rate among peers during a game competition.

Taken together, these studies reveal inconsistencies that may be attributed to differences in how moral norms of the setting are operationalized across studies and highlight the need for a more explicit discussion of how moral norms of the setting should be measured.

4.3.1 Cognitive availability of moral norms

In addition to the presented empirical studies, Wikström (2019) suggests that individuals may become aware of moral norms through various channels beyond direct observation, such as verbal or written instructions, reactions to rule infractions, and visual indicators of past actions (e.g., graffiti or

vandalism), or by experimenting and observing others' responses.

According to SAT, a setting's influence on behavior is based on the aspects that an individual perceives. As articulated by Wikström et al. (2024, p. 280), "The part of the environment that is relevant is that which the actor can access with her or his senses (including through media); any part of the environment an actor cannot access arguably has no impact on her or him, and therefore no influence on her or his action." This perspective primarily emphasizes the immediate perception of situational characteristics through sensory input. However, this study advocates for a broader view, suggesting that learned situational characteristics can also shape individuals' action-relevant moral expectations, thereby affecting the perceived moral norms of the setting.

If moral norms develop when individuals engage in actions and experience corresponding social reactions, this indicates that they update and retain information from past experiences. This process suggests that learned social responses shape how individuals understand moral expectations. SAT acknowledges an overlap between objective and subjective (i.e., perceived) moral expectations, especially when individuals are familiar with a setting (Wikström et al., 2024). Familiarity, however, inherently requires individuals to retain and integrate information about situational features over time, further emphasizing the role of learned situational characteristics in shaping subjective moral expectations. Place-based moral norms, such as attire expectations at a beach versus a religious building, illustrate that moral norms of the setting can be learned within the setting itself, independent of others' behavior at a given moment.

Hardie's (2021) concept of parental control through psychological rather than physical presence aligns with this reasoning. The notion of psychological presence (i.e., cognitive availability) suggests that previously acquired knowledge about a setting's norms informs an individual's perceived moral expectations, even in the absence of direct external reinforcement.[7] It is also consistent with SAT's core principle: the interaction between the individual and the setting. People carry learned situational

[7] This perspective aligns with the concept of "internal representations" that are describe as "external sensory information from the environment combined with internal knowledge from the individual's past experiences." (Wikström & Treiber, 2007, p. 251) although these are associated with the ability to exercise self-control.

characteristics (e.g., moral norms) into situations, merging these pre-existing understandings with immediate situational features to construct an immediate perception of moral expectations.

In conclusion, broadening the conceptualization of moral norms within SAT to include both immediately perceived situational cues and cognitively available, learned characteristics of a setting may provide a more comprehensive understanding of how moral expectations form and how they influence behavior.

4.3.2 Key dimensions of moral norms of the setting

Given the inherent variability of moral norms, empirical research requires a clear and systematic framework for operationalizing them in different situational contexts (Hardie & Rose, 2025). A detailed discussion on measurement options and explicit reasoning behind operationalization strategies improves the interpretability of study findings, promotes theoretical consistency, and ensures SAT's applicability across various behavioral contexts.

Wikström's (2019) suggestions for measuring moral norms of the setting, along with prior research approaches, provide a strong foundation for establishing consistent measurement categories. To build upon these foundations, I propose several key dimensions in order to systematically differentiate the various aspects of moral norms. These dimensions, summarized in Table 4.1, can guide future studies, helping researchers develop precise, valid measures of moral norms aligned with SAT's situational model.

The first dimension differentiates between norms that are immediately perceived in the moment and those accessed indirectly through learned, cognitively available information. Directly observable norms are those that individuals perceive through immediate sensory cues (e.g., visual indicators in a setting or others' current behaviors). In contrast, cognitive norms are shaped by past experiences and retained as learned expectations, which individuals carry into new situations.

The second dimension distinguishes between injunctive norms, describing what is typically approved (e.g., direct instructions or rule-infraction reactions), and descriptive norms, describing what is done (e.g., observed compliance and visual cues of past actions; Cialdini & Goldstein, 2004).

The third dimension addresses the sources of moral norms, acknowledging that these originate from multiple entities or social referents. As Kleinewiese (2022) suggests, norms are held by "other people" across various levels, such as groups or society at large, and can endorse different moral rules. This dimension differentiates between norms derived from specific individuals, such as a parent, partner, or colleague, and those endorsed by collective entities, such as groups, institutions, or communities. Additionally, indirect cues, such as visual evidence of past behaviors like litter or graffiti, may shape an individual's moral expectations.

Finally, the fourth dimension acknowledges that norms vary in their specificity to particular behaviors, meaning they vary in relevance to "the activity in question" (Wikström et al., 2024, p. 95). Some norms are highly targeted, such as those governing cheating, which apply specifically to academic dishonesty but not necessarily to theft, whereas broader norms concerning honesty or rule adherence in general may influence behavior across multiple contexts (Wikström et al., 2024; Kleinewiese, 2022). This distinction matters because individuals may extrapolate moral expectations across behaviors, as seen in cross-norm inhibition effects (Keizer et al., 2008).

Table 4.1. Operationalizing Moral Norms in Situational Contexts: Key Theoretical Dimensions

Dimension	Categories	Definitions	Potential behavioral implications
Mode of Perception	• Direct (Sensory/Immediate) • Indirect (Cognitive/Prior Knowledge)	Differentiates norms perceived through direct cues vs. norms accessed via stored cognitive frameworks.	Direct cues, e.g., presence of authority, visible order) may be more stable; cognitive norms depend on retrieval ease and context.
Type of Norm	• Injunctive (What ought to be done) • Descriptive (What is done)	Injunctive norms are based on (societal) approval or disapproval, while descriptive norms are based on observed behaviors.	Alignment between injunctive and descriptive norms enhances norm clarity and strengthens behavioral influence.
Source of Norm	• Individual (e.g., parent, peer) • Collective (e.g., group, institution) • Indirect cues (e.g., graffiti)	Entities or cues from which moral expectations originate.	Collective sources provide more stable and influential norms; norm conflicts may weaken behavioral influence.
Specificity of Norm	• High specificity (e.g., exam cheating) • Low specificity (e.g., honesty)	Scope to which a norm applies to a particular behavior or broader behavioral domain.	Highly specific norms are more behavior-relevant; general norms may influence across contexts; relevant to cross-norm inhibition.

While it remains an open empirical and theoretical question whether different modes of perception, types of norms, sources, or levels of specificity have distinct or interactive effects on the perceived moral norms of a setting (c.f. Brechwald & Prinstein, 2011; McGloin & Thomas, 2019), some theoretical considerations offer insight into which specification influences perceived moral expectations more strongly.

First, moral expectations must be salient to influence behavior (Paluck & Shepherd, 2012). Situational cues should be clearly perceptible, while cognitively stored moral expectations should be easily retrievable. If both are prominent, they are equally relevant. However, since the ease of cognitive

retrieval of learned norms depends on immediate context and may be more volatile, directly perceptible sensory cues might provide a more stable indicator of moral expectations.

Second, both injunctive and descriptive norms offer insight into others' moral expectations and can serve as valid operationalizations of moral norms of the setting. Moral expectations should become clearer when both types of norms align—that is, when injunctive norms are not only articulated but also practiced, and when descriptive norms are not merely the result of deterrence effects. This aligns with research suggesting that congruent norms have a stronger influence on behavior (Smith et al., 2012).

Third, in a given situation, norm conflicts may arise when different social referents endorse competing norms, such as when family and peers hold conflicting moral beliefs (Hardie & Rose, 2025). However, moral norms' effectiveness depends on the norms' homogeneity within a setting (Wikström et al., 2024). A collective entity, such as a group or institution, is likelier to provide a stable, uniform norm environment than an individual. In contrast, when norms originate from a single person, an actor may question whether those expectations are unique to that individual, reducing their influence.

Finally, the perception-choice process is always a response to a specific motivator. Consequently, norms directly related to the target behavior should be most influential.

This study argues that a suitable operationalization of moral norms in the framework of SAT should prioritize directly observable norms rather than solely cognitive ones, include both descriptive and injunctive norms for greater clarity, focus on norms specific to the behavior under study rather than generalized moral expectations, and derive norms from a social entity rather than a single individual relevant to the setting. However, this specification also indirectly provides insight into the deterrent qualities of the situation, as frequent behavior patterns may imply a lower likelihood of sanctions (Sattler et al., 2021). To minimize this confounding effect, it is beneficial to introduce a temporal gap between norm perception and the decision-making moment.

By aligning with SAT's situational model, this approach can enhance the consistency and interpretive clarity of empirical findings across diverse behavioral contexts. Adopting this framework may ultimately lead to more precise and reliable measurements of moral norms, thereby strengthening both the theoretical and practical applications of SAT in criminology.

4.3.3 The operationalization of self-control ability in SAT

Most studies within the SAT framework use the adaptation of the LSCS to measure self-control ability (Grasmick et al., 1993; Pauwels et al., 2018; Wikström et al., 2012). This scale primarily captures traits such as impulsivity, risk-taking, and temper. Although these traits are sources of self-control ability (Wikström et al. 2012), they do not directly measure the construct as defined by SAT (Hasselhorn et al. 2024). Instead, they serve as indirect indicators, which introduces concerns about systematic errors and limits the interpretability of empirical results (De Buck & Pauwels, 2022). This discrepancy between the theoretical construct and the measurement instrument complicates evaluating whether empirical findings regarding self-control ability are consistent with the theory.

A key issue is that the traits measured by the LSCS may confound self-control ability with other individual-level constructs, such as sensation seeking or risk preferences (cf. Zuckerman et al., 1978). These traits may be related to self-selection factors or deterrence sensitivity (Ernst, 2021). For example, individuals who score high on risk-taking might avoid rule-breaking not because they possess strong self-control ability but because they are highly sensitive to consequences (deterrence) or avoid criminogenic situations due to personal preferences. This confounding weakens the scale's validity and complicates interpretation of results.

Another critical limitation involves the lack of established measurement invariance across different language versions, which refers to the extent to which a scale measures the same construct across different languages and cultures. This is particularly problematic given that SAT research spans multiple countries and languages, including South Korean (Choi & Yun, 2021), Chinese (Liu et al., 2022), German (Kroneberg & Schulz, 2018), Swedish (Ivert et al., 2018), and Dutch (De Buck & Pauwels, 2022) versions of the LSCS. Without demonstrated measurement invariance, it remains unclear whether divergent findings across these studies reflect genuine differences in (the effect of) self-control abilitiy or are artifacts of varying interpretations and cultural contexts embedded in the translated scales.

Additionally, the LSCS does not explicitly account for the moral context of the setting, which is central to SAT. SAT theorizes that self-control ability becomes relevant primarily in situations where

an individual's moral values are challenged by external factors (Wikström et al., 2024). The generalized nature of the LSCS overlooks these situational dynamics and the interaction between self-control ability and the moral norms of the setting. Consequently, it presents a static view of self-control that does not align with SAT's situational framework. The scale also demonstrates consistently low reliability across studies (Hirtenlehner & Hardie, 2016: α=.63; Hirtenlehner & Kunz, 2016: α=.60; Sattler et al., 2022: ω=.63; Serrano-Maíllo, 2018: α=.68), further suggesting that its items do not consistently measure the same underlying construct.

To address these limitations, Hasselhorn et al. (2024) developed the Self-Control Ability Scale (SCAS), which directly measures an individual's perceived ability to resist temptations, provocations, and social pressure when externally challenged. Unlike the LSCS, the SCAS focuses on situational control in morally conflicting scenarios, aligning more closely with SAT's conceptualization of the construct. The scale demonstrates strong psychometric properties, including high reliability and, crucially, measurement invariance across different language versions, enabling more valid cross-cultural comparisons in SAT research. Notably, Hasselhorn et al. (2024) found only a weak association between the SCAS and the LSCS, further questioning the latter's validity as a measure of self-control ability within the SAT framework.

Given these measurement concerns with the LSCS, this study employs the SCAS to measure self-control ability, providing a more precise test of SAT's predictions regarding the conditional relevance of self-control.

4.4 Current study

Given the measurement challenges in previous SAT research, particularly regarding moral norms and self-control ability, this study integrates refined operationalizations to address these gaps. The research examines how self-control ability, personal morality, and situational moral norms interact to influence rule-breaking behavior.

While SAT typically does not emphasize unconditional main effects, it suggests that higher self-control ability (H1a), a rule-abiding personal morality (H1b), and the presence of rule-abiding moral norms in the setting (H1c) should reduce the willingness to engage in rule-breaking. Expanding on this,

the research hypothesizes that the effect of self-control ability is moderated by an individual's level of personal morality. Specifically, we hypothesize that individuals with a stronger law-abiding personal morality should exhibit a weaker relationship between self-control ability and the willingness to engage in rule-breaking (H2). This aligns with Wikström et al.'s (2024) notion that for those with strong law-abiding morality, the "added preventive influence of strong self-control controls should be small or non-existent" (Wikström et al., 2024, p. 59).

Following SAT's principle of conditional relevance, whereby self-control becomes important only when individuals perceive rule-breaking as a viable option, this study expects self-control ability to depend on the interaction between personal morality and situational norms. When both personal morality and moral norms favor rule-abiding behavior, self-control ability should have minimal influence, because individuals are unlikely to perceive rule-breaking as an action alternative. Therefore, rule-abiding norms should amplify the effect of rule-abiding personal morality, further diminishing the influence of self-control ability (H3). Conversely, in rule-breaking settings, self-control ability should matter more for individuals with rule-abiding personal morality than for those with rule-breaking personal morality.

To test these hypotheses, this study employs a scenario-based methodology that manipulates the moral norms of the setting as both descriptive and injunctive group-based norms specific to the behavior under investigation. The norm manipulation occurs immediately before decision scenarios with temporal separation from the decision point to isolate the effect of moral norms while minimizing confounding factors such as deterrence perceptions or immediate social sanctions. Additionally, this study uses the SCAS to provide a more direct measure of self-control ability, improving upon previous operationalizations within the SAT framework.

This comprehensive investigation generates valuable insights into the nuanced relationships between self-control ability, personal morality, and moral norms of the setting, thereby advancing the empirical understanding of rule-breaking behavior.

4.5 Methods

4.5.1 Participants

This study utilizes data from the nationwide web-based ENHANCE study involving adults aged 18 and older. The initial sample for this four-wave study was recruited offline and designed to be nationally representative in terms of sex, age, education, and federal state for the adult population in Germany with internet access, which applies to approximately 95% of all households. A multistage random sampling procedure was used to provide every household with internet access the same chance of participation and to include infrequent internet users, while preventing self-selection. A scenario experiment was conducted in the third wave of this study. A total of 3,725 participants were randomly assigned to the experiment, and after accounting for missing values, the final analytical sample included 3,053 participants (47.59% female; mean age: 59.58, standard deviation = 15.40). The ethics committee of the University of Erfurt approved the study, including this experiment (reference number: EV-20190917).

4.5.2 Experimental setup and willingness to engage in rule-breaking

The study employed a factorial survey design with vignettes to leverage the strengths of both experimental and survey research. This approach ensures high internal validity, minimizes multicollinearity of manipulated variables, and allows for examining multiple causal influences. Simultaneously, it enhances external validity by using more representative samples and capturing individual attitudes (Atzmüller & Steiner, 2015; Aguinis & Bradley, 2014b; Jasso, 2006). Vignettes provide short descriptions of hypothetical situations that are experimentally varied.

The vignette study explores how moral norms influence individuals' willingness to consume prescription drugs for cognitive enhancement. It presents a scenario in which participants are employed at a newly established company and face an upcoming performance review to determine whether their employment contracts will be extended. Participants are asked to imagine a conversation during a break with colleagues about the forthcoming evaluation. During this conversation, one colleague offers prescription pills to enhance concentration (see Table S1 in the Appendix to Chapter 4). The vignette manipulates the other colleagues' attitudes and behavior toward the pills, with two conditions: in the

rule-abiding condition, the colleagues express that they do not want to try the pills and find the idea highly problematic; in the rule-breaking condition, they are willing to trying the pills and do not consider the idea problematic. After the scenario is presented, participants are asked to indicate their willingness to take the pills on a 10-point scale, ranging from "not at all" [0] to "very much" [9] (plus the option "no response" chosen by 0.21%, *N*=8).[8] All vignettes, instruments, and instructions were pretested cognitively (N=11) and quantitatively (N=78).

Taking prescription drugs without a prescription violates key moral and social norms in several ways. First, consuming prescription drugs for non-medical purposes involves participating in the misuse of regulated substances, which violates societal standards of lawfulness and integrity, and the dealing itself is a criminal offense under the German Medical Products Act. Additionally, this decision constitutes an unfair advantage, akin to doping, and undermines the principles of fairness, honesty, and equal competition. Finally, taking non-prescribed pills carries health risks and the potential for addiction. Prioritizing personal advantage over health risks reflects a disregard for moral obligations related to self-care and personal health. Together, these considerations underscore how the willingness to engage in this behavior breaks moral rules regarding fairness, lawfulness, and self-care.

4.5.3 Measures

Personal morality was assessed using three adapted items capturing moral beliefs and moral emotions (guilt and shame; Hirtenlehner & Hardie, 2016), specific to the investigated behavior (for details, see Table S**2**). Response options ranged from "does not apply" [1] to "completely applies" [5]. Cronbach´s alpha was 0.87. The items were averaged (by Stata's 'rowmean' function) and then z-transformed, with higher values indicating higher morality.

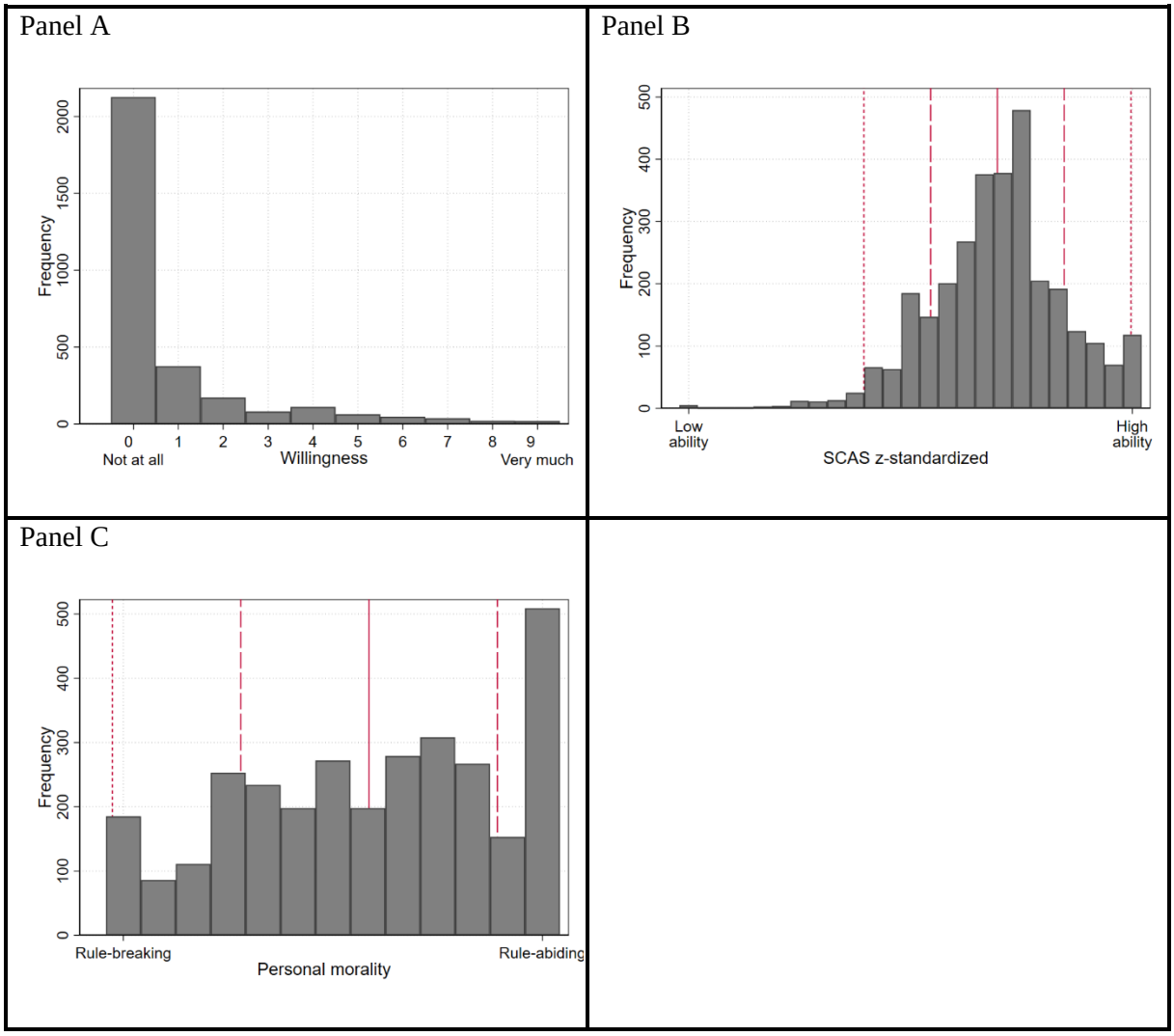
In contrast to other SAT studies (Hirtenlehner & Kunz, 2016; Kroneberg & Schulz, 2018), this study used a subset of items from the SCAS that captures an individual's ability to adhere to their

[8] We also assessed crime contemplation to take the pill by asking "How strongly would you be tempted to take the pills in this situation?" with the response options ranging from „not at all" [0] to „very much" [9]. Because of a very high correlation (*r*=0.85) only results of the willingness are discussed in the further analysis.

morality when externally challenged (Hasselhorn et al. 2024). The scale included six items: three items (t2, t3, t4) capturing the subdimension of temptations and three items (s2, s3, s4) capturing the subdimension of social pressure. Response options ranged from “does not apply” [1] to “completely applies” [5]. Cronbach´s alpha was 0.85. The items were averaged (using the same procedure as above) and z-transformed, with higher values indicating higher self-control ability.

Panel A in Figure 4.1 shows that the willingness to engage in rule-breaking is relatively low, with a majority (69.7%) of participants showing no willingness at all. Self-control ability is approximately normally distributed (Panel B), while personal morality (Panel C) has a bimodal distribution with peaks at "rule-breaking" and "rule-abiding" personal morality and a relatively uniform spread of values between these two modes. Table S3 shows descriptive statistics and bivariate correlations for all measures included in the analysis.

Figure 4.1. The distribution of willingness to engage in rule-breaking (Panel A), self-control ability (Panel B), and personal morality (Panel C).



Notes: The continuous line represents the mean, and dashed lines represent +1 standard deviation (SD) and -1 SD, whereby dotted lines represent -2 SD and +2 SD (not displayed if outside the range).

4.5.4 Statistical analysis

The distribution of the willingness to engage in rule-breaking is highly skewed (see Panel A in Figure 4.1), similar to indices used for crime versatility or frequency, despite not being count data. Negative binomial regression is a recommended analytical method for this data type, as it best accommodates the skewed and discrete nature of the response variable and accounts for overdispersion. However, the focus on interaction effects requires caution against relying solely on this model type. Negative binomial models are inherently multiplicative, which can increase the risk of methodological artifacts when an

additional multiplicative interaction term is included. The interaction term may be affected by, or even canceled out by, the model's inherent multiplicative structure (Hardie, 2020). This suggests that interaction coefficients may provide misleading estimates of the overall interplay between predictors (Barton-Crosby & Hirtenlehner, 2021; Bowen, 2012; Hirtenlehner & Kunz, 2016).

Moreover, comparing regression coefficients across groups is not possible in this context due to the dependency of coefficient scaling on model fit, which is influenced by the level of unobserved heterogeneity (Mood, 2010). An alternative approach is to compare the marginal effects of a predictor variable at representative values of other regressors (Barton-Crosby & Hirtenlehner, 2021; Mood, 2010; Williams, 2012). These conditional marginal effects can be tested for equality using the Z-test developed by Paternoster et al. (1998). Some researchers advocate using OLS regression for skewed data, such as crime frequency, given its reliable coefficients and easily interpretable results (Pauwels et al., 2018). While linear regression models carry a risk of ceiling or floor effects in interactions for certain variables (Kammigan, 2022; Rohrer & Arslan, 2021), this is less problematic for the current hypotheses, where the specific pattern of interactions, namely the conditional relevance of controls, resembles a floor effect (Kroneberg & Nägel, 2024).

The analysis strategy follows the approach outlined by Barton-Crosby and Hirtenlehner (2021), who used linear regression to examine product term coefficients for detecting and interpreting interaction effects. However, recognizing that OLS regression applied to a skewed outcome variable can yield spurious interactions simply due to the non-normal distribution of the dependent variable (Osgood et al., 2002), the OLS analyses will be supplemented with marginal effects comparisons derived from negative binomial models. This approach aligns with recent arguments by Kammigan (2022), which emphasize prioritizing absolute effects—available in OLS or as average marginal effects—over baseline-dependent, relative effects to accurately assess how strong personal morality reduces the effect of self-control ability on rule-breaking behavior.

4.5.5 Results

The statistical analysis proceeds in three stages: first, examining the main effects, then the two-way interaction between self-control ability and personal morality, and finally, the three-way interaction,

which includes the moral norms of the setting (also encompassing all two-way interactions).

Table 4.2. The interplay of self-control, personal morality, and moral norms of the setting (linear regression models)

	Model 1	Model 2	Model 3
Rule-abiding moral norms	-0.18**	-0.18**	-0.19**
	(0.06)	(0.06)	(0.06)
Self-control ability (SCAS)	-0.33***	-0.32***	-0.32***
	(0.03)	(0.03)	(0.04)
Rule-abiding personal morality	-0.33***	-0.33***	-0.30***
	(0.03)	(0.03)	(0.04)
SCAS×personal morality		0.07*	0.01
		(0.03)	(0.04)
Moral norms×personal morality			-0.07
			(0.06)
Moral norms×SCAS			0.01
			(0.06)
Moral norms×SCAS×personal morality			0.12*
			(0.06)

Notes: Standard errors in parentheses; *p<.05, **p<.01, ***p<.001.

Model 1 (in Table 4.2) confirms the main effects predicted by hypotheses H1a-H1c. Self-control ability is significantly associated with reduced rule-breaking (p<.001), supporting H1a. Specifically, a one standard deviation increase in self-control ability corresponds to a 0.33-point decrease on the 0–9 scale of reported willingness to engage in rule-breaking behavior. Higher levels of personal morality correlate with less rule-breaking (p<.001), supporting H1b. Finally, the experimental treatment introducing rule-abiding norms of the setting significantly decreases rule-breaking (*p*=.003), supporting H1c.

Model 2 test the interaction between self-control ability and personal morality. The significant interaction term (*p*=.013) supports H2 and indicates that the effect of self-control ability weakens as personal morality becomes more rule-abiding. Marginal effects derived from the negative binomial regression (see Table 4.3) further corroborate this pattern: self-control ability is negatively associated with rule-breaking across all levels of personal morality. However, the association is more pronounced for individuals with low levels of rule-abiding personal morality (–1 SD), where a one standard deviation

increase in self-control ability is associated with a 0.45-point decrease in the predicted willingness to engage in rule-breaking behavior on the 0–9 scale ($p < .001$). In comparison, for individuals with high rule-abiding morality (+1 SD), the association is weaker but still significant (ME: –0.27, $p < .001$). The difference in marginal effects (ΔME: 0.18) is statistically significant (p=.047).

Table 4.3. Marginal effects (differences) of self-control ability depending on the level of personal morality (based on negative binominal regressions models)

ME		Difference in ME		
Personal morality	ME	Rule-breaking	-1SD	+1SD
Rule-breaking	-0.54** (-3.329)			
-1SD	-0.45*** (-6.014)	0.09 (0.515)		
+1SD	-0.27*** (-5.801)	0.27 (1.578)	-0.18* (1.981)	
Rule-abiding	-0.25*** (-4.994)	0.29 (1.715)	0.20* (2.221)	0.02 (0.357)

Notes: ME=Conditional marginal effect; *z*-values in parentheses; *p<.05, **p<.01, ***p<.001; Rule-breaking personal morality refers to the empirical minimum, while rule-abiding personal morality refers to the empirical maximum.

Model 3 assesses the conditional relevance of self-control ability, incorporating a three-way interaction among self-control, personal morality, and moral norms of the setting. The significant three-way interaction supports H3, suggesting that the moderating role of personal morality is more pronounced in rule-abiding settings.

Marginal effects from the negative binomial model (Table 4.4) illustrate this pattern. In a rule-abiding setting (see right panel of Figure 4.2), the effect of self-control ability on rule-breaking is substantially weaker for individuals with high rule-abiding personal morality (ME: -0.18, p=.001) than for those with lower personal morality (ME: -0.69, p=.006; difference in ME: 0.51, p=.048). In contrast, in rule-breaking settings (left panel of Figure 4.2), the relationship between self-control ability and rule-breaking behavior is non-significant for individuals with rule-breaking personal morality (ME: -0.35,

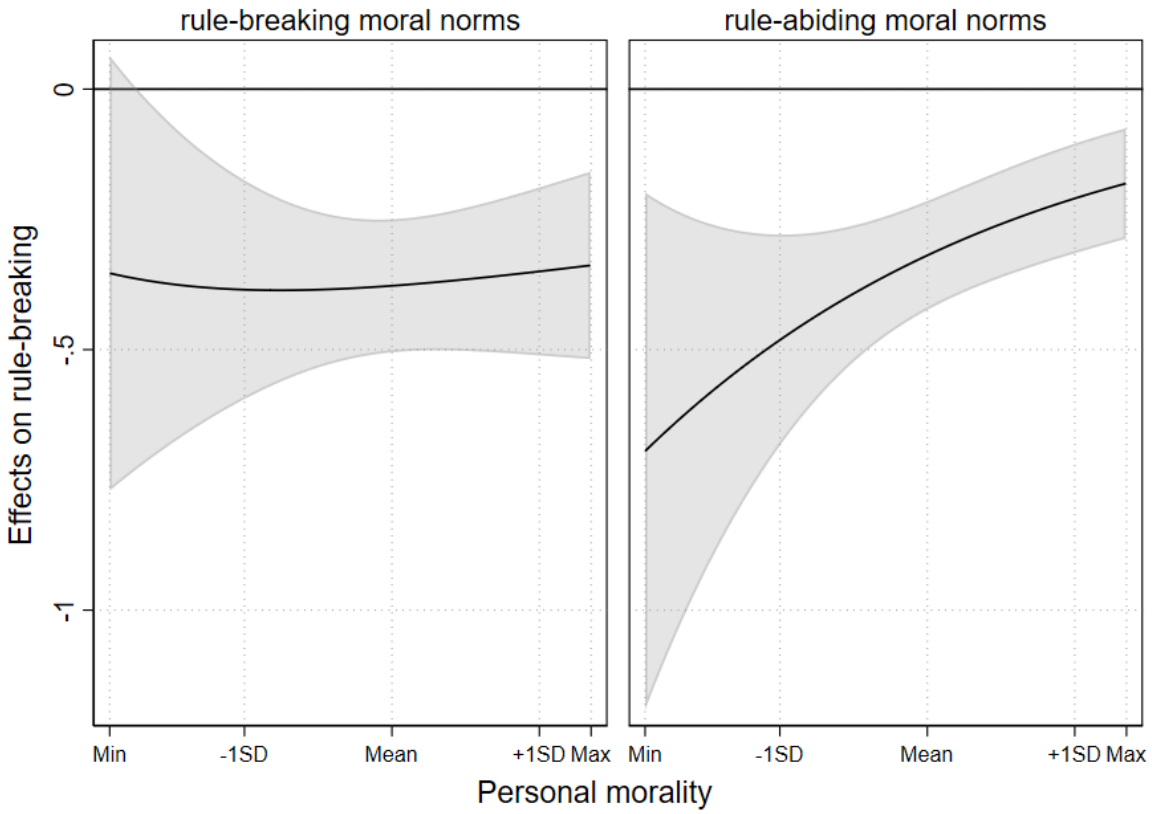
p=.097) and does not significantly differ from those with rule-abiding morality (ME: -0.34, p<.001; ΔME: 0.02, p=.948).

Table 4.4. Marginal effects (differences) of self-control ability depending on the level of personal morality and moral norms of the setting (based on negative binominal regressions models)

ME		Difference in ME		
Personal morality/ moral norms	ME	Rule-breaking/ rule-breaking	Rule-abiding/ rule-breaking	Rule-breaking/ rule-abiding
Rule-breaking/ rule-breaking	-0.35 (-1.660)			
Rule-abiding/ rule-breaking	-0.34*** (-3.679)	0.02 (0.065)		
Rule-breaking/ rule-abiding	-0.69** (-0.744)	-0.34 (1.032)	-0.36 (1.324)	
Rule-abiding/ rule-abiding	-0.18** (-3.344)	0.17 (0.786)	0.16 (1.476)	0.51* (1.986)

Notes: ME=Conditional marginal effect; *z*-values in parentheses; *p<.05, **p<.01, ***p<.001; Rule-breaking personal morality refers to the empirical minimum, while rule-abiding personal morality refers to empirical maximum, and rule-breaking and rule-abiding moral norms refer to the treatment conditions.

Figure 4.2. Marginal effect of self-control ability conditional on personal morality and moral norms of the setting (based on negative binominal regression)



Notes: Grey area indicates 95% confidence interval; SD=Standard deviation; Min=Minimum; Max=Maximum.

4.6 Discussion and conclusion

This study examined willingness to engage in rule-breaking behavior using a scenario in a large, nationally representative survey that experimentally manipulated the moral norms of the setting. By directly targeting descriptive and injunctive norms that aligned with the behavior in question, the experimental manipulation closely adhered to the theoretical framework of SAT, offering a robust empirical test of its propositions. In addition, the situational focus of the SCAS represents a promising alternative to previously used measures, capturing how an individual's self-control ability responds conditionally to situational moral expectations.

The findings demonstrate that self-control ability**,** personal morality**,** and rule-abiding moral norms each independently reduce rule-breaking intentions. Crucially, the interaction models support SAT's hypothesis regarding the conditional relevance of controls**.** Consistent with SAT and prior studies

(Ivert et al., 2018; Kroneberg & Schulz, 2018), the influence of self-control ability is significantly stronger among individuals with weaker personal morality, reinforcing SAT's emphasis on conditional relevance. This result contrasts with some prior studies using the LSCS (e.g, Choi & Yun, 2021), which reported an opposite pattern, potentially due to systematic measurement error or lack of cross-language measurement invariance in those studies.

Importantly, the mitigating effect of rule-abiding personal morality on the influence of self-control ability is particularly pronounced in settings characterized by rule-abiding moral norms. This finding aligns with SAT's conditional relevance of controls and the principle of moral correspondence, suggesting that self-control ability becomes irrelevant in situations without moral conflict. This underscores the situational nature of self-control ability's influence, reflecting SAT's emphasis on the interaction between individual propensity and environmental exposure.

In contrast, in rule-breaking settings, the association between self-control ability and rule-breaking does not differ significantly between individuals with low and high personal morality. This may reflect an absence of moral guidance, consistent with the concept of "subsidiary influence of self-control" (Hirtenlehner & Leitgöb, 2021). This interpretation suggests that the lack of a clear moral filter among individuals with rule-breaking personal morality in rule-breaking settings should lead to the strongest impact on self-control ability (cf. De Buck & Pauwels, 2022; Pauwels, 2018b; Schepers & Reinecke, 2018). However, the statistically non-significant effect observed in this condition suggests that when both personal and situational norms support rule-breaking, self-control may become largely irrelevant, rather than most relevant—a pattern that aligns with SAT's moral correspondence hypothesis.

The lack of a significant difference in the effect of self-control ability among individuals with rule-breaking versus rule-abiding personal morality in rule-breaking contexts may also be explained by the "double-edged sword" concept (Kroneberg & Schulz, 2018). For some individuals with strong rule-breaking morality, self-control ability may enable adherence to their own moral rules, favoring rule-breaking, and potentially increasing rule-breaking in some while decreasing it in others. This bidirectional effect could increase estimator uncertainty, inflate standard errors, and result in a statistically non-significant difference in the effect of self-control ability.

Overall, these findings directly address inconsistencies in prior studies by employing a more theoretically precise operationalization of moral norms and self-control ability. They highlight the importance of strong, theory-driven operationalizations of key concepts in investigations of SAT's conditional relevance of controls and emphasize the need for explicitly discussing operationalization strategies. Finally, this study reaffirms the value of SAT in explaining rule-breaking across diverse contexts.

4.6.1 Limitations and future research

While this study provides valuable insights into the conditional relevance of self-control ability and the role of moral norms in rule-breaking behavior, several limitations warrant consideration.

First, although the scenario-based approach effectively manipulated moral norms of the setting, it assessed only behavioral intentions, not actual behavior. As such, the findings may not fully capture the complexity of real-world rule-breaking. Future research could enhance external validity by employing behavioral experiments or field studies that observe actual rule-breaking while manipulating situational moral cues (cf. Hasselhorn et al., under review, [Chapter 5]). Similarly, longitudinal designs may be useful for examining how the influence of self-control ability and moral norms unfolds over time and for further validating the applicability of the SCAS.

Second, future studies should investigate how learned situational characteristics shape moral norms and how these learned expectations interact with immediate situational cues—potentially offering insights into habit formation. Experimental and longitudinal approaches could help clarify how individuals integrate past experiences with current perceptions of moral expectations. Additionally, further research should examine how different operationalizations of moral norms affect behavioral outcomes, thereby contributing to more refined and theoretically consistent measurement strategies within the SAT framework.

Specifically, future work could build on the proposed dimensions of moral norm operationalization—including mode of perception, type of norm (e.g., descriptive vs. injunctive), source of the norm, and norm specificity—to better understand how moral norms influence behavior in different contexts. Similarly, scholars should explore how individuals navigate conflicting moral expectations

from different sources, and how the social status or relational proximity of these sources (e.g., friend or acquaintance; cf. Brechwald & Prinstein, 2011) shapes decision-making.

The suggestion that situational characteristics—including deterrence—can be learned and cognitively stored, rather than immediately perceived, could also be extended. Future research may investigate how perceived deterrence, much like perceived moral norms, interacts with learned expectations and self-control ability, particularly in the domain of risk assessment.

Third, while this study sought to improve the operationalization of both moral norms of the setting and self-control ability, questions remain regarding whether existing measures of personal morality adequately reflect the theoretical concept of general value-based rules of conduct and capture their situational application into "circumstance specific rules of conduct" (Hardie & Rose, 2025; Wikström et al., 2024, p. 34f). Although the SCAS marks progress over previous instruments like the LSCS, future research should further investigate the process of exercising self-control, i.e., resolving conflicting goals, using situationally sensitive self-control measures (Hardie & Rose, 2025; Herrmann et al., 2025; Wikström et al., 2024).

Fourth, although this study found no clear evidence of the "double-edged sword" effect using the SCAS, future research could investigate this possibility in specific subpopulations with strong rule-breaking morality, such as individuals involved in terrorism or organized crime (Kroneberg and Schulz, 2018). Relatedly, studies could examine emerging forms of rule-breaking, such as non-adherence to public health regulations (e.g., COVID-19 restrictions), where personal moral rules may be less well-established.

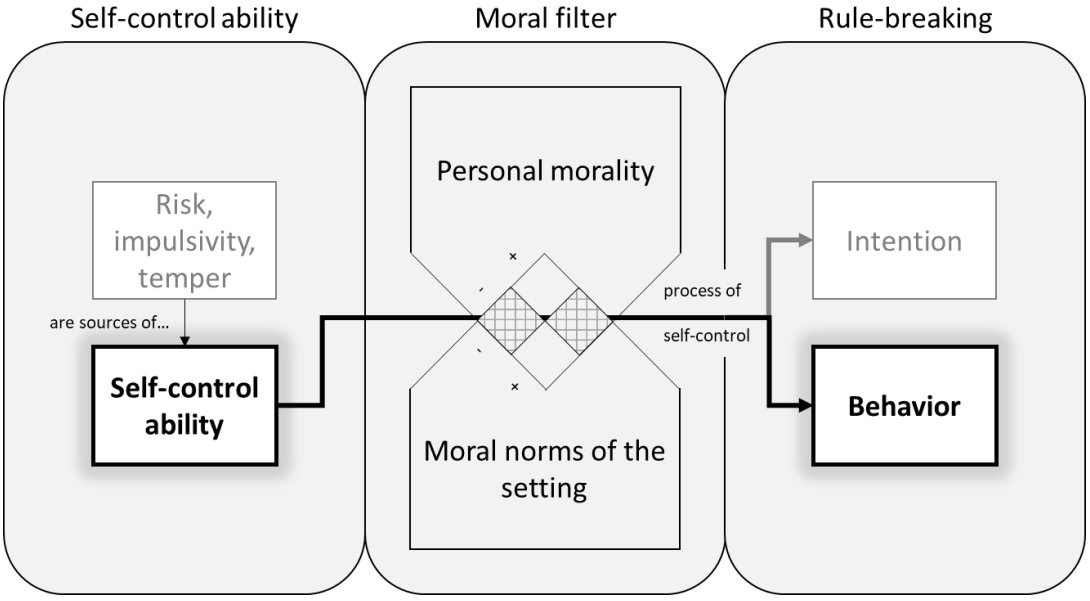
In conclusion, this study provides substantial support for SAT's model of conditional relevance by demonstrating that the influence of self-control ability on rule-breaking behavior is highly context-dependent. These findings underscore the importance of criminological models that integrate both individual propensities and situational characteristics to comprehensively capture the dynamics underlying rule-breaking behavior. Finally, the results underscore the importance of explicitly discussing the operationalization of theoretical models, as transparent measurement choices are essential for ensuring interpretability, theoretical consistency, and comparability across studies. Ultimately, his

line of inquiry contributes to the design of criminological interventions that take into account the interplay between individual characteristics and situational contexts.

Chapter 5

Towards the experimental study of behavior in testing Situational Action Theory: Deterrence, moral norms of the setting, and cheating

Figure 4.3. Theoretical framework of study 4



5 Towards the Experimental Study of Behavior in Testing Situational Action Theory: Deterrence, Moral Norms of the Setting, and Cheating

Abstract

Situational Action Theory (SAT) is a general theory of crime and rule-breaking that specifies the situational interplay of personal and setting characteristics. We provide the first experimental evaluation of key SAT hypotheses that focuses on actual behavior. To this end, we developed a cheating experiment that manipulates deterrence and the moral rules of the setting. In addition, we measured personal morality and self-control ability prior to the experiment. On this basis, we examine whether the impact of controls—self-control ability and deterrence—on rule-breaking depends on participants' morality and the moral rules of the setting. The pre-registered 2-by-2 between-subjects experiment was conducted with an adult sample (N=883). Participants were presented with an online music quiz and promised monetary incentives for each correct answer to highly specific questions, which were designed to be almost impossible to answer without the prohibited use of external resources. The number of correct answers serves as an indicator of the extent of cheating. Results suggest that a non-negligible proportion of participants engaged in varying degrees of cheating, while the majority did not cheat at all. Deterrence and conforming moral rules of the setting reduced cheating, and lower conforming personal morality was also associated with less cheating. Overall, there was limited support for the conditional relevance of controls. Our study pioneers a methodological approach that combines high internal validity with a spatio-temporal linkage of measures, including actual behavior. It provides a starting point for future studies that may improve this approach or use similar designs to devise more informative tests of SAT and other situational theories of crime and delinquency.

5.1 Introduction

To explain crime and delinquency, it is not enough to focus on individual or environmental factors in isolation. As the proximate causes of rule-breaking are situational, explanations need to center on the convergence of particular individuals in particular settings (Wikström & Kroneberg, 2022). This focus on person-environment interaction is at the heart of Situational Action Theory (SAT), which details the situational mechanisms that lead to rule-breaking (Wikström, 2019; Wikström et al., 2024).

According to SAT, acts of rule-breaking result from a perception-choice process initiated by an individual's response to a perceived motivator in the immediate situation, in which individuals first perceive and then choose among a set of action alternatives. SAT argues that the interplay between an individual's personal morality and the moral rules of the setting determines whether they perceive deviant and non-deviant action alternatives. When personal morality and the perceived moral rules of a setting both prescribe to follow a particular rule, the perceived action alternatives do not include breaking it. Further factors such as outer-to-inner controls (i.e., deterrence) and inner-to-outer controls (i.e., self-control ability) should be irrelevant under these conditions. When personal morality conflicts with the moral rules of the setting, that is, if there is no congruent rule-guidance on which behavior is acceptable, individuals perceive both deviant and non-deviant action alternatives. Only then does an individual's choice between perceived conforming and deviant action alternatives depend on controls, which has been termed the "principle of conditional relevance of controls."

SAT has inspired a large body of research aiming to evaluate core implications of the theory, such as the principle of the conditional relevance of controls. A number of studies found self-control (e.g., Ivert et al., 2018; Kroneberg & Schulz, 2018; Pauwels et al., 2018) and deterrence (e.g., Hirtenlehner & Hardie, 2016; Pauwels et al., 2018) to be particularly influential among individuals with deviant morality – which has been interpreted as support for SAT. However, unexpectedly, this influence was found to be especially strong in deviant settings (De Buck & Pauwels, 2022; Hirtenlehner & Leitgöb, 2021; Pauwels, 2018b; Schepers & Reinecke, 2018). In line with hypotheses derived from SAT, other studies indicate that self-control (e.g., Choi & Yun, 2021; Liu et al., 2022) and deterrence

(e.g., Liu et al., 2022; Piquero et al., 2016) may be most relevant for individuals with conforming morality, particularly in a deviant setting (Ernst & Gerth, 2023).

A general shortcoming of previous studies limits the conclusiveness of the accumulated evidence: so far, no study has offered a test based on *situational data* (i.e., person-environment convergence) that varies key variables *experimentally* and examines *actual behavior*. As stated in the most recent book on SAT, "situational hypotheses about the role of controls in crime causation should be tested with situational data, and preferably through experimental designs." (Wikström et al., 2024, p. 58). SAT is all about the convergence of person and immediate environment within a situation (Wikström, 2019, p. 261) and situational data are therefore most suitable for testing the theory (De Buck & Pauwels, 2022; Ernst & Gerth, 2023; Hardie & Rose, 2025). Lacking such data, most studies have used survey designs with questions about acts of crime in a specific time period and generalized circumstances across the same time period. Such designs cannot grasp the specific situation for each act of crime. They also have to rely on the assumption that acts of crime happen spatially and temporarily at the place and time that were assessed in the generalized measure (Wikström & Kroneberg, 2022). Thus, they cannot take into account that individuals' exposure to settings of varying criminogeneity differs drastically across time and place (Ernst & Gerth, 2023; Wikström et al., 2024). Studies using space-time budgets provide hourly situational data but only allow for retrospective measurement of certain situational characteristics (Groff, 2007; Wikström et al., 2018; Wikström & Treiber, 2016). Another limitation is their non-experimental nature. While space-time budgets offer greater external validity and capture the self-selection process, experimental designs are important complements for identifying causal effects of setting characteristics (Wikström & Kroneberg, 2022). Generally, experiments have been recommended "whenever they are feasible under given theoretical, practical, legal, political, and sometimes ethical circumstances" (Farrington et al., 2020, p. 665). However, experiments have rarely been used to test theories on criminal or deviant behavior, even though "there seems to be an increasing interest" (Dezember et al., 2021, p. 686).

A methodological approach that allows both the collection of situational data and the identification of the effects of experimental treatments are randomized hypothetical scenario studies (De

Buck & Pauwels, 2022; Pauwels, 2018b; Sattler et al., 2022). These studies define and randomly manipulate different features of the fictious settings that confront respondents with hypothetical choice situations. This way, scenario studies can examine the impact of various treatments on behavioral intentions. However, a well-known limitation of these studies is that they do not measure actual behavior, and that it remains uncertain how closely scenario-based intentions correspond to actual acts of rule-breaking (Alem et al., 2018; Petzold & Wolbring, 2019; Pogarsky, 2004). Another question is whether such designs allow capturing the real-world behavioral relevance of individual characteristics, such as personal morality or self-control ability (Hainmueller et al., 2015; Petzold & Wolbring, 2019). Furthermore, hypothetical scenarios may be experienced as artificial, meaning that participants might not be (emotionally) invested in the scenario and might not be able to imagine themselves in an actual situation. While recent research has made progress in reducing this problem through visual or virtual-reality scenarios (De Buck & Pauwels, 2022; Van Gelder et al., 2018), these designs still do not capture actual behavior in real settings. Given these methodological considerations, a strong case can be made for experimental designs that target actual behavior.

5.1.1 The current study

To advance the empirical testing of SAT, this study develops an experimental design that allows to evaluate key implications of the theory based on situational data on experimentally manipulated setting characteristics and actual behavior. The developed experiment removes important sources of confounding by randomly manipulating characteristics of the immediate setting. It allows observation of actual behavior rather than intentions, and it ensures spatio-temporal convergence of persons and their immediate environment. We build on previous experimental work by using an online music quiz task (cf. Hugh-Jones, 2016; Nagin & Pogarsky, 2003). To test for the conditional relevance of controls, we examine to what extent self-control ability and deterrence are differentially associated with cheating, depending on the interplay of personal morality and the moral rules of the setting. While we can only measures self-control ability and personal morality, our design experimentally manipulates the moral rules of the setting and deterrence. Our study thereby yields the first behavioral experimental test of SAT.

Three additional features of our study are worth mentioning: first, in testing SAT's prediction regarding the role of self-control ability, we use the new operationalization of this concept (Hasselhorn et al., 2024). This new scale is based on SAT's view of self-control ability as an individual's ability to adhere to their morality when externally challenged (Wikström et al., 2012, 2024; Wikström & Treiber, 2007). Although not the major focus of our study, we provide one of the first applications of this novel measure and show how it is associated with cheating and personal morality, compared to the modified Grasmick et al. scale commonly used in previous tests of SAT. Second, while many studies on crime and delinquency use youth or student samples, we use an adult sample. This allows us to test of SAT's implications at other stages of life, in which susceptibilities to situational incentives as well as levels of self-control and personal morality may differ (Pauwels et al., 2018; Sattler et al., 2022). Finally, our study uses pre-registration to avoid the bias of undocumented post-hoc analytical decisions or reformulation of hypotheses (Chin et al., 2023).

5.2 Theory

SAT aims to explain acts of rule-breaking, with crime being a special case in the rules being violated have been defined in law (Wikström et al., 2012). Whether or not an individual engages in rule-breaking is assumed to result from a perception-choice process. The process begins with a situational motivation, which can be either an opportunity to fulfill needs (temptation) or a response to unwanted external stimuli (provocation). The presence of such motivators is necessary, but not sufficient for rule-breaking (Wikström, 2019). The perception of action alternatives is governed by the so-called moral filter, which consists of the actor´s personal morality and the moral rules of the setting. The moral filter determines whether an actor perceives of rule-breaking as an action alternative. Personal morality refers to the internalization of moral rules, while the strength of these internalized rules is linked to the intensity of associated guilt and shame (Wikström et al., 2012). The moral rules of a setting reflect the perceived judgment of others regarding morally appropriate behavior in that particular circumstance. Essentially, they represent the standards of others concerning acceptable reactions and responses to certain motivators. The principle of moral correspondence, also known as the "moral filter hypothesis" (Wikström, 2010a), proposes that only conforming action alternatives are perceived if both personal

morality and the moral rules of the setting are conforming (Wikström & Treiber, 2007). Conversely, if both elements are deviant, only deviant courses of action are perceived as viable. In both scenarios, corresponding behaviors are enacted without further deliberation, rendering control mechanisms irrelevant in explaining rule-breaking behavior. The influence of strong personal moral rules on the perception of action alternatives is therefore expected to be particularly pronounced in conforming settings. However, when the elements of the moral filter diverge, both conforming and deviant actions are perceived as possibilities. Only in these situations do individuals deliberate about whether or not to break a rule and are influenced by internal (self-control ability) and external controls (deterrence).

In SAT, self-control ability refers to the capacity to resist external pressures that conflict with one's personal morality (Wikström, 2019)[9]. Consequently, individuals with high self-control ability are less likely to act on perceived opportunities for rule-breaking. Deterrence, on the other hand, is described as an "outer-to-inner" process whereby "(perceived) threats of sanctions in a setting makes a person withstand internal pressure to act against a moral norm (or a rule of law) due to her or his fear (or worry) about (immediate or future) negative consequences" (Wikström, 2019, p. 270). SAT argues that self-control ability is the primary control mechanism when individuals face external pressures to commit acts that conflict with their (conforming) moral beliefs. Conversely, deterrence becomes the primary control mechanism when individuals face situations that encourage actions conflicting with the prevailing moral rules.

5.2.1 Prior research on conditional relevance of controls

The principle of conditional relevance of controls in SAT posits that self-control ability and deterrence exert their influence on rule-breaking behavior only when personal moral rules and situational moral rules diverge (Wikström & Treiber, 2007). A large body of research has examined these interactions, often focusing on the conditional effect of self-control or deterrence on rule-breaking behavior contingent on personal morality. These studies have produced mixed findings. Some suggest that self-

9 Thereby, SAT departs from the conventional interpretation of self-control in the General Theory of Crime, which views self-control as resistance to short-term impulses (Hirschi & Gottfredson, 2000).

control (e.g., Ivert et al., 2018; Kroneberg & Schulz, 2018; Pauwels et al., 2018) or deterrence (e.g., Hirtenlehner & Hardie, 2016; Pauwels et al., 2018) is particularly influential for individuals with low conforming morality, while others find the opposite pattern for self-control (e.g., Choi & Yun, 2021; Liu et al., 2022) and deterrence (e.g., Liu et al., 2022; Piquero et al., 2016).

Most of these studies focus on individual-level data, examining how personal characteristics (e.g., morality, self-control ability, deterrence sensitivity) relate to rule-breaking. While this has yielded valuable insights, testing SAT's situational hypotheses require linking personal and contextual factors directly to specific actions in time and space (Hardie & Rose, 2025). According to SAT, the effects of self-control and deterrence should depend on the interaction of personal moral rules with the prevailing moral rules of the setting. For instance, self-control ability should be more important for individuals with conforming morality placed in a setting characterized by deviant moral rules, compared to a setting with conforming moral rules. Consequently, a rigorous test of SAT's predictions requires to capture variation in the moral rules of the setting.

Several studies have used exposure to deviant peers as a proxy indicator of the moral rules of the setting. For example, Schepers and Reinecke (2018) found that self-control was associated with students' crime versatility across all individuals and settings, but the effect was strongest for those who reported deviant morality and perceived their peers to be deviant. Deterrence, on the other hand, only influenced versatility for individuals with deviant morality with deviant peers. Hirtenlehner and Leitgöb (2021) examined vandalism and found that self-control influenced rule-breaking only for students with deviant personal morality in a deviant setting (operationalized by perceived peer morality and crime involvement). However, the non-situational proxy nature of perceived peer attributes (as indicators of the moral rules of the settings in which rule-breaking occurred) limits the conclusiveness of these results about *situational* influences.

Using network data to measure the characteristics of peers more directly, Ernst and Gerth (2023) found support for SAT's principle of conditional relevance. Self-control had the strongest influence on cheating in a setting where most students cheated, specifically for individuals with high conforming morality. The authors argued that, in the school setting, the cheating behavior of other students

constitutes the immediate situational context for a student's own cheating behavior. However, becoming aware of cheating by classmates could affect one's own behavior in two different ways: It could change the perceived moral rules of the setting and thereby affect the moral filter and the perception of action alternatives (perception stage). And it could change the perceived deterrence should students already deliberate over whether to cheat or not (choice stage). To be sure, this well-known methodological problem of testing general theories is not confined to SAT (see Kroneberg & Kalter, 2012, p. 77). Still, to rigorously test the conditional relevance of controls, it would be desirable to focus on (or experimentally design) situations in which deterrence and moral rules of the setting vary independently of each other.

As peer deviance, deterrence cues, and rule-breaking are often confounded or endogenous in observational data, factorial survey designs offer a valuable complement. These designs yield random variation in setting characteristics which yields high internal validity and allows for situational analyses (De Buck & Pauwels, 2022; Pauwels, 2018b). Using such designs, Pauwels (2018b) and De Buck and Pauwels (2022) found that self-control ability was associated with the willingness to engage in rule-breaking across individuals and settings. However, the effect was strongest for individuals with deviant morality in a deviant setting, manipulated by introducing a third person in the scenario. Moreover, De Buck and Pauwels (2022) reported that deterrence only reduced rule-breaking intentions for individuals with deviant morality in a deviant setting. These findings echo prior studies using standard survey measures (Hirtenlehner & Leitgöb, 2021; Schepers & Reinecke, 2018). However, the problem of a potential confounding between deterrence and moral rules of the setting applies here as well. The treatment condition involving a monitoring agent or third person exerting informal social control will likely affect both perceived deterrence and the perceived moral rules of the setting. Hence, it is difficult to draw conclusions about the conditional relevance of controls based on these research designs.

The current study attempts to develop a new testing ground for SAT that avoids these problems by experimentally manipulating deterrence and the moral rules of the setting and tracing their causal effects on actual behavior. This approach aims to bridge the gap between individual-level analyses and the situational-level interactions central to SAT, providing a more nuanced understanding of rule-

breaking behavior. To be sure, also for experiments, it remains a challenge to vary deterrence and the moral rules of the setting independently of each other. The reason is theoretical: individuals often perceive moral rules of the setting based on "observations of others rule-compliance" (Wikström, 2019, p. 269), but could use the same information also to infer a certain level of sanction risk and severity, i.e., deterrence (Diekmann et al., 2015; Hardie & Rose, 2025; Sattler et al., 2022). It is therefore rather unlikely that individuals in a setting will perceive conforming moral rules but low deterrence – or deviant moral rules but high deterrence. Still, experiments provide the best opportunities to design settings in such a way that one manipulates specific characteristics that fall exclusively under the domain of setting norms, absent any influence on perceived deterrence.

5.2.2 Hypotheses

The pre-registration of our experiment included a comprehensive set of hypotheses (https://aspredicted.org/9RK_GFJ). Here, we will mainly evaluate core hypotheses of SAT concerning the moral filter and the conditional relevance of self-control ability and deterrence.

Even though SAT does not focus on unconditional main effects, high self-control ability (*H1a*), a conforming personal morality (*H1b*), conforming moral rules of the setting (*H1c*), and high deterrence should reduce rule-breaking (*H1d*).

Deriving more specific hypotheses from SAT requires to introduce assumptions regarding the distribution of personal morality in our study population, as well as the strength of experimental manipulations. First, we expect a low prevalence of deviant personal morality in our sample (as it is not a particularly high-risk or offender sample). Second, we assume that the "honesty-discouraging" condition of our experiments does not create an "oppositional" setting in which rule-breaking is a normative imperative. Rather, it creates a setting in which rule-breaking can be more easily justified than in the "honesty-encouraging" condition (see subchapter "Manipulations" for more details). Those two assumptions imply that even in the "honesty-discouraging" condition, we will rarely observe habitual rule-breaking (see Kroneberg & Schulz, 2018).Third, we assume that the context of our

experiment – conducted by a university on an official platform – should generally resonate with conforming moral beliefs. Additional strongly "honesty-encouraging" moral rules of the setting are therefore often not necessary for individuals with strong conforming personal morality to behave honestly without perceiving of cheating as an action alternative.

Given these assumptions, the negative impact of self-control ability (*H2a*), deterrence (*H2b*), and conforming moral rules of the setting (*H2c*) on rule-breaking should be less relevant among individuals with strong conforming personal morality compared to those with weaker personal morality. Moreover, the negative impact of self-control ability (*H2d*) and deterrence (*H2e*) on rule-breaking should be less relevant in a setting with "honesty-encouraging" moral rules compared to an "honesty-discouraging" setting.[10]

The principle of the conditional relevance of controls implies that self-control ability and deterrence do not influence rule-breaking when personal morality corresponds with the moral rules of the setting. Thus, we hypothesize that "honesty-encouraging" moral rules of the setting strengthen the impact of conforming personal morality, making the effect of *self-control* ability weaker compared to "honesty-discouraging" moral rules of the setting (*H3a*). Similarly, we also expect that "honesty-encouraging" moral rules of the setting increase the impact of conforming personal morality to make *deterrence* less relevant as compared to "honesty-discouraging" moral rules of the setting (*H3b*).[11] However, based on our assumptions regarding the experimental manipulation, we expect that personal morality will still moderate the effect of controls in the "honesty-discouraging" setting.

10 Given the assumption about the experimental manipulation, we do not expect both moderation effects to be strong.

11 Our pre-registration also includes hypotheses that are not an integral part of SAT, but have been developed by other authors. For example, based on the idea of compensatory control (Hirtenlehner, 2020; Hirtenlehner & Leitgöb, 2024; Hirtenlehner & Meško, 2019; Sattler et al., 2022), we also pre-registered hypotheses regarding the interplay between deterrence and self-control ability conditional on personal morality and/or moral rules of the setting. However, as specified in the pre-registration, we mainly focus on the moral filter and the conditional relevance controls. Thus, these additional hypotheses (H2f, H3c, and H3d) and results are described in the supplementary materials (Table S4, Table S5, Table S6, Figure S1, and Figure S2).

5.3 Methods

5.3.1 Sample

Testing our hypotheses ultimately requires estimating three-way interactions. To achieve a large enough sample, we employed a web-based experiment, for which we recruited adult participants in Germany in September and October 2020 via Clickworker, a crowdsourced platform. An advantage of such samples compared to commonly used student samples is that they are more demographically diverse (Crone & Williams, 2017), while exhibiting similar experimental treatment effects (Briones & Benham, 2017; Lutz, 2016). Respondents were invited to participate in a study on knowledge, attitudes, and emotions. As an incentive, they received a base fee of €3 for participation, and were informed that they could earn up to €6 based on task performance.

The gross sample consisted of 1,005 individuals, of whom 965 (96.0%) consented to participate and 817 (81.3%) completed the entire questionnaire. Fourteen individuals were identified as "speeders" (with a completion time shorter than 2.5 times the overall median) and excluded from the analysis as pre-registered. The final analysis, without missing values on any relevant variable, consisted of 883 participants[12] (43.3% identified as female, 56.7% as male, and 0.02% as diverse; mean age: 32.70 years (SD=10.12).

5.3.2 Experimental procedure

First, participants completed a questionnaire that included measures of self-control ability and personal morality (for details, see below). Next, a series of filler questions, including self-rated music knowledge, unrelated to the study's core objectives, were used to mitigate potential demand effects and to obscure the experiment's true purpose (Zizzo, 2010). A short description of the crowdsourcing platform was followed by an introduction of a music-related quiz and the quiz itself.

12 The pre-registration aimed for a target sample size of 800 participants. However, due to the nature of crowdsourced recruitment, multiple participants may initiate the survey concurrently, increasing the final sample size beyond our initial target.

The purpose of this quiz was to provide participants with a motivation and an opportunity to cheat and to yield a measure of cheating. Participants were presented with ten open-ended questions on music. These were chosen to be so extremely specific that the answers were almost impossible to know but readily searchable online.[13] During the introduction of the music quiz, participants were explicitly told that it was prohibited to use external resources (e.g., search engines) to answer the questions. In addition, they were required to confirm their understanding of this instruction by typing "I have read the information about the quiz" before proceeding.

This set-up gave participants the opportunity to cheat since the quiz was conducted online and participants could not be monitored. Hence, in violation of the stated rule, external resources could potentially be used to answer the quiz. To provide a situational motivation for rule-breaking, participants were offered a monetary reward of €0.50 for each correctly answered question.[14] The number of correctly answered questions serves as an indicator of cheating and constitutes our dependent variable. The underlying assumption is that a correct answer to these extremely challenging quiz questions is very likely to come about through the prohibited use of external resources, thereby constituting a violation of the experimental rules. To guard against violations of this assumption, we conducted a robustness analysis that considered up to two correct answers in the quiz task as non-cheating responses.

By using open-ended questions, the likelihood of obtaining a correct answer by chance was eliminated. This is a key advantage over traditional methodologies that rely on multiple-choice questions with randomly distributed correct answers (Nagin & Pogarsky, 2003). Furthermore, our approach yields

13 To ensure the online searchability of these questions and thus to reduce time costs for cheating, two student assistants tested the questions by entering whole or partial phrases into the search engine Google.com. A question was included if its answer appeared in a "featured snippet," in the link text or in the meta-description (the brief summary of a web page displayed below the link), and when there was no need to visit another website. The questions are provided in Table S7. To not de-motivate participants with only difficult-to-answer questions, we included two simple questions which did not count as cheating if answered correctly but for which incentives could be received.

14 This incentive was intended to serve as a compelling motivator, particularly because comparable tasks on this platform offer compensation of around €0.15 per minute at the time of the survey, which makes the higher reward likely to heighten the temptation to cheat. Moreover, the maximum amount was twice as much as the base fee. All participants who completed the survey were compensated.

a count variable (i.e., the number of correctly answered questions) that allows us to capture the extent of cheating.

5.3.3 Manipulations

The experiment employed a 2x2 between-subjects design to manipulate deterrence (low vs. high) and the moral rules of the setting (honesty-discouraging vs. honesty-encouraging). Participants were randomly assigned to one of the four resulting conditions.

Moral rules of the setting were manipulated prior to the music quiz. Participants were instructed to read an experimentally varied description of the crowdsourcing platform. In the honesty-encouraging condition, the crowdsourcing platform was portrayed as an honorable community emphasizing honesty and fairness. Conversely, the honesty-discouraging condition depicted the crowdsourcing platform as being operated by "capitalist exploiters" who prioritize profit over workers' rights (see Table S8 for details). This manipulation aimed to prime participants with a sense that rule-breaking might be acceptable or even morally legitimate. We were aware that this manipulation was unlikely to induce a high prevalence of habitual cheating, especially as the experiment did not constitute a familiar circumstance and as strong moral habits prescribing cheating are presumably rare. Rather, the purpose of this treatment was to create a noticeable contrast between the two settings in terms of the perceived importance of rule conformity. To ensure participants read this description, they were required to type its last sentence into a separate text box before proceeding (in the honesty-encouraging condition: "By joining the community, Clickworkers accept the 'Crowdworker Code of Conduct' and are committed to upholding the principles of reliability, honesty and fairness." and in the honesty-discouraging condition: "The 'Clickworkers' do not receive minimum wage and sick pay, nor do they have protection against dismissal"). A pretest with 82 different participants from the same platform revealed that the perceived importance of honest responding was lower in the honesty-discouraging condition (M=5.51, SD=0.19, N=41) compared to the honesty-encouraging condition (M=4.78, SD=0.28, N=41, $t(80)$=2.12, p=.04).[15]

15 The question posed was "How important is it to other Clickworkers that everyone completes the tasks honestly?" with response categories ranging from "not at all important" [1] to "very important" [7].

When participants were informed that using external resources (e.g., search engines) in the music quiz was prohibited, an additional statement was included in the high deterrence condition: "A software program will analyze patterns in answers and response times based on specific algorithms and statistical models." This statement was absent in the low deterrence condition. The goal of the statement was to create a higher perceived detection risk in the high deterrence condition. To ensure participants recognized the deterrence statement, they were required in both conditions to confirm they had read the information by typing a pre-defined sentence into a text box: "I have read the information about the quiz" (low deterrence condition) or "I have read the information about the quiz (and the use of software)" (high deterrence condition). In a second independent pretest, 107 different participants of the same platform indicated a higher perceived detection risk in the high deterrence condition (M=4.98, SD=0.25, N=55) compared to the low deterrence condition (M=4.23, SD=0.25, N=52, t(105)=-2.15, p=.03).[16]

5.3.4 Measures

Personal morality: Personal morality was assessed with four items capturing the perceived guilt regarding four acts of rule-breaking relevant to the online or crowdsourcing context such as "Not always being completely honest when working on assignments on crowdsourcing platforms." (Table S9 lists all items and results of an exploratory factor analysis). Response options ranged from "not guilty at all" [1] to "very guilty" [7], with higher scores indicating higher levels of conforming personal morality (cf. Hirtenlehner & Hardie, 2016). The internal scale consistency was acceptable (Cronbach's α=.74). A mean score was constructed with values ranging between zero and one (M=0.78, SD=0.16).[17]

Self-control ability: The ability to exercise self-control was measured with the subdimension "temptation" of the self-control ability scale (SCAS; Hasselhorn et al., 2024). This subdimension was chosen because the experiment presented an opportunity to gain a monetary reward (to fulfill a desire; Table S10 lists all items and results of an exploratory factor analysis). Response options ranged from "doesn't apply at all" [1] to "applies completely" [7], with higher scores indicating higher levels of self-

16 The question posed was "Do you think you would be caught using an assistive device?" with response categories ranging from "No, definitely not" [1] to "Yes, definitely" [7].

17 Stata's rowmean function was used across multi-item measures when averages were calculated.

control ability. The internal scale consistency was good (Cronbach's α=.89). A mean score was constructed with values ranging between zero and one (M=0.70, SD=0.18). We replicated all results using the commonly used PADS+ self-control measure as part of our robustness checks (Wikström et al., 2012).

5.3.5 Analytic strategy

As pre-registered, we employed a series of multiple linear regressions models to examine the hypothesized main and conditional effects. This approach offers several advantages over alternative methods. Linear regression models provide a more reliable and less biased estimate of interaction effects compared to non-linear models (Ai & Norton, 2000; Mood, 2010). Although linear regression models carry the risk of ceiling or floor effects in variable-specific interactions (Kammigan, 2022; Rohrer & Arslan, 2021), this risk is less problematic for our main hypotheses (*H3a* and *H3b*), given the specific pattern of interactions implied by the conditional relevance of controls.

First, we estimate the main effects of all independent variables (self-control ability, deterrence level, personal morality, and moral rules of the setting) on the number of correctly answered questions, i.e., our measure of cheating. Second, all possible two-way interaction effects between the independent variables are estimated. Third, to investigate the conditional effects of self-control and deterrence, we add a three-way interaction term involving self-control, personal morality, and moral rules of the setting, as well as a three-way interaction term involving deterrence, personal morality, and moral rules of the setting.

In addition to the regression models, we report and visually depict marginal effects for each focal variable across the observed range of the moderator variables (Williams, 2012). This visualization highlights the range, strength, and accuracy of interaction effects by examining the conditional impact of a focal variable (e.g., deterrence) on the dependent variable across different levels of the moderator variables (e.g., personal morality and moral rules of the setting). This comprehensive approach provides a deeper understanding of the hypothesized conditional effects and allows better assessment of the interaction, even when interaction coefficients are not statistically significant (Rohrer & Arslan, 2021).

To ensure the robustness of our findings, we conduct several pre-registered supplementary analyses. These analyses include: (a) incorporating participants identified as "speeders"; (b) considering up to two correct answers in the quiz task as non-cheating responses; (c) substituting the SCAS measure with the frequently used PADS+ self-control measure (Wikström et al., 2012);[18] (d) including self-reported music knowledge as a covariate;[19] and (e) excluding participants with deviant personal morality scores (i.e., scores below .50), since our derivation of hypotheses disregards the patterns that may result for this extremely small group.

In addition to the pre-registered analyses, we provide the reader with information on how the novel SCAS self-control ability measure correlates with cheating, PADS+ self-control, and personal morality.

5.4 Results

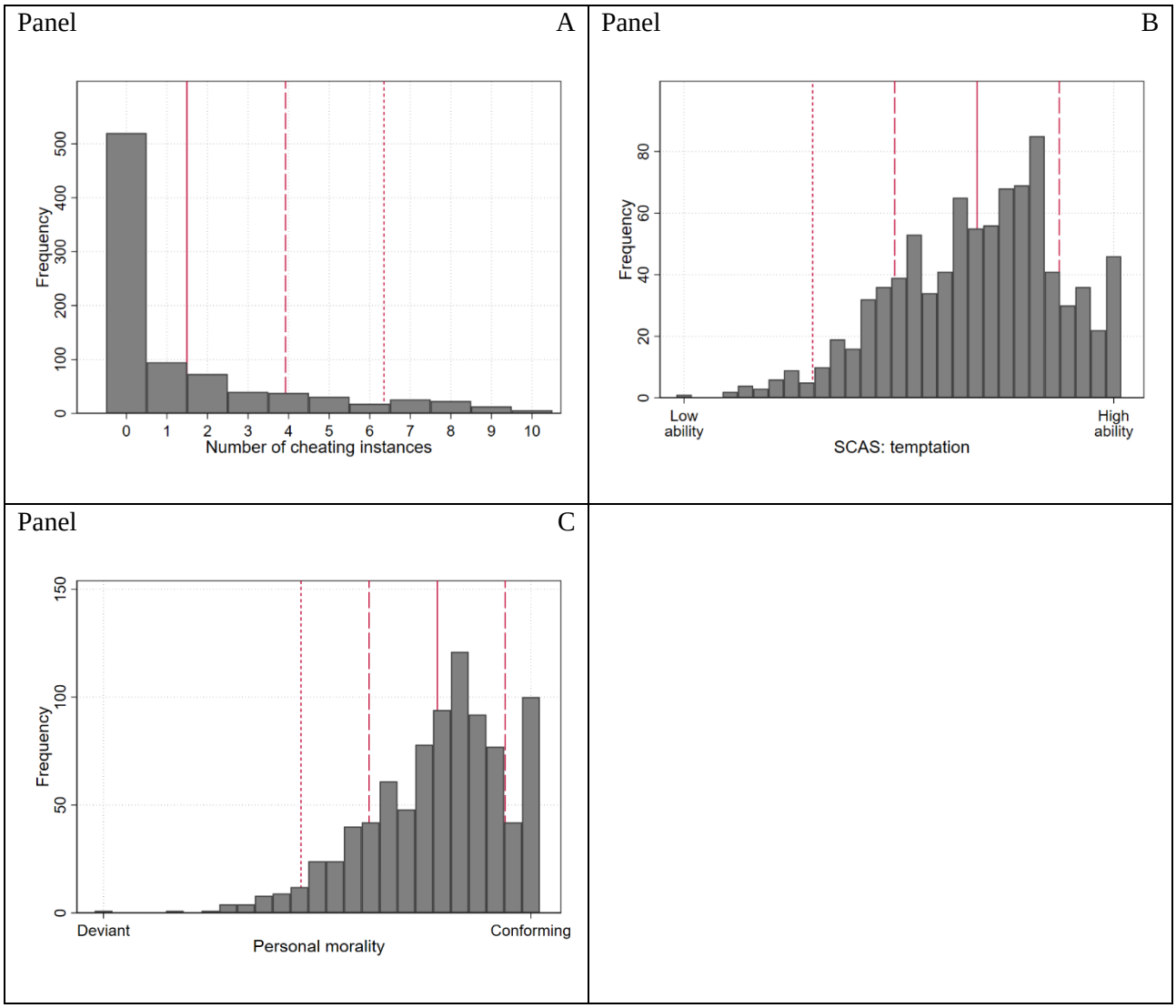
5.4.1 Descriptives

Panel A in Figure 5.1 shows that the number of cheating instances (indicated by the average number of correctly answered questions) is relatively low (M=1.49, SD=2.43). A majority (58.9%) of participants did not cheat at all. Still, a non-negligible proportion of participants engaged in varying degrees of cheating, with very few participants who cheated 9 to 10 times. Self-control ability is approximately normally distributed (Panel B), while personal morality is positively skewed (Panel C); thus, a larger proportion of participants reported higher levels of personal morality (see Table S11 for descriptives of all three variables).

18 The PADS+ measure of self-control consists of eight items, such as "I often act on the spur of the moment without stopping to think". The response options ranged from "strongly disagree" [1] to "strongly agree" [7]. All items were averaged, with higher scores indicating higher levels of self-control.

19 Self-reported music knowledge was assessed with the question "How would you rate your knowledge of music in general?". Response options ranged from "extremely low" (1) to "extremely high" (10), with higher scores indicating a more self-reported knowledge.

Figure 5.1. The distribution of cheating instances[1] (Panel A), self-control ability (Panel B), and personal morality (Panel C; *N*=883)



Notes: 1 Indicated by the number of correctly answered questions. 2 The continuous line represents the mean and dashed lines represent +1 standard deviation (SD) and -1 SD, whereby dotted lines represent -2 SD and +2 SD (not displayed if outside the range).

5.4.2 Associations between self-control measures, morality, and cheating

The SCAS correlates positively with personal morality (r=0.48, p<.001, see Table S12) and with the PADS+ self-control measure (r=0.27, p<.001), while the latter is also positively associated with personal morality (r=0.26, p<.001). Cheating is negatively correlated with the SCAS (r=-0.08, p<.005), the PADS+ self-control measure (r=-0.09, p<.01), and personal morality (r=-0.14, p<.01). However, when controlling for personal morality, the partial correlation between cheating and SCAS (r(880)=-.02, p=.524) and between cheating and PADS+ self-control (r(880)=-.06, p=.071) ceases to be

statistically significant.

Table 5.1. Linear regressions models on cheating (*N*=883).

	Model 1	Model 2	Model 3	Model 4
High deterrence	-0.75***	-0.45	-0.49	-0.36
	(0.000)	(0.607)	(0.577)	(0.764)
Honesty-discouraging moral rules	0.38*	0.03	-1.66	0.11
	(0.019)	(0.969)	(0.508)	(0.921)
Self-control ability scale (SCAS)	-0.25	-4.85*	-6.28*	-4.84*
	(0.625)	(0.024)	(0.032)	(0.024)
Personal morality	-1.88**	-4.46*	-5.53*	-4.40*
	(0.001)	(0.011)	(0.016)	(0.015)
High deterrence×honesty-discouraging moral rules		0.03	0.03	-0.14
		(0.920)	(0.933)	(0.930)
High deterrence×SCAS		-0.55	-0.49	-0.55
		(0.592)	(0.631)	(0.593)
High deterrence×personal morality		0.09	0.10	-0.02
		(0.935)	(0.933)	(0.989)
Honesty-discouraging moral rules×SCAS		1.91	4.68	1.91
		(0.062)	(0.240)	(0.062)
Honesty-discouraging moral rules×personal morality		-1.30	0.92	-1.40
		(0.256)	(0.779)	(0.333)
SCAS×personal morality		5.03*	6.77	5.02*
		(0.041)	(0.050)	(0.041)
SCAS×honesty-discouraging moral rules×personal morality			-3.53	
			(0.472)	
High deterrence×honesty-discouraging moral rules×personal morality				0.22
				(0.913)

Notes: *p<.05, **p<.01, ***p<.001.

5.4.3 Multivariate analysis

Model 1 in Table 5.1 shows that, unexpectedly, self-control ability was not significantly associated with cheating behavior (p=.625; not supporting *H1a*). As expected, higher levels of personal morality were associated with less cheating (p=.001; supporting *H1b*). Individuals scoring highest on morality cheated on average on 1.88 fewer questions compared to those with the lowest score. Turning to the experimental treatments, deterrence as well as the moral rules of the setting had statistically significant effects of the expected direction (supporting *H1c* and *H1d*). Specifically, participants in the high deterrence condition cheated on an average of 0.75 fewer questions than those in the low deterrence condition (p=.019). Participants in the honesty-discouraging condition cheated on 0.38 more questions than those in the honesty-encouraging setting (p<.001). While these average differences are not large, they are still substantial, especially given the skewness of the dependent variable (i.e., that most participants never cheated).

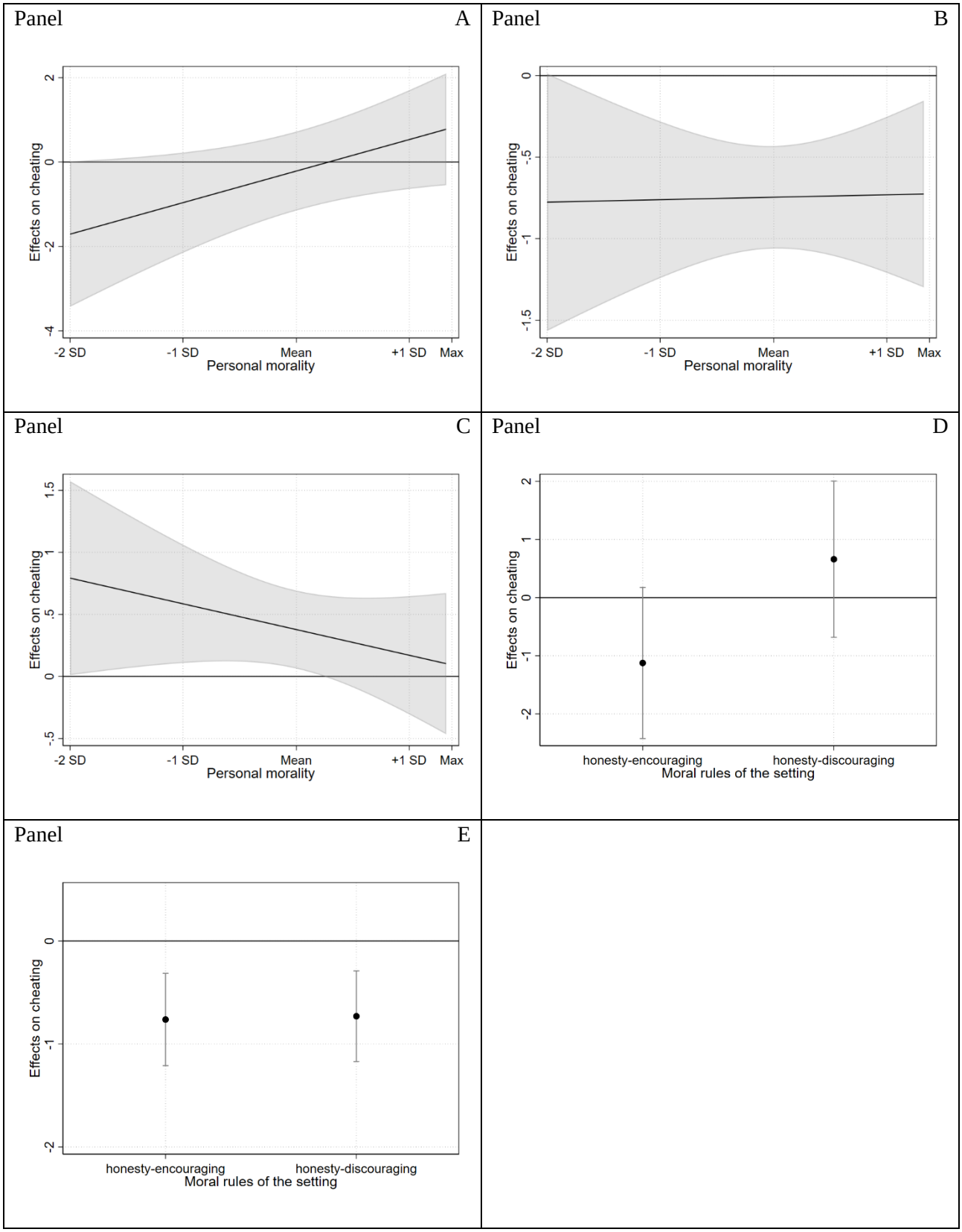
Model 2 incorporates all possible two-way interactions, and Figure 5.2 depicts the corresponding marginal effects plots to examine the conditional effects of the moral rules of the setting, self-control, and deterrence. Although most interaction terms are not statistically significant (failing to support *H2b*-*H2e*), the plots reveal that the association between most variables and cheating is statistically significant within a specific range of the moderator variables (personal morality, self-control ability, and moral rules of the setting). The interaction between self-control ability and personal morality is statistically significant (p=.041), suggesting that the association between self-control ability and cheating weakens as personal morality increases, supporting *H2a*. Panel A shows, however, that a significant association between self-control ability and cheating is only observed for individuals with very low personal morality (scores below 0.44). Notably, the negative effect of deterrence appears consistent across both high and low personal morality – with the width of the confidence intervals mirroring the distribution of the continuous variable (Panel B) and in both honesty-encouraging and honesty-discouraging moral rules of the setting (Panel E). The effect of moral rules on cheating is smaller and statistically non-significant for both very high and very low personal morality (Panel C) but statistically significant and positive for individuals with low to moderate levels of personal morality

(between the personal morality scores of .46 and .82). Self-control ability is not statistically significantly related to cheating for either honesty-encouraging or honesty-discouraging moral rules of the setting (Panel D).

Models 3 and 4 provide the basis to assess the conditional relevance of controls, that is, whether the associations of self-control ability and deterrence with cheating vary depending on the interplay between personal morality and moral rules. The results do not support *H3a* and *H3b*, as neither model yields a statistically significant three-way interaction. However, further examinations of the marginal effects plot for self-control ability (Panel A in Figure 5.3) reveal a more nuanced pattern. In the honesty-discouraging moral rules condition, self-control is not significantly associated with cheating across the entire range of personal morality. However, in the honesty-encouraging moral rules condition, higher personal morality weakens the negative association between self-control and cheating. This pattern is in line with *H3a*. To illustrate, given honesty-encouraging moral rules, self-control ability is statistically significantly associated with a reduction in the number of cheating instances by 3.17 questions (p=.012) among participants with a personal morality score two standard deviations below the mean – while for those with maximum personal morality scores, self-control ability is not statistically significantly associated with cheating (ME: 0.23, p=.802, difference in ME is 3.40, p=.030; Table S13).

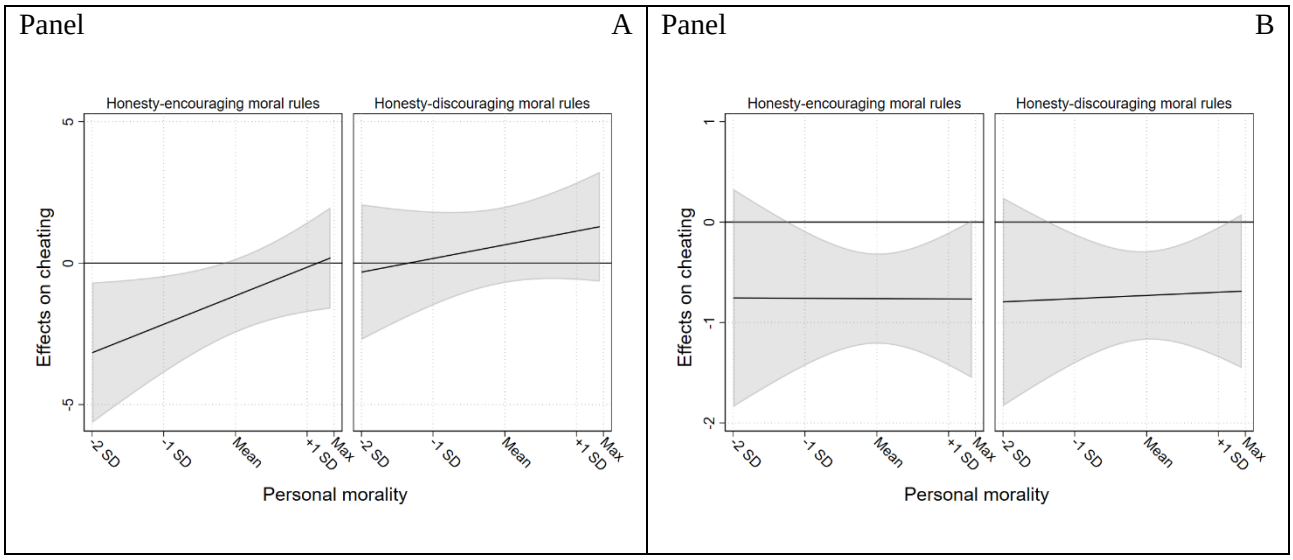
Panel B in Figure 5.3 shows that, in contradiction to *H3b*, the negative effect of deterrence seems to not vary depending on the moral rule conditions and across different levels of personal morality. It is, however, statistically significant for commonly occurring values of personal morality around the mean (between the personal morality scores of .59 and .98 in a honesty-encouraging and .57 and .96 in a honesty-discouraging setting).

Figure 5.2. Marginal effects of self-control ability (Panel A), deterrence (Panel B), and moral rules of the setting (Panel C) depending on personal morality and of self-control ability (Panel D) and deterrence (Panel E) depending moral rules of the setting on cheating (based on Model 2 in Table 5.1, *N*=883)



Notes: SD=Standard deviation; Max=Maximum.

Figure 5.3. Marginal effects of self-control ability (Panel A) and deterrence (B) depending on both personal morality and moral rules of the setting on cheating (based on Model 3-4 in Table 5.1; *N*=883)



Notes: SD=Standard deviation; Max=Maximum.

5.4.4 Robustness analyses

Our robustness analyses largely confirm the stability of our results, with some variations. The interaction effect between self-control ability and personal morality was not statistically significant (p=.100) when including speeders (N=897, Table S14) or when excluding individuals with deviant personal morality (p=.188, N=876, Table S15). However, when using the PADS+ self-control measure, the interaction between self-control ability and personal morality was more pronounced. Specifically, a statistically significant association was found between self-control and cheating for personal morality scores below .77 and remained consistent across both moral rules of the setting (Table S16). When considering up to two correct answers as non-cheating, the main effect of the moral rules of the setting was not statistically significant (p=.071), possibly due to the reduced variance in the dependent variable (Table S17). Finally, self-reported music knowledge had a statistically significant positive association (p<.001) with our measure of cheating when included as a covariate (Table S18). One interpretation is that individuals who reported greater music knowledge were more willing to cheat to maintain their proclaimed status. In any case, the other main effects stay the same.

5.5 Discussion and conclusion

Our study provides the first test of SAT that is situational, experimental, and focuses on actual behavior. Specifically, we examined the principle of the conditional relevance of internal and external controls in a cheating experiment in which we randomly manipulated deterrence and the moral rules of the setting. This methodological approach complements existing studies by combining high internal validity with a spatio-temporal linkage of persons, settings, and behavior. Additionally, we used a newly validated SCAS that offers a more direct operationalization of self-control ability as conceptualized in SAT.

In our pre-registered study, we implemented a 2x2 between-subjects design in the context of an online music quiz. Participants were incentivized with monetary rewards for each correct answer to ten highly specific, open-ended music questions designed to be nearly impossible to answer without using prohibited external resources, which provides a clear opportunity for cheating. The moral rules of the setting were manipulated through descriptions of the recruitment platform's work cultures, while deterrence was varied by informing participants about the presence or absence of a software program designed to detect cheating. Consistent with most survey and scenario studies (Ernst & Gerth, 2023; Hugh-Jones, 2016; Kroneberg & Schulz, 2018; Pauwels et al., 2018; Sattler et al., 2022), we observed that the majority of participants did not cheat at all, while two in five participants cheated at least once.

As expected, cheating was less frequent under the high deterrence condition, in the honesty-encouraging condition (i.e., situations emphasizing honesty and fairness), and among participants with conforming personal morality. Self-control ability, measured through the SCAS and PADS+ scales, was associated with reduced cheating only in the bivariate analysis. In line with previous studies and SAT's principle of the conditional relevance of controls (Ernst & Gerth, 2023), we found that the negative association between self-control ability (also when using the PADS+ self-control measure) and cheating was weakened by conforming personal morality. Moreover, when also accounting for different moral rules of the setting, this pattern was only consistent in an honesty-encouraging setting. This finding supports the moral filter hypothesis, which argues that controls are irrelevant when individuals with conforming personal morality face conforming moral rules of the setting.

Other results do not support SAT's principle of the conditional relevance of controls. First, in the honesty-discouraging setting, no association between self-control ability and rule-breaking was observed regardless of the level of personal morality. This result deviates from those gained in previous survey-based (Hirtenlehner & Leitgöb, 2021; Schepers & Reinecke, 2018) and scenario-based studies (De Buck & Pauwels, 2022; Pauwels, 2018b). Second, the observed negative effect of deterrence was independent of the moral filter. Therefore, participants appeared generally deterred from rule-breaking due to a perceived higher sanction risk. We did not find this effect to be absent among individuals with conforming personal morality, in honesty-encouraging settings, or when these factors were combined. This finding is difficult to reconcile with SAT's principle of conditional relevance (cf. Gallupe & Baron, 2014) and aligns more with traditional theories of deterrence (Nagin, 2018; Pratt et al., 2017).

We would like to emphasize that our study just marks the starting point of a research line that uses experiments on actual behavior to evaluate SAT. There are several important methodological lessons to be drawn from our study. To point out how future research may improve on our design, we discuss a number of issues. First, as discussed above, a major challenge is to implement deviant moral rules of the setting. Our treatment that described the context of the crowdworker online platform as a form of "capitalist exploitation" may have been perceived as rule-ambivalent rather than genuinely rule-breaking by at least some participants. It was therefore not possible to test the principle of moral correspondence for individuals with deviant personal morality. Moreover, as ambivalence does not yield clear rule-guidance (De Buck & Pauwels, 2022), it may have resulted in rule-guidance for some participants but not for others, as indicated by its limited main effect and moderating effect on self-control ability.

A second major challenge was to manipulate the deterrent qualities and the moral rules of the setting independently of each other (Kroneberg & Kalter, 2012; Sattler et al., 2022). We purposefully did not adopt the common approach to communicate information on "descriptive norms," i.e., the rule-abiding or rule-breaking behavior of others in the same situation (Diekmann et al., 2015). Such treatments confound deterrence and setting rules because a high prevalence of rule-breaking signals both ineffective deterrence and deviant moral rules of the setting. In contrast, we took care to manipulate both

setting characteristics in a conceptually distinct way: the description of the crowdworker platform was used for the moral setting treatment, while the alleged use of a software program for detecting cheating was used as the deterrence treatment. Still, our design cannot completely rule out the possibility of some extent of confounding. For example, for some individuals, the deterrent message we were testing for cheating may reinforce the perceived moral rules of honesty. To the extent that this is the case, the deterrence treatment could already influence the moral filter – making it harder to demonstrate the conditional relevance of external controls. One possible solution would be a sequential (within-subject) design, where weak conforming moral rules are established first and then deterrence is increased. Such an approach would allow for a more apparent distinction between the independent effects of moral rules and deterrence while accounting for their potential interplay.

A third challenge is to devise treatments that are not too strong in the sense of producing total conformity (or the opposite) but still strong enough to allow meaningful tests of interaction effects. As the statistical literature has shown, when (main) effects are small, it is difficult to find interaction effects, assuming they exist (Aguinis et al., 2005). This is especially true with respect to SAT because it predicts a pattern where control effects are attenuated and suppressed under certain conditions (rather than reversed). Our experimental treatments shifted the number of cheating instances by 0.75 (deterrence) and 0.38 (moral rules of the setting), which is substantial (given that most participants never cheated), but not large. We encourage future replications and modifications of our experiment to see whether stronger treatment effects yield different results.

A fourth challenge pertains to the difficult-to-observe elements of the perception-choice process. One such element is motivation. In designing our experiment, we aimed to provide participants with the opportunity and the motivation to cheat. However, the monetary incentive provided was relatively small and one could question whether participants were sufficiently motivated to cheat. We assume that the motivation to cheat was strong enough, especially as participants registered on platforms like Clickworker are often motivated also by monetary rewards and therefore care for an adequate return on their time. Still, future studies may replicate our experiment while increasing the stake size. Another element that was unobservable in our study is the perception of action alternatives. Like most other

studies on SAT, we could only capture determinants of the moral filter and not its outcome. As a step forward, recent attempts to measure perceived action alternatives more directly could be used also in the context of our and similar experimental designs (Herrmann et al., 2025; Kroneberg & Nägel, 2024).

Beyond these challenges, some further limitations of our study should be acknowledged. First, while experiments offer high internal validity, caution should be exercised in generalizing findings beyond the specific experimental context. Among other things, our study focused on cheating behavior, which might be considered less severe compared to other forms of rule-breaking. However, it is important to note that many forms of minor rule violations and crimes exist. Still, we hope to inspire studies building on our design, and we also invite future research to devise experimental tests of SAT focusing on other offences and using other experimental paradigms (e.g., the Taylor Aggression Paradigm; Taylor, 1967).

Second, our experimental design manipulated only setting characteristics and did not include direct manipulations of personal morality or self-control. This restricts our ability to draw causal inferences about these individual characteristics, which are notoriously difficult to manipulate. One possible avenue could be to manipulate cognitive load (e.g., via digit span tasks; Sternberg, 1966) or heat-stress (Martin et al., 2019), which could temporarily reduce the accessibility of executive functions relevant to exercising self-control ability (Wikström & Treiber, 2007).

Finally, our study used a convenience sample of crowdworkers. While crowdworker samples are more demographically diverse compared to student samples (Briones & Benham, 2017), they are less diverse than nationally representative samples and tend to be highly educated (Hargittai & Shaw, 2020; Jensen-Doss et al., 2022). Despite these demographic differences, crowdworker samples have been shown to provide similar treatment effects (Clifford et al., 2015; Lutz, 2016; Mullinix et al., 2015; Weinberg et al., 2014). Moreover, according to SAT, the sociodemographic characteristics of crowdworkers should not interact with the more proximate causes of rule-breaking, such as self-control ability and personal morality, leading us to expect similar patterns of responses to the experimental manipulations (Horne & Rauhut, 2013).

To conclude, our study developed a new approach to provide situational tests of SAT with high internal validity and a focus on actual behavior. While we showed that deterrence, deviant moral rules, and personal morality lowered cheating, our findings provided limited support for the specific conditional relationships predicted by SAT. However, as emphasized by Lieberson and Horwich (2008, p. 2), "it is almost certain that no single study will validate or invalidate a theory." Rather, future studies should build on and improve our or similar designs to devise even more informative tests of SAT. Our study serves to lay the ground and may motivate such attempts. It also allows for the identification of important methodological challenges that future experimental work needs to address. In any case, demonstrating that pre-registered and pre-validated experimental manipulations have the hypothesized effects on actual behavior remains an important building block of a strong evidence base supporting any situational theory of crime.

Chapter 6

Overall Discussion

6 Overall Discussion

Social science research on self-control (ability) suffers from the jingle problem—when multiple theoretical concepts share the same label. Reducing this problem requires a clear conceptualization of the theoretical concept being studied, coupled with a valid operationalization (Hanfstingl et al., 2024; Marsh et al., 2019). This dissertation addresses this issue by adopting SAT's perspective, which clearly defines self-control (ability), and aims to address two challenges: (1) to address the operationalization of self-control within the SAT framework by developing an appropriate measure, and (2) to investigate SAT's empirical predictions about how self-control ability influences rule-breaking behavior using methods with high internal validity.

The theoretical argument of SAT posits that the influence of self-control abilities is conditional on the interplay between the moral norms of a setting and an individual's personal morality, as specified in Table 1.1 (Wikström et al., 2012, 2024). Self-control ability should not be associated with rule-breaking when individuals do not deliberate as both personal morality and moral norms of the setting correspond (cell A and cell D in Table 1.1). However, it should decrease the likelihood of rule-breaking when individuals deliberate about action alternatives due to conflicting rule-guidance (cell B and cell C in Table 1.1). In a subsidiary argument, self-control ability is expected to exert its primary influence on individuals with rule-abiding personal morality in a setting characterized by encouraging rule-breaking norms (cell C in Table 1.1). Additionally, the double-edged sword argument suggests that self-control ability should increase the likelihood of rule-breaking for individuals with personal morality that favors rule-breaking (cell B in Table 1.1; Kroneberg & Schulz, 2018).

The central question of this analysis asks: How did the presented empirical studies improve the empirical test of SAT? To what extent do the presented studies support SAT's theoretical hypotheses?

6.1 Discussion of Chapters 2 and 3

In Chapter 2, the double-hurdle statistical model offers a methodological advancement by distinguishing between variables that affect the perception process and those that influence the choice process. This distinction allows us to investigate whether self-control influences rule-breaking behavior only during deliberation, as SAT predicts. However, the model has limitations, as it cannot determine if the effect of self-control in deliberation is assessed for individuals with rule-breaking personal morality in rule-abiding settings or for those with rule-abiding personal morality in rule-breaking settings (represented in cells B and C in Table 1.1).

The findings suggest that self-control may play a more fundamental role than SAT initially specifies. While self-control reduces the willingness to engage in rule-breaking during the choice process as expected, it also reduces the perception of rule-breaking as an action alternative when personal morality is not controlled for. This dual effect is connected to survey research examining linear interactions between self-control and personal morality, which serves as a proxy for the moral filter (Hirtenlehner & Kunz, 2016; Ivert et al., 2018). Since a statistically significant interaction in a linear model is symmetric, it also implies that for individuals with high levels of self-control, personal morality has no association with rule-breaking (Kroneberg & Schulz, 2018). However, we must interpret this cautiously, as the association between self-control and rule-breaking in the perception process disappears when controlling for personal morality, potentially indicating confounding rather than causation.

Chapter 3 advances the measurement of self-control ability by introducing the SCAS. While this chapter does not directly test the relationship between self-control ability and rule-breaking, it establishes the methodological foundation for subsequent analyses. The SCAS demonstrates modest but promising predictive validity through its bivariate association with self-reported crime versatility.

Beyond its association with rule-breaking, it is particularly noteworthy that SCAS shows only weak associations with both the original LSCS and its various adaptations. If we accept that the SCAS validly captures self-control ability as conceptualized in SAT, this finding raises substantial questions about previous research on the conditional relevance of controls in SAT (De Buck & Pauwels, 2022;

Pauwels, 2018b; Schepers & Reinecke, 2018). These earlier findings may need substantial reinterpretation given the measurement discrepancies. This measurement concern elevates the importance of the studies presented in Chapters 4 and 5, which employ the newly developed SCAS to test SAT's core theoretical predictions.

6.2 Discussion of Chapters 4 and 5

Subsequently, the fundamental empirical findings from Chapters 4 and 5 regarding the theoretical predictions on the conditional relevance of self-control ability are presented. Table 6.1 summarizes the mixed findings on the association between self-control ability and rule-breaking behavior. The results largely align with SAT's theoretical predictions for individuals with rule-breaking personal morality. When these individuals encounter settings with rule-abiding moral norms (cell B in Table 6.1), their self-control ability significantly reduces rule-breaking, suggesting they engage in deliberation between different action alternatives. Conversely, in rule-breaking settings (cell A in Table 6.1), we found no association between self-control ability and rule-breaking, supporting SAT's argument that these individuals perceive only rule-breaking alternatives without deliberation. These findings directly contradict previous studies using the LSCS that reported the strongest association between self-control and rule-breaking in this same combination of personal morality and setting norms (Hirtenlehner & Leitgöb, 2021, 2024; Kabiri et al., 2022; Schepers & Reinecke, 2018). This stark contrast highlights the methodological importance of using SCAS in this research context. It should be noted, however, that in Chapter 4, the observed association in this setting did not differ statistically from that of individuals with rule-abiding personal morality, presenting a limitation to these conclusions.

Table 6.1 Empirical results of the conditional relevance of self-control ability

		Moral norms of the setting	
		encourage rule-breaking (+)	discourage rule-breaking (-)
Personal morality	encourage rule-breaking (+)	[A] ❖ Chapter 4: not statistically significant negative association ❖ Chapter 5: no association	[B] ❖ Chapter 4: negative association ❖ Chapter 5: negative association
	discourage rule-breaking (-)	[C] ❖ Chapter 4: negative association ❖ Chapter 5: not statistically significant positive association	[D] ❖ Chapter 4: small negative association ❖ Chapter 5: no association

Notes: The gray pattern indicates combinations of personal morality and the setting's moral norms in which only one type of action alternative is perceived. Letters in parentheses (e.g., [A]) declare cells for further reference. Cells A-D declare the empirical association of self-control ability with rule-breaking.

For individuals with rule-abiding personal morality, the findings are mixed. In a setting with rule-abiding moral norms (cell D in Table 6.1), there is a negative association between self-control and rule-breaking in Chapter 4 (even if this is smaller than in cell B in Table 6.1) and no association in Chapter 5. Thus, Chapter 5 supports our expectation, while Chapter 4 does only to some degree, because individuals should not perceive different action alternatives and therefore, not deliberate.

The findings diverge between Chapters 4 and 5 when examining the influence of self-control ability on rule-breaking in the rule-breaking setting (cell C in Table 6.1). In Chapter 4, we saw a negative association between self-control ability and rule-breaking, supporting SAT's conditional relevance of controls. However, in Chapter 5, the findings indicate no statistically significant effect, and the effect is positive. This is puzzling, since for individuals with rule-breaking personal morality in a setting that discourages rule-breaking (cell C in Table 6.1), we would expect self-control ability to reduce rule-breaking and even exert its primary influence (cf. cell C in Table 1.1). This result also deviates from the existing literature, which includes survey-based studies (Hirtenlehner & Leitgöb, 2021; Schepers & Reinecke, 2018) and scenario-based studies (De Buck & Pauwels, 2022; Pauwels, 2018b). In addition, a positive self-control ability effect following the double-edged sword argument would be expected for

individuals with rule-abiding personal morality in a setting that encourages rule-breaking (cell B in Table 6.1). However, this interpretation does not fit, as these individuals have completely different personal morality (Kroneberg & Schulz, 2018).

Divergent methodological approaches (survey experiment vs. behavioral experiment) may partially explain the observed discrepancies in the results. While scenario-based studies, as discussed in Chapter 4, capture perceptions and evaluations of hypothetical situations, the behavioral experiment in Chapter 5 examines actual actions under real incentives and risks. A real decision situation might lead to the inclusion of various incentives and risks in the decision, whose influence also depends on self-control. This is particularly significant because SAT aims to explain behavior instead of intentions (unlike, for example, the theory of planned behavior; Ajzen, 1987, 1991), making the findings from the behavioral experiment more directly relevant to the theory.

Another salient difference lies in the operationalization of the moral norms of the setting. The crowdsourcing platform described in Chapter 5 is distinguished by its categorization of participants as either an honest community or "capitalist exploiters," which offers a broad treatment of injunctive norms (Cialdini et al., 1991a). Conversely, in Chapter 4, behavior and moral evaluation were manipulated, which relates directly to the behavior under investigation and could have a more substantial influence on perception. These mixed and diverging results highlight the need for future studies to clarify and potentially explain these differences. Next, I will reflect on my approach and present avenues for future research.

6.3 Limitations and outlook for future research

This dissertation exhibits several methodological and conceptual limitations that warrant discussion and suggest promising avenues for future research.

6.3.1 Sample characteristics and generalizability

Sample composition presents a primary limitation across two chapters. Chapters 3 and 5 primarily relied on adult crowdworkers from Germany and the United States, supplemented by German university students, which significantly constrains the generalizability of findings to other populations. While

crowdworker samples provided greater demographic diversity than the student samples, they still fail to represent the general population adequately, reducing external validity. It is important to note, however, that empirical evidence suggests crowdworker samples typically yield treatment effects comparable to those from more representative samples (Clifford et al., 2015; Lutz, 2016; Mullinix et al., 2015; Weinberg et al., 2014).

A second generalizability concern relates to the types of rule-breaking behaviors examined. While the SAT literature has concentrated on acquisitive offenses, non-acquisitive property offenses, bullying, and violence (Hardie & Rose, 2025; Kammigan, 2022), with notable exceptions in Ernst and Gerth (2023) and Shadmanfaat et al. (2020), this dissertation investigated illegal drug sales (Chapter 2), prescription medication misuse (Chapter 4), and cheating in experimental tasks (Chapter 5). This divergence potentially limits the cross-applicability of findings to other categories of deviance and criminal behavior, particularly violent crimes.

In summary, although this dissertation deliberately focused on a research design with high internal validity, the external validity of these results is limited. This may mean that the effects found are partially explained by the contexts rather than the treatments alone (Esterling et al., 2025). Therefore, it cannot be ruled out that the treatment effects depend on the specific experimental context. Future studies should focus on more diverse samples and contexts, e.g., adolescents in schools, since young people tend to be particularly vulnerable to crime and deviant behavior (Steffensmeier et al., 2025; Stolzenberg & D'Alessio, 2008). Nevertheless, the theoretically-driven experimental approach allows the theoretical findings regarding the SAT to be generalized (as argued in section 1.3.3.1).

6.3.2 Experimental design challenges

Experimental manipulation of situational factors presented substantial challenges. Chapters 2 and 5 document difficulties in independently manipulating moral norms of the setting and deterrence. Creating conditions, where different situational variables remain orthogonal without affecting each other, proved problematic. This difficulty was evident in the challenges encountered when implementing genuine rule-violating moral norms (Chapter 5).

One potential solution involves a sequential (within-subject) design in which weak conforming moral norms of the setting are established first, followed by increased deterrence. Utilizing the quiz paradigm, a multiple-round approach may be a feasible option. In the first round of the potential study, participants complete an online quiz simultaneously with others and receive feedback afterward, including a graph illustrating how their group performed compared to the results of an extensive representative study (cf. Diekmann et al., 2015; Rauhut, 2013). In the rule-breaking condition, the two distributions diverged, with the group answering distinctly more quiz questions, suggesting that others were cheating. Before the start of the second round of quiz questions, participants in the high deterrence conditions should see a statement indicating that AI would be used to check for cheating (as in Chapter 5). This approach would facilitate a clearer distinction between the independent effects of the moral norms of the setting and deterrence while considering their potential interaction.

6.3.3 Measurement and theoretical limitations

While Chapter 3 contributes significantly to the field through the development of the SCAS, important measurement questions remain unresolved. Particularly challenging is the measurement of less observable elements within the perception-choice process, including motivation and the identification of perceived action alternatives (Hardie & Rose, 2025). Further methodological innovation is necessary to effectively disentangle the perception-choice process as conceptualized in SAT. This might involve developing techniques that enable more direct measurement of perceived action alternatives at different stages of decision-making (Herrmann et al., 2025; Kroneberg & Nägel, 2024).

These measurement challenges suggest several promising theoretical extensions. One particularly valuable direction would be the reconceptualization of moral correspondence beyond the current ideal-typical scenarios of rule-breaking and rule-abiding moral norms toward a more nuanced continuum with intermediate levels (Herrmann et al., 2025). This refinement suggests that the probability of deliberation depends not only on the degree of (in-)congruence between personal morality and perceived moral norms of the setting, but also on the strength or intensity of personal morality itself (Herrmann et al., 2025; Hirtenlehner & Schulz, 2021; Kammigan, 2022).

6.3.4 Statistical estimation of interactions

While this dissertation concentrated on enhancing measurement and design, a subsequent step in advancing empirical testing would be to address statistical estimation. In SAT research, scholars commonly estimate conditional relationships using models with multiplicative interaction terms (Hainmueller et al., 2019; Hardie, 2020). To control for confounders, researchers often include additive control variables without corresponding product terms in models that feature interactions (e.g., Barton-Crosby & Hirtenlehner, 2021; Choi & Yun, 2021; Hirtenlehner & Kunz, 2016; Ishoy & Blackwell, 2019). Although prevalent, this approach can possibly lead to substantial model misspecification, especially in observational studies. Beiser-McGrath and Beiser-McGrath (2020) demonstrate that such interaction terms may absorb variance from unmodeled nonlinearities or interactions. To address this issue, Blackwell and Olson (Blackwell & Olson, 2022) propose two solutions: fully moderated models that include all interaction terms, or Projected Distance Scoring, a machine learning-based method suitable when sample size constraints limit the former approach. While these concerns primarily affect observational studies, they have less impact on experimental designs due to random treatment assignment, which reduces the need for detailed control strategies. Future studies should therefore critically evaluate which control variables to include and provide corresponding theoretical justifications.

6.3.5 Ecological Momentary Assessment

This dissertation advocated for factorial survey experiments and behavioral experiments over traditional surveys. A promising alternative data source for future research is Ecological Momentary Assessment (EMA), a data collection method that captures individuals' behaviors, emotions, and experiences in real time within their natural environments (Shiffman et al., 2008). While space-time budgets survey participants' activity fields over a specific recall period (e.g., four days in PADS+; Wikström et al., 2017), EMA prompts participants to report their thoughts, feelings, and actions multiple times daily through mobile devices. EMA therefore minimizes recall bias and enhances ecological validity (Shiffman et al., 2008).

EMA data may offer advantages to space-time budgets, allowing researchers studying crime and deviant behavior to explore how situational and personal factors interact to influence rule-breaking in specific settings (Engström & Kronkvist, 2023). For example, researchers can use EMA to survey individuals as they move through high-risk areas, such as nightlife districts, poorly lit streets, or locations with known criminal activity, capturing real-time data on perceived moral norms, peer presence, perceived deterrence, and deviant behavior. This approach enables researchers to assess behavioral data with spatiotemporal links (Wikström & Kroneberg, 2022). Additionally, by integrating EMA with geolocation data, researchers can map perceptions and behaviors to specific contexts, offering insights into the criminogeneity of certain spaces that complement small-area community surveys (Dao et al., 2019; Wikström et al., 2017).

Chapter 7

Conclusion

7 Conclusion

Sociology as a scientific discipline fundamentally seeks to reconstruct social reality within coherent theoretical frameworks that can be empirically tested (Friedrichs, 1990). Within this context, SAT provides a framework for understanding rule-breaking behavior. This dissertation has sought to advance the empirical evaluation of SAT by addressing critical methodological and measurement challenges that have hindered its rigorous testing. The research presented here has enhanced the empirical testing of SAT's conditional relevance of controls through three significant advancements: (1) introducing the SCAS as a novel measure of self-control ability, (2) designing scenario experiments with carefully crafted, theoretically-derived manipulations, and (3) implementing an initial behavioral experimental design.

Despite these successive methodological innovations, the experiment in Chapter 5 (and to some degree Chapter 4) offers limited support for SAT's hypotheses regarding the conditional relevance of controls. This divergence between theoretical expectations and empirical results demands careful interpretation. When empirical findings fail to align with theoretical predictions, three potential explanations deserve consideration (Allen & Yen, 2002):

First, the measurement (of self-control) may not correspond to the theoretical concept. This dissertation has substantially addressed measurement concerns for self-control ability, which demonstrates greater alignment with SAT's theoretical conceptualization, responding to persistent calls in the literature through development of the SCAS (Barton-Crosby & Hirtenlehner, 2021; Hirtenlehner et al., 2022; Kroneberg & Schulz, 2018; Pauwels et al., 2018). However, measuring other key constructs—particularly personal morality and situational moral norms—remains imperfect and would benefit from further refinement (Hardie & Rose, 2025).

Second, limitations of the empirical study (the experiment) may compromise the assessment of theoretical propositions. While this dissertation has significantly improved experimental testing through

both scenario-based and behavioral approaches, the experimental designs contain methodological weaknesses that require addressing in future research, as detailed in Chapter 5.

Third, the theory may require adaptation. Given the limitations in this dissertation, concluding that SAT requires fundamental theoretical revision remains premature. As Lieberson and Horwich (2008, p. 2) note, "it is almost certain that no single study will validate or invalidate a theory." Instead, this dissertation represents an important step in the ongoing theory development and refinement process.

This dissertation enhances criminological methodology by focusing on measurement validity, improving experimental designs, and offering a detailed evaluation of theoretical claims in the study of rule-breaking behavior. It not only contributes to the empirical testing of SAT but also underscores the importance of clear discussions about operationalization strategies across social sciences. The core question remains—what do we truly measure with a particular survey item, experimental manipulation, or operationalization? This question is essential to social scientific inquiry and resonates with concerns highlighted in introductory methodology courses across various disciplines. This research demonstrates that challenging the empirical status quo of established instruments and operationalizations represents a valuable approach as theories evolve and develop.

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Declaration of Sources

9 Declaration of Sources

AI tools used

AI tool	Purpose of use	Parts of the work affected	Remarks
OpenAI ChatGPT (GPT-4o)	Proofreading of text for conciseness, grammar, and spelling	Entire work – apart from Chapter 2	
Grammarly	Correction of grammatical and stylistic errors	Entire work – apart from Chapter 2	Premium plan with Microsoft Word integration

Appendix

10 Appendix

10.1 Appendix to Chapter 2

Table S1: Double-hurdle regression models on the willingness to sell drugs – testing for additional interactions between personal morality and low self-control (N=3,088).

	M_1	M_2
Participation equation		
Personal morality	-10.234	-3.823**
	(7.044)	(1.355)
Low self-control	-11.775	
	(8.551)	
Personal morality×Low self-control	2.972	
	(2.140)	
Constant	40.907	15.442**
	(28.184)	(5.440)
Quantity equation		
Low self-control	1.392***	1.864**
	(0.309)	(0.653)
Deterrence (D_P×D_S)	-1.662*	-1.667*
	(0.741)	(0.732)
Deterrence×Low self-control	0.479	0.486
	(0.466)	(0.462)
Benefits	0.399	0.396
	(0.218)	(0.218)
Personal morality	-0.222	0.003
	(0.177)	(0.343)
Conforming moral context	-0.557*	-0.554*
	(0.219)	(0.218)
Personal morality×Low self-control		-0.105
		(0.184)
Constant	-0.906	-1.775
	(0.704)	(1.149)
Sigma	4.219***	4.258***
	(0.153)	(0.156)
Covariance	-1.593***	-1.816***
	(0.454)	(0.430)

Notes: *p<0.05, **p<0.01, ***p<0.001. Standard errors in parentheses. Sigma indicates the standard deviation of the error term of the quantity equation. Covariance indicates the estimated covariance between the error terms of the quantity equation and the participation equation.

Table S2: Correlations of vignette dimensions (N=3,088).

Variables	1	2	3	4	5
1 Benefits					
2 Deterrence (severity of punishment, D_C)	-0.000				
3 Deterrence (detection probability, D_p)	-0.001	0.006			
4 Moral context	-0.001	-0.004	0.002		
5 Personal morality	0.003	0.014	0.000	-0.030	
6 Low self-control	0.024	-0.002	-0.015	0.032	-0.107***

Note: ***p<0.001 (two-tailed).

Table S3: Selectivity analysis of the missing values of the willingness measure (i.e. dropping out on the experiment page of the survey or choosing "no response" instead of another value) – based on a linear probability model.

	M1	*M2*
Benefits	0.006 (0.004)	0.006 (0.004)
Deterrence (severity of punishment, D_C)	-0.005 (0.004)	-0.008* (0.004)
Deterrence (detection probability, D_p)	0.001 (0.004)	0.001 (0.004)
Moral context	0.000 (0.004)	-0.002 (0.004)
Personal morality	0.000 (0.002)	-0.000 (0.002)
Low self-control	-0.001 (0.002)	-0.002 (0.002)
Anonymity perception		-0.001 (0.003)
Adjusted R^2	0.001	0.001
F-test	0.69	1.29
Number of observations	3,132	3,101[a]

Notes: M=Model. Standardized coefficients with standard errors in brackets. *p<0.05 (two-tailed). [a]Lower case-number, because this variable has been assessed later in the questionnaire.

Table S4: Wording and statistics of the personal morality scale (N=3,049 to 3,081a, Cronbach´s α=0.90).

Facet	Item	Mean	SD	Min	Max	1[b]	2[b]
Moral rule	I would find that immoral.	4.67	0.832	1	5		
Guilt	I would feel guilty if I did that.	4.64	0.882	1	5	0.799***	
Shame	I would be ashamed of doing that if someone else found out.	4.54	0.998	1	5	0.681***	0.787***

Note: Prior to the items, participants read the question "How would you judge the illegal resale of prescription medication?". Response options: „absolutely does not apply" [1] to „completely applies" [5]. [a]Number of responses varies due to missing data. [b] Pairwise correlations with ***p<0.001 (two-tailed).

Table S5: Double-hurdle regression models on the willingness to sell drugs – testing both components of deterrence separately (N=3,088).

	M_1	M_2	M_3
Participation equation			
Personal morality	-3.689**	-3.706**	-3.689**
	(1.343)	(1.353)	(1.344)
Constant	14.912**	14.981**	14.915**
	(5.394)	(5.431)	(5.395)
Quantity equation			
Low self-control	1.436***	1.661***	1.443***
	(0.272)	(0.270)	(0.336)
Deterrence D_p	-1.148	-0.531*	-1.147
	(0.609)	(0.217)	(0.610)
Deterrence D_S	-0.820***	-0.771	-0.800
	(0.217)	(0.609)	(0.610)
Deterrence D_p ×Low self-control	0.417		0.416
	(0.384)		(0.385)
Deterrence D_S ×Low self-control		-0.038	-0.013
		(0.384)	(0.385)
Benefits	0.412	0.415	0.412
	(0.217)	(0.217)	(0.217)
Personal morality	-0.146	-0.153	-0.146
	(0.186)	(0.185)	(0.186)
Conforming moral context	-0.553*	-0.558*	-0.553*
	(0.186)	(0.217)	(0.217)
Constant	-0.727	-1.037	-0.736
	(0.657)	(0.656)	(0.711)
Sigma	4.257***	4.252***	4.256***
	(0.157)	(0.157)	(0.157)
Covariance	-1.862***	-1.841***	-1.861***
	(0.436)	(0.438)	(0.436)

Notes: $^{*}p<0.05$, $^{**}p<0.01$, $^{***}p<0.001$. Standard errors in parentheses. Sigma indicates the standard deviation of the error term of the quantity equation. Covariance indicates the estimated covariance between the error terms of the quantity equation and the participation equation.

Table S6: Double-hurdle regression models on the willingness to sell drugs – without the interaction of internal (low self-control) and external controls (deterrence) (N=3,088).

	M_1	M_2	M_3	M_4
Participation equation				
Personal morality	-3.073**		-3.087**	-2.115*
	(1.086)		(1.106)	(0.826)
Conforming moral context		-0.096	-0.012	1.049
		(0.160)	(0.122)	(1.232)
Personal morality×Conforming moral context				-2.256
				(2.651)
Constant	1.554**	0.591***	1.566**	1.097**
	(0.523)	(0.135)	(0.543)	(0.412)
Quantity equation				
Low self-control	0.920***	0.922***	0.920***	0.920***
	(0.111)	(0.109)	(0.111)	(0.111)
Deterrence ($D_p \times D_S$)	-0.948***	-0.993***	-0.948***	-0.951***
	(0.258)	(0.250)	(0.258)	(0.257)
Benefits	0.408	0.385	0.408	0.399
	(0.217)	(0.210)	(0.218)	(0.218)
Personal morality	-0.137	-1.523***	-0.137	-0.119
	(0.145)	(0.118)	(0.146)	(0.146)
Conforming moral context	-0.559*	-0.335	-0.537	-0.700*
	(0.218)	(0.610)	(0.318)	(0.352)
Constant	0.319	-0.590	0.306	0.454
	(0.349)	(4.981)	(0.374)	(0.410)
Sigma	4.252***	3.887***	4.252***	4.245***
	(0.155)	(0.143)	(0.155)	(0.156)
Covariance	-1.781***	-0.015	-1.777***	-1.806***
	(0.432)	(10.720)	(0.434)	(0.447)

Notes: $^{*}p<0.05$, $^{**}p<0.01$, $^{***}p<0.001$. Standard errors in parentheses. Sigma indicates the standard deviation of the error term of the quantity equation. Covariance indicates the estimated covariance between the error terms of the quantity equation and the participation equation.

Table S7: Double-hurdle regression models on the willingness to sell drugs – average marginal effectsa (N=3,088).

	M_1	M_2	M_3	M_4
Personal morality	-1.570***	-0.449***	-1.575***	-1.586**
	(0.430)	(0.035)	(0.436)	(0.517)
Conforming moral context	-0.164*	-0.143*	-0.164*	-0.165*
	(0.064)	(0.062)	(0.065)	(0.065)
Low self-control	0.270***	0.271***	0.270***	0.270***
	(0.033)	(0.033)	(0.033)	(0.033)
Deterrence ($D_p \times D_S$)	-0.253***	-0.271***	-0.253***	-0.254***
	(0.070)	(0.070)	(0.070)	(0.070)
Benefits	0.117	0.112	0.117	0.115
	(0.064)	(0.062)	(0.064)	(0.064)

Notes: $^{*}p<0.05$, $^{**}p<0.01$, $^{***}p<0.001$. Standard errors in parentheses. [a] Average marginal effects (AME) are calculated with the post-estimation command "margins, dydx (*) predict (yexpected)".

Table S8: Double-hurdle regression models on the willingness to sell drugs – average marginal effectsa (N=3,088).

	M_1	M_2	M_3	M_4
Personal morality	-0.450***	-1.575***	-0.448***	-0.447***
	(0.033)	(0.424)	(0.035)	(0.035)
Conforming moral context	-0.142*	-0.163*	-0.140*	-0.141*
	(0.061)	(0.065)	(0.062)	(0.062)
Low self-control	0.276***	0.266***	0.271***	0.271***
	(0.032)	(0.033)	(0.033)	(0.033)
Deterrence ($D_p \times D_S$)	-0.263***	-0.255***	-0.275***	-0.273***
	(0.065)	(0.070)	(0.067)	(0.067)
Benefits	0.113	0.120	0.111	0.112
	(0.061)	(0.065)	(0.062)	(0.062)

Notes: $^{*}p<0.05$, $^{**}p<0.01$, $^{***}p<0.001$. Standard errors in parentheses. [a] Average marginal effects (AME) are calculated with the post-estimation command "margins, dydx (*) predict (yexpected)".

Table S9: Double-hurdle regression models on the willingness to sell drugs – controlling for perceived anonymity of the study (N=3,068a).

	M_1	M_2	M_3	M_4
Participation equation				
Personal morality	-3.056**		-3.087**	-2.094**
	(1.078)		(1.109)	(0.799)
Conforming moral context		-0.080	-0.025	1.065
		(0.158)	(0.123)	(1.257)
Personal morality×Conforming moral context				-2.322
				(2.707)
Anonymity	-0.155	-0.366	-0.156	-0.155
	(0.097)	(0.203)	(0.098)	(0.096)
Constant	2.250***	2.222*	2.279***	1.797**
	(0.665)	(0.962)	(0.688)	(0.602)
Quantity equation				
Low self-control	0.851***	0.887***	0.850***	0.852***
	(0.125)	(0.124)	(0.125)	(0.126)
Deterrence (D_p×D_S)	-0.997***	-1.031***	-0.998***	-1.001***
	(0.261)	(0.253)	(0.261)	(0.260)
Deterrence×Low self-control	0.277	0.150	0.277	0.272
	(0.263)	(0.255)	(0.263)	(0.264)
Benefits	0.411	0.413	0.410	0.401
	(0.218)	(0.213)	(0.219)	(0.219)
Personal morality	-0.147	-1.469***	-0.149	-0.131
	(0.145)	(0.123)	(0.145)	(0.146)
Conforming moral context	-0.544*	-0.319	-0.497	-0.659
	(0.218)	(0.378)	(0.317)	(0.348)
Anonymity	-0.129	0.208	-0.129	-0.124
	(0.227)	(0.511)	(0.226)	(0.225)
Constant	0.881	-1.088	0.853	0.975
	(1.027)	(1.703)	(1.036)	(1.050)
Sigma	4.246***	3.935***	4.245***	4.239***
	(0.155)	(0.280)	(0.155)	(0.155)
Covariance	-1.744***	-0.828	-1.736***	-1.768***
	(0.438)	(1.889)	(0.440)	(0.451)

Notes: $^{*}p<0.05$, $^{**}p<0.01$, $^{***}p<0.001$. Standard errors in parentheses. Sigma indicates the standard deviation of the error term of the quantity equation. Covariance indicates the estimated covariance between the error terms of the

quantity equation and the participation equation. [a]N<3,088 due to the missing values in the anonymity variable.

10.2 Appendix to Chapter 3

Table S1: German version of the Self-Control Ability Scale.

Question	Manchmal kommen Menschen in Situationen, in denen sie Konflikte mit ihren moralischen Prinzipen erleben. Im Folgendem finden Sie einige Aussagen dazu, wie Menschen damit umgehen. *Bitte lesen Sie diese durch und geben Sie an, wie Sie im Allgemeinen mit solchen Situationen umgehen.*
Item	
Temptation (t)	
t1	Auch wenn ich in einer Situation etwas bekommen kann, was ich unbedingt haben will, werfe ich meine moralischen Prinzipien nicht über Bord.
t2	Egal wie verlockend eine Situation ist, ich bleibe standhaft und reagiere nicht darauf.
t3	Trotz einer günstigen Gelegenheit etwas Wertvolles zu bekommen, schaffe ich es, meinen Prinzipien treu zu bleiben.
t4	Unabhängig davon, welche persönlichen Vorteile ich haben kann, treffe ich Entscheidungen entsprechend meiner moralischen Prinzipien.
t5	Auch wenn ich in einer Situation starken Versuchungen ausgesetzt bin, kann ich mich an meine moralischen Grundsätze halten.
Social pressure (s)	
s1	Auch wenn in einer Gruppe alle einer Meinung sind, werfe ich meine moralischen Prinzipien nicht über Bord.
s2	Egal wie sehr mich andere zu etwas überreden wollen, ich bleibe standhaft und reagiere nicht darauf.
s3	Auch wenn viele Menschen anders handeln als ich, schaffe ich es, meinen Prinzipien treu zu bleiben.
s4	Unabhängig davon, was andere sagen oder tun, treffe ich Entscheidungen entsprechend meiner moralischen Prinzipien.
s5	Auch wenn ich in einer Situation starkem Druck von anderen ausgesetzt bin, kann ich mich an meine moralischen Grundsätze halten.
Provocation (p)	
p1	Auch wenn mich jemand absichtlich anrempelt, werfe ich bei meiner Reaktion meine moralischen Prinzipien nicht über Bord.
p2	Egal wie stark mich jemand beleidigt, ich bleibe standhaft und reagiere nicht darauf.
p3	Auch wenn andere Leute mich ärgern, schaffe ich es, meinen Prinzipien treu zu bleiben.
p4	Unabhängig davon, ob jemand mich mit Absicht wütend macht, treffe ich Entscheidungen entsprechend meiner moralischen Prinzipien.
p5	Auch wenn ich in einer Situation stark provoziert werde, kann ich mich an meine moralischen Grundsätze halten.
Response options	1 *trifft überhaupt nicht zu* - 2 - 3 - 4 - 5 - 6 - 7 *trifft voll und ganz zu*

Table S2: Pearson correlations of the Self-Control Ability Scale ($N_{Study\ 1}$=864).

	Overall scale score	t	s	p	t1	t2	t3	t4	t5	s1	s2	s3	s4	s5	p1	p2	p3	p4
Overall scale score	–																	
Temptation (t)	.81***	–																
Social pressure (s)	.84***	.57***	–															
Provocation (p)	.81***	.44***	.54***	–														
t1	.69***	.84***	.47***	.40***	–													
t2	.61***	.75***	.40***	.35***	.49***	–												
t3	.69***	.86***	.49***	.36***	.69***	.53***	–											
t4	.67***	.82***	.49***	.35***	.61***	.52***	.65***	–										
t5	.72***	.88***	.53***	.38***	.71***	.56***	.73***	.65***	–									
s1	.70***	.45***	.85***	.45***	.39***	.28***	.41***	.39***	.42***	–								
s2	.57***	.33***	.73***	.37***	.26***	.30***	.24***	.25***	.29***	.46***	–							
s3	.73***	.52***	.84***	.46***	.43***	.36***	.44***	.45***	.48***	.66***	.48***	–						
s4	.70***	.52***	.83***	.40***	.42***	.34***	.45***	.47***	.49***	.62***	.53***	.67***	–					
s5	.74***	.52***	.84***	.50***	.43***	.37***	.46***	.42***	.49***	.72***	.47***	.65***	.57***	–				
p1	.63***	.34***	.39***	.81***	.29***	.27***	.28***	.27***	.29***	.33***	.25***	.37***	.30***	.33***	–			
p2	.51***	.22***	.28***	.75***	.21***	.22***	.16***	.14***	.18***	.20***	.28***	.21***	.18***	.25***	.48***	–		
p3	.75***	.43***	.55***	.84***	.36***	.34***	.35***	.35***	.39***	.49***	.34***	.48***	.41***	.54***	.59***	.50***	–	
p4	.74***	.42***	.56***	.83***	.39***	.31***	.35***	.33***	.36***	.49***	.36***	.48***	.44***	.52***	.55***	.49***	.74***	–

p5	.70***	.42***	.44***	.85***	.38***	.30***	.36***	.35***	.37***	.38***	.27***	.38***	.33***	.44***	.70***	.52***	.65***	.63***

Notes: t:temptation; s:social pressure; p:provocation; $^{*}p<.05$, $^{**}p<.01$, $^{***}p<.001$.

Table S3: Assessment of personal morality (the original German version is shown in parentheses).

Question	Some behaviours are open to different opinions. How guilty would you feel if you did any of the following? (Über manche Verhaltensweisen kann man verschiedener Meinung sein. Wie schuldig würden Sie sich fühlen, wenn Sie etwas von den folgenden Dingen tun würden?)
Offense	
Tax evasion	Avoiding the payment of taxes. (Die Zahlung von Steuern umgehen.)
Insurance fraud	Making an unjustified claim to an insurance company. (Ungerechtfertigte Schadensersatzansprüche an eine Versicherung stellen.)
Social benefit fraud	Taking advantage of social benefits even though you are not entitled to them. (Soziale Vergünstigungen nutzen, obwohl man dazu nicht berechtigt ist.)
Theft in shop	Taking small items from a shop without paying. (In einem Geschäft Kleinigkeiten mitnehmen ohne zu bezahlen.)
Theft in shop >50€	Taking goods worth more than €50 from a shop without paying. (In einem Geschäft Waren im Wert von mehr als 50€ mitnehmen, ohne zu bezahlen.)
Destroy things	Damaging someone else's property. (Fremde Sachen beschädigen.)
Hit someone	Hitting or physically injuring someone. (Jemanden schlagen oder körperlich verletzen.)
Response options	1 *not guilty at all* - 2 - 3 - 4 - 5 - 6 - 7 *very guilty* (1 - *überhaupt nicht schuldig* - 2 - 3 - 4 - 5 - 6 - 7 *sehr schuldig*)

Table S4: Assessment of crime versatility (the original German version is shown in parentheses).

Question	Most people occasionally do things that are not allowed. Below you will find a number of such things described. Please indicate whether you have ever done these things in the last 12 months. (Die meisten Menschen tun gelegentlich Dinge, die nicht erlaubt sind. Im Folgenden finden Sie eine Reihe solcher Dinge beschrieben. Bitte geben Sie an, ob Sie diese Dinge in den letzten 12 Monaten schon mal getan haben.)
Offense	
Tax evasion	Paid for goods or services in cash without a receipt to avoid taxes. (Waren oder Dienstleistungen bar und ohne Beleg bezahlt, um Steuern zu sparen.)
Fare evasion	Used public transportation (train, bus) without a valid ticket. (öffentliche Verkehrsmittel (Bahn, Bus) ohne gültigen Fahrschein benutzt.)
Keep change	Received excess change and knowingly kept it. (zu viel Wechselgeld erhalten und es wissentlich behalten.)
Illegal employment	Worked "off the books" without declaring the income for taxation. (“schwarz“ gearbeitet, ohne das Einkommen zu versteuern.)
Insurance fraud	Made false statements to an insurance company. (falsche Angaben bei einer Versicherung gemacht.)
Social benefit fraud	Claimed social benefits or assistance from the government without being entitled to them. (soziale Vergünstigungen oder Leistungen vom Staat in Anspruch genommen, ohne Anrecht darauf zu haben.)
Theft in shop	Took items from a store without paying for them. (in einem Geschäft Dinge mitgenommen, ohne zu bezahlen.)
Theft from person	Stole something or money from someone. (jemandem eine Sache oder Geld gestohlen.)
Theft at workplace	Took and kept tools, stationery, or other things from my workplace. (von meiner Arbeitsstelle Werkzeug, Schreibmaterial oder andere Dinge mitgenommen und behalten.)
Blackmail	Threatened or extorted someone to make them afraid or to obtain money or a specific item. (jemanden bedroht oder erpresst, um ihm/ihr Angst zu machen oder um Geld oder eine bestimmte Sache zu bekommen.)
Destroy things	Intentionally damaged or destroyed someone else's belongings. (fremde Sachen absichtlich beschädigt oder zerstört.)
Hit someone	Attacked someone to the point where they were injured or bleeding. (jemanden so angegriffen, dass er/sie verletzt war oder geblutet hat.)
Drunk driving	Drove a car while being intoxicated. (ein Auto gefahren, obwohl Sie zu viel getrunken hatten.)
Take drugs	Used hashish, cocaine, or other illegal drugs. (Haschisch, Kokain oder andere illegale Drogen genommen.)
Response options	*0 times, 1 times, 2 times, 3 times, 4 times, 5 times, 6 times, 7 times, 8 times, 9 times, 10 times, more than 10 times* (*0-mal, 1-mal, 2-mal, 3-mal, 4-mal, 5-mal, 6-mal, 7-mal, 8-mal, 9-mal, 10-mal, mehr als 10-mal*)

Table S5: Assessment of deviant intention (the original German version is shown in parentheses).[1]

Questions	How likely is it that you would cheat the person on the sale? (Wie wahrscheinlich ist es, dass Sie die Person beim Verkauf betrügen würden?) How likely it is that you would take the drug. (Wie wahrscheinlich ist es, dass Sie das Medikament einnehmen würden?)
Offense	
Cheat on sale	
Baseline	Imagine someone wants to buy something from you. (Stellen Sie sich vor, jemand will etwas von Ihnen kaufen)
Temptation	Imagine someone wants to buy something from you and has no idea about the true value of the item. (Stellen Sie sich vor, jemand will etwas von Ihnen kaufen und hat keine Ahnung über den wahren Wert des Gegenstands.)
Social pressure	Imagine someone wants to buy something from you and friends urge you to cheat the person because they are so unlikeable. (Stellen Sie sich vor, jemand will etwas von Ihnen kaufen und Freunde fordern Sie auf, die Person zu betrügen, weil sie so unsympathisch ist.)
Provocation	Imagine someone wants to buy something from you and makes fun of you and makes derogatory remarks. (Stellen Sie sich vor, jemand will etwas von Ihnen kaufen und macht sich dabei über Sie lustig und äußert sich abfällig.)
Intake of illegal drugs	
Baseline	Imagine someone offers you a drug that is banned in Germany and has a performance-enhancing effect. (Stellen Sie sich vor, jemand bietet Ihnen ein in Deutschland verbotenes Medikament an, das leistungssteigernd wirkt.)
Temptation	Imagine someone offers you a drug that is banned in Germany and has a performance-enhancing effect. You believe that the drug would help you a lot with something important. (Stellen Sie sich vor, jemand bietet Ihnen ein in Deutschland verbotenes Medikament an, das leistungssteigernd wirkt. Die Person sagt, Sie seien ein Feigling und würden sich sowieso nicht trauen es einzunehmen.)
Social pressure	Imagine someone offers you a drug that is banned in Germany and has a performance-enhancing effect. Your friends ask you to take it. (Stellen Sie sich vor, jemand bietet Ihnen ein in Deutschland verbotenes Medikament an, das leistungssteigernd wirkt. Sie glauben, dass Ihnen das Medikament bei einer wichtigen Sache sehr helfen würde.)
Provocation	Imagine someone offers you a drug that is banned in Germany and has a performance-enhancing effect. The person says you are a coward and would not dare to take it anyway. (Stellen Sie sich vor, jemand bietet Ihnen ein in Deutschland verbotenes Medikament an, das leistungssteigernd wirkt. Ihre Freunde fordern Sie auf es einzunehmen.)
Response options	1 *very unlikely* - 2 - 3 - 4 - 5 - 6 - 7 *very likely* (1 - *sehr unwahrscheinlich* - 2 - 3 - 4 - 5 - 6 - 7 *sehr wahrscheinlich*)

Notes: [1] Each set of questions consisted of a baseline question describing the behavior, followed by three additional questions that specified different situations involving high temptation, social pressure, or provocation.

Table S6: Descriptive statistics of the Self-Control Ability Scale ($N_{Study\ 2}$=350).

	Mean	SD	Min	Max	Kurt	Skew
Temptation (t)						
t1	5.27	1.34	1.00	7.00	3.13	-0.76
t2	4.84	1.26	1.00	7.00	2.64	-0.33
t3	5.15	1.36	1.00	7.00	2.91	-0.63
t4	5.19	1.29	1.00	7.00	2.57	-0.53
t5	5.20	1.26	1.00	7.00	2.57	-0.41
Social pressure (s)						
s1	5.39	1.26	1.00	7.00	2.92	-0.59
s2	5.12	1.31	1.00	7.00	2.69	-0.53
s3	5.45	1.19	1.00	7.00	3.89	-0.82
s4	5.43	1.15	1.00	7.00	3.48	-0.71
s5	5.25	1.27	1.00	7.00	3.19	-0.71
Provocation (p)						
p1	5.10	1.43	1.00	7.00	3.10	-0.70
p2	4.23	1.63	1.00	7.00	2.24	-0.27
p3	4.84	1.43	1.00	7.00	2.64	-0.48
p4	4.82	1.45	1.00	7.00	2.52	-0.42
p5	4.77	1.41	1.00	7.00	2.69	-0.51

Notes: SD:Standard deviation; Min:Minimum; Max:Maximum; Skew:Skewness; Kurt:Kurtosis.

Table S7: Pearson correlations of the Self-Control Ability Scale ($N_{Study\ 2}$=350).

	Overall scale score	t	s	p	t1	t2	t3	t4	t5	s1	s2	s3	s4	s5	p1	p2	p3	p4
Overall scale score	–																	
Temptation (t)	.84***	–																
Social pressure (s)	.83***	.57***	–															
Provocation (p)	.86***	.56***	.57***	–														
t1	.67***	.84***	.46***	.42***	–													
t2	.70***	.84***	.47***	.45***	.60***	–												
t3	.75***	.86***	.51***	.53***	.65***	.66***	–											
t4	.74***	.87***	.52***	.50***	.66***	.69***	.65***	–										
t5	.76***	.91***	.50***	.51***	.70***	.70***	.75***	.78***	–									
s1	.70***	.48***	.86***	.45***	.41***	.41***	.41***	.44***	.42***	–								
s2	.63***	.39***	.80***	.42***	.29***	.37***	.37***	.33***	.31***	.59***	–							
s3	.75***	.53***	.88***	.53***	.46***	.42***	.47***	.47***	.47***	.68***	.64***	–						
s4	.74***	.55***	.85***	.50***	.43***	.43***	.46***	.52***	.52***	.67***	.57***	.71***	–					
s5	.75***	.51***	.89***	.53***	.39***	.40***	.46***	.49***	.45***	.74***	.61***	.73***	.71***	–				
p1	.71***	.52***	.45***	.80***	.40***	.39***	.48***	.46***	.50***	.37***	.29***	.44***	.42***	.44***	–			
p2	.64***	.35***	.39***	.83***	.26***	.32***	.34***	.31***	.28***	.31***	.34***	.38***	.29***	.36***	.56***	–		
p3	.77***	.50***	.54***	.88***	.37***	.42***	.50***	.43***	.46***	.42***	.40***	.50***	.48***	.51***	.64***	.72***	–	
p4	.76***	.52***	.50***	.86***	.39***	.42***	.50***	.46***	.49***	.39***	.35***	.47***	.47***	.46***	.61***	.58***	.70***	–

p5	.76***	.50***	.53***	.87***	.37***	.38***	.47***	.46***	.47***	.43***	.42***	.47***	.47***	.49***	.60***	.63***	.69***	.78***

Notes: t:temptation; s:social pressure; p:provocation; $^{*}p<.05$, $^{**}p<.01$, $^{***}p<.001$.

Table S8: Standardized factor loadings of a three-factor confirmatory factor analysis ($N_{Study\ 2}$=350).

Item	Factor 1	Factor 2	Factor 3
Temptation (t)			
t1	0.77***		
t2	0.79***		
t3	0.82***		
t4	0.85***		
t5	0.90***		
Social pressure (s)			
s1		0.82***	
s2		0.71***	
s3		0.85***	
s4		0.83***	
s5		0.87***	
Provocation (p)			
p1			0.73***
p2			0.74***
p3			0.85***
p4			0.85***
p5			0.86***

Notes: *p<.05, **p<.01, ***p<.001.

Table S9: Fit statistics for the constrained three-factor models ($N_{Study\ 2}$=350).

	χ^2 (df)	χ^2/df	CFI	RMSEA	SRMR	AIC	BIC
Congeneric	155.57*** (87)	1.79	0.98	0.05	0.04	14,288	14,473
Tau-equivalent	184.81*** (99)	1.87	0.97	0.06	0.05	14,292	14,431
Parallel	296.23*** (111)	2.67	0.93	0.08	0.05	14,424	14,516

Notes: CFI:Comparative Fit Index; RMSEA:Root Mean Square Error of Approximation; SRMR:Standardized Root Mean Square Residual; AIC:Akaike Information Criterion; BIC:Bayesian Information Criterion. $^{*}p<.05$, $^{**}p<.01$, $^{***}p<.001$. Scaled χ^2 difference tests between the congeneric and tau-equivalent model: $\chi^2_{diff}(12)=33.62$, $p<.001$. Scaled χ^2 difference tests between the tau-equivalent and parallel model: $\chi^2_{diff}(12)=94.98$, $p<.001$.

Table S10: Descriptive statistics of Self-Control Ability Scale ($N_{Study\ 3\text{-}Wave\ 1}$=82).

	Mean	SD	Min	Max	Kurt	Skew
Self-Control Ability Scale						
Overall scale score	5.33	0.81	2.93	7.00	4.07	-0.60
Temptation	5.55	0.89	2.60	7.00	4.15	-0.91
Social pressure	5.32	0.89	2.80	7.00	2.80	-0.19
Provocation	5.12	1.10	2.00	7.00	3.37	-0.66
Temptation (t)						
t1	5.71	1.11	2.00	7.00	4.04	-1.08
t2	5.00	1.21	1.00	7.00	3.76	-0.67
t3	5.67	0.95	3.00	7.00	3.77	-0.85
t4	5.58	1.01	3.00	7.00	2.95	-0.51
t5	5.78	1.03	2.00	7.00	4.85	-1.15
Social pressure (s)						
s1	5.44	1.08	1.00	7.00	5.50	-1.00
s2	4.92	1.07	1.00	7.00	4.66	-0.82
s3	5.37	1.13	3.00	7.00	2.42	-0.28
s4	5.59	0.92	3.00	7.00	2.65	-0.11
s5	5.27	1.03	3.00	7.00	2.43	-0.12
Provocation (p)						
p1	5.55	1.24	2.00	7.00	3.24	-0.85
p2	4.58	1.49	1.00	7.00	2.31	-0.41
p3	5.22	1.26	1.00	7.00	3.96	-0.97
p4	5.10	1.19	2.00	7.00	3.10	-0.43
p5	5.15	1.16	2.00	7.00	3.33	-0.65

Notes: SD:Standard deviation; Min:Minimum; Max:Maximum; Skew:Skewness; Kurt:Kurtosis.

Table S11: Descriptive statistics of the Self-Control Ability Scale ($N_{Study\ 3\text{-}Wave\ 2}$=82).

	Mean	SD	Min	Max	Kurt	Skew
Self-Control Ability Scale						
Overall scale score	5.30	0.84	2.80	7.00	4.12	-0.68
Temptation	5.37	0.93	2.60	7.00	3.78	-0.69
Social pressure	5.28	0.95	2.00	7.00	3.94	-0.53
Provocation	5.24	0.99	1.80	7.00	4.75	-1.07
Temptation (t)						
t1	5.44	1.18	1.00	7.00	4.70	-1.04
t2	4.97	1.22	2.00	7.00	2.80	-0.56
t3	5.54	1.10	2.00	7.00	3.75	-0.89
t4	5.47	0.89	3.00	7.00	3.68	-0.64
t5	5.44	1.09	2.00	7.00	3.56	-0.75
Social pressure (s)						
s1	5.28	1.20	1.00	7.00	4.66	-1.18
s2	5.08	1.09	3.00	7.00	2.27	0.03
s3	5.41	1.13	1.00	7.00	5.45	-1.12
s4	5.40	1.12	2.00	7.00	3.40	-0.61
s5	5.26	0.99	3.00	7.00	2.91	-0.20
Provocation (p)						
p1	5.63	1.14	2.00	7.00	4.14	-1.19
p2	4.82	1.26	1.00	7.00	3.27	-0.65
p3	5.31	1.11	2.00	7.00	3.25	-0.57
p4	5.21	1.12	2.00	7.00	4.28	-1.02
p5	5.23	1.09	2.00	7.00	3.76	-0.83

Notes: SD:Standard deviation; Min:Minimum; Max:Maximum; Skew:Skewness; Kurt:Kurtosis.

Table S12: Reliability of the Self-Control Ability Scale ($N_{Study\ 3}$=78).

	Cronbach's α		ICC
	Wave 1	Wave 2	
Self-Control Ability Scale			
Overall scale score	.93	.95	.823
Temptation	.89	.90	.757
Social pressure	.91	.91	.709
Provocation	.92	.92	.801

Notes: ICC:Intraclass coefficient for mixed-effects linear model.

Table S13: Pearson correlations and descriptive statistics of the Self-Control Ability Scale ($N_{Study\ 4}$=638).

	Pearson´s correlation coefficients				Descriptives					
	Overall scale score	Temptation	Social pressure	Provocation	Mean	SD	Min	Max	Kurt	Skew
Self-Control Ability Scale										
Overall scale score	–				5.56	0.92	1.93	7.00	3.57	-0.71
Temptation	.847***	–			5.63	1.03	1.80	7.00	3.63	-0.82
Social pressure	.822***	.675***	–		5.77	1.02	2.00	7.00	3.52	-0.84
Provocation	.803***	.471***	.420***	–	5.27	1.29	1.00	7.00	3.07	-0.73
Temptation (t)										
t1	.601***	.784***	.446***	.301***	5.77	1.32	1.00	7.00	4.78	-1.35
t2	.682***	.798***	.585***	.353***	5.33	1.27	1.00	7.00	2.90	-0.58
t3	.746***	.873***	.589***	.425***	5.68	1.22	1.00	7.00	3.79	-0.99
t4	.757***	.850***	.613***	.449***	5.82	1.14	1.00	7.00	4.13	-1.07
t5	.759***	.873***	.594***	.449***	5.56	1.21	2.00	7.00	3.12	-0.79
Social pressure (s)										
s1	.649***	.524***	.830***	.306***	5.80	1.25	1.00	7.00	4.14	-1.14
s2	.626***	.484***	.799***	.314***	5.59	1.22	1.00	7.00	2.98	-0.69
s3	.716***	.584***	.884***	.357***	5.81	1.17	1.00	7.00	3.59	-0.94
s4	.752***	.650***	.868***	.396***	5.90	1.15	1.00	7.00	3.91	-1.10
s5	.758***	.632***	.874***	.417***	5.73	1.22	1.00	7.00	3.37	-0.91
Provocation (p)										
p1	.642***	.415***	.328***	.775***	5.52	1.44	1.00	7.00	3.62	-1.01
p2	.706***	.397***	.373***	.890***	5.11	1.62	1.00	7.00	2.63	-0.66
p3	.711***	.421***	.354***	.897***	5.28	1.44	1.00	7.00	3.37	-0.88
p4	.723***	.406***	.389***	.908***	5.19	1.44	1.00	7.00	2.90	-0.68
p5	.730***	.424***	.393***	.904***	5.25	1.44	1.00	7.00	3.03	-0.73

Notes: $^{*}p<.05$, $^{***}p<.01$, $^{***}p<.001$; SD:Standard deviation; Min:Minimum; Max:Maximum; Skew:Skewness; Kurt:Kurtosis.

Table S14: Standardized factor loadings of a three-factor confirmatory factor analysis ($N_{Study\ 4}$=638).

Item	Factor 1	Factor 2	Factor 3
Temptation (t)			
t1	0.68***		
t2	0.73***		
t3	0.85***		
t4	0.84***		
t5	0.86***		
Social pressure (s)			
s1		0.76***	
s2		0.71***	
s3		0.86***	
s4		0.86***	
s5		0.86***	
Provocation (p)			
p1			0.67***
p2			0.82***
p3			0.89***
p4			0.92***
p5			0.91***

Notes: *p<.05, **p<.01, ***p<.001.

Table S15: Fit statistics for the constrained three-factor models ($N_{Study\ 4}$=638).

	χ^2 (df)	χ^2/df	CFI	RMSEA	SRMR	AIC	BIC
Congeneric	193.15*** (87)	2.22	0.98	0.05	0.03	25,318	25,532
Tau-equivalent	261.26*** (99)	2.64	0.97	0.06	0.07	25,388	25,549
Parallel	541.28*** (111)	4.88	0.90	0.10	0.06	25,833	25,940

Notes: CFI:Comparative Fit Index; RMSEA:Root Mean Square Error of Approximation; SRMR:Standardized Root Mean Square Residual; AIC:Akaike Information Criterion; BIC:Bayesian Information Criterion. $^{*}p<.05$, $^{**}p<.01$, $^{***}p<.001$. Scaled χ^2 difference tests between the congeneric and tau-equivalent model: $\chi^2_{diff}(12)=77{,}59$, $p<.001$. Scaled χ^2 difference tests between the tau-equivalent and parallel model: $\chi^2_{diff}(12)=197.95$, $p<.001$.

10.3 Appendix to Chapter 4

Table S1. **Vignette text.**

Please imagine the following situation:

- Your employer is a new and up-and-coming business. A personal performance evaluation will take place in two months. It will determine whether your employment contract and those of several other colleagues will be renewed.
- The basis for the evaluation is the successful completion of a work-intensive project. If your contract is renewed, you can finally make some purchases you have long wanted.
- During a break you are sitting together in the office with a couple of colleague friends. You talk about the work-intensive project and the possible renewal of the employment contracts.
- One colleague, whose contract has already been renewed indefinitely, asks whether anyone would be interested in prescription tablets to increase concentration during the upcoming work-intensive time. He happens to have a package with him. At first you don't respond, but your other colleagues would like to try the tablets and don't find the idea objectionable.
- After the other colleagues leave the room with the tablets, the first colleague speaks with you again. The colleague then asks if you're also interested or not.

Notes: Underscored text indicated part of the manipulation of moral norms of the setting. In the rule-abiding condition the first part is replaced with "don't want to try the tablets and even find the idea reprehensible" while the other parts are blank. An additional, orthogonal treatment by a statement after the second last sentence, which should justify the behavior, was not considered for this study.

Table S2**. Assessment of personal morality**

Question	How would you judge taking prescription medication to increase mental performance when otherwise not necessary due to an illness?
Facet	**Item**
Moral rule	I would find that immoral.
Guilt	I would feel guilty if I did that.
Shame	I would be ashamed of doing that if someone else found out.
Response options	1 "absolutely does not apply" - 2 "does not really apply" - 3 "partially applies" – 4 "mainly applies" – 5 "completely applies"

Table S3. **Descriptive statistics (N=3.053).**

	Correlation			Descriptives					
	Willingness of rule-breaking	Self-Control Ability	Personal morality	Mean	SD	Min	Max	Kurt	Skew
Willingness of rule-breaking	-			0.85	1.74	0.00	9.00	9.07	2.50
Self-Control Ability	-0.21***	-		0.00	1.00	-1.91	1.35	1.98	-0.27
Personal morality	-0.21***	0.13***	-	0.00	1.00	-4.62	2.02	3.92	-0.38

Notes: SD=Standard deviation; Min=Minimum; Max=Maximum; Skew=Skewness; Kurt=Kurtosis; $^{*}p<.05$, $^{**}p<.01$, $^{***}p<.001$.

10.4 Appendix to Chapter 5

Table S4. Linear regressions models of the interplay between self-control ability and deterrence on cheating (*N*=883)

	Model 5	Model 6	Model 7	Model 8
High deterrence	-1.45	2.45	2.02	2.26
	(0.158)	(0.307)	(0.422)	(0.500)
Honesty-discouraging moral rules	-0.74	0.22	-1.77	-1.61
	(0.458)	(0.790)	(0.446)	(0.563)
Self-control ability scale (SCAS)	-5.50**	-2.72	-5.37	-5.22
	(0.008)	(0.264)	(0.083)	(0.123)
Personal morality	-4.32**	-2.80	-3.59	-3.49
	(0.007)	(0.139)	(0.122)	(0.165)
High deterrence×honesty-discouraging moral rules	1.98	0.04	0.70	0.21
	(0.097)	(0.911)	(0.678)	(0.964)
High deterrence×SCAS	0.86	-5.44	-3.40	-3.81
	(0.492)	(0.161)	(0.397)	(0.490)
High deterrence×personal morality	0.13	-3.76	-4.82	-5.13
	(0.908)	(0.234)	(0.147)	(0.244)
Honesty-discouraging moral rules×SCAS	3.17*	1.70	6.28	5.99
	(0.012)	(0.075)	(0.102)	(0.203)
Honesty-discouraging moral rules×personal morality	-1.34	-1.31	-0.23	-0.45
	(0.242)	(0.253)	(0.941)	(0.903)
SCAS×personal morality	5.02*	2.44	4.62	4.44
	(0.029)	(0.394)	(0.203)	(0.266)

SCAS×honesty-discouraging moral rules×personal morality				-3.58 (0.436)	-3.20 (0.577)
High deterrence×honesty-discouraging moral rules×personal morality				2.39 (0.301)	3.03 (0.632)
High deterrence×honesty-discouraging moral rules×SCAS	-2.85 (0.090)			-3.72 (0.052)	-2.90 (0.708)
High deterrence×SCAS×personal morality		6.28 (0.189)		6.05 (0.207)	6.57 (0.333)
High deterrence×SCAS×honesty-discouraging moral rules×personal morality					-1.04 (0.914)

Notes: **p*<.05, ***p*<.01, ****p*<.001.

Hypotheses regarding compensatory effects of self-control ability and deterrence

Based on the concept of compensatory control (Kroneberg & Schulz, 2018; Sattler et al., 2022), we expect the negative effect of deterrence on rule-breaking to diminish as self-control ability increases (H2f). Thus, individuals with high self-control are expected to be less likely to be further deterred by strong external threats.

Furthermore, controls should only be relevant when personal morality or the moral rules of the setting are deviant. With stronger conforming personal morality, the impact of self-control ability on the effect of deterrence is expected to be weaker (H3c). Following the same argument, honesty-encouraging moral rules of the setting reduce the impact of self-control ability on the effect of deterrence compared to honesty-discouraging moral rules of the setting (H3d).

Models 5 and 6 in Table S4 test for potential compensatory effects between deterrence and self-control, depending on either personal morality or moral rules. While neither model yielded a statistically significant three-way interaction (failing to support H3c and H3d), the marginal effects (Table S5) and marginal effects plots for deterrence effects (Panel B in Figure S2) by self-control ability and moral rules conditions reveal a more complex picture.

In the honesty-encouraging moral rules condition, the effect of deterrence marginally weakens at increasing levels of self-control ability and becomes statistically non-significant for individuals with higher levels of self-control ability (>=+1SD). However, in the honesty-discouraging condition, high self-control ability appears to amplify the deterrence effect, which is contrary to our expectations.

The marginal effects (Table S6) and marginal effects plots for deterrence (Panel A in Figure S2) suggest that the marginal effect of deterrence for individuals with maximal conforming morality is slightly smaller with increasing levels of self-control ability albeit not statistically significant (difference in ME is 0.59, p=.549). In contrast, for individuals with personal morality two standard deviations below the mean the marginal effect of deterrence is greater with increasing levels of self-control (difference in ME is -1.78, p=.162). However, further research is needed to confirm this pattern. Nevertheless, for maximal scores on personal morality and self-control, the deterrence effect does not statistically significant differ from zero.

While a statistically significant interaction was not observed for the compensatory effect of self-control ability and deterrence, the marginal effects analysis suggests that the association between deterrence and self-control might vary depending on the moral rules of the setting. In the honesty-encouraging condition, the deterrent effect appears to diminish with increasing self-control ability. This could be explained by a potential redundancy between the two influences (cf. Hirtenlehner and Meško, Hirtenlehner and Leitgöb 2024)[20]. However, the finding that high self-control seems to amplify the deterrence effect in the honesty-discouraging condition is unexpected and requires further exploration. It is possible that under conditions where rule-breaking is seemingly tolerated, individuals with high self-control ability are more responsive to the external pressure of deterrence.

20 Hirtenlehner, H., & Meško, G. (2019). The compensatory effects of inner and outer controls. European Journal of Criminology, 16(6), 689-707.

Hirtenlehner, H., & Leitgöb, H. (2024). Deterrence Perceptions, Self-Control Ability and the Moral Filter: Conceptualizing and Testing a Model of a Subsidiary Relevance of Deterrence. Deviant Behavior, 1-28.

Table S5. Conditional marginal effects of deterrence on cheating depending on the level of self-control ability and moral rules of the setting and representative contrasts (based on Model 5 in Table 5.1, *N*=883)

		ME	p
Self-control ability	Moral rules of the setting		
1: -2SD	Honesty-encouraging	-1.09	0.039
2: -1SD	Honesty-encouraging	-0.93	0.005
3: Mean	Honesty-encouraging	-0.76	0.001
4: +1SD	Honesty-encouraging	-0.60	0.071
5: Max	Honesty-encouraging	-0.49	0.288
6: -2SD	Honesty-discouraging	0.04	0.948
7: -1SD	Honesty-discouraging	-0.34	0.306
8: Mean	Honesty-discouraging	-0.73	0.001
9: +1SD	Honesty-discouraging	-1.11	0.001
10: Max	Honesty-discouraging	-1.36	0.004
		Contrast	
5vs1		0.60	0.390
6vs1		1.13	0.138
10vs1		-0.27	0.701
6vs5		0.52	0.462
10vs5		-0.87	0.182
10vs6		-1.40	0.052

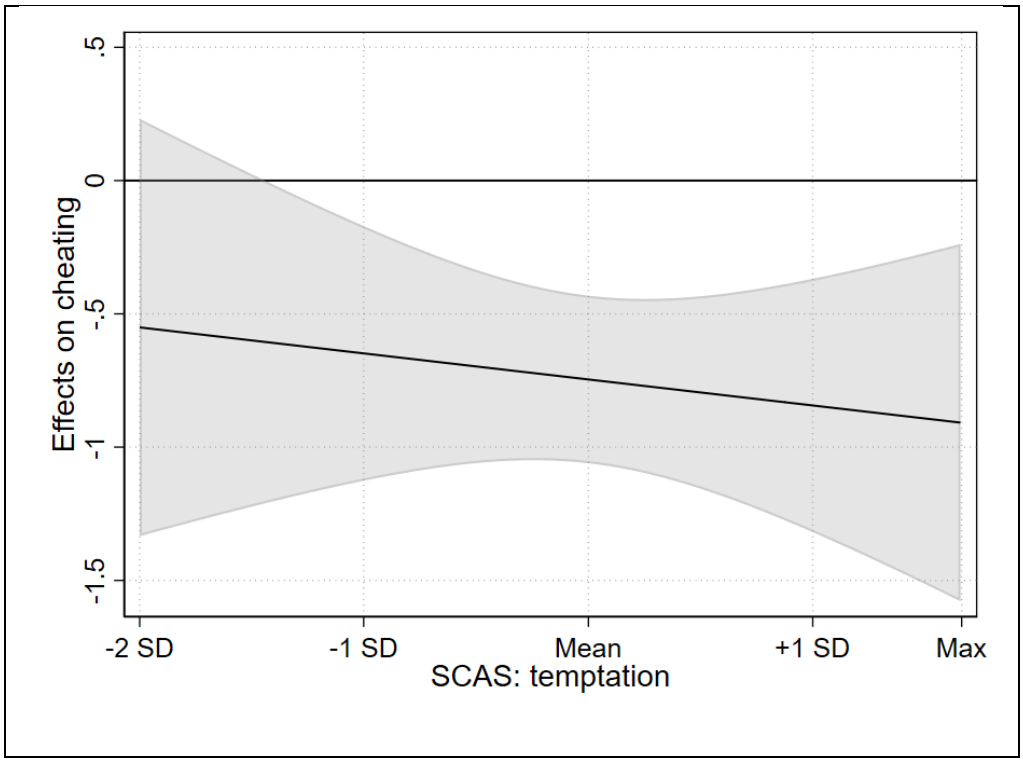
Notes: ME=Conditional marginal effect; SD=Standard deviation; Max=Maximum.

Table S6. Conditional marginal effects of deterrence on cheating depending on the level of self-control ability and personal morality and representative contrasts (based on Model 6 in Fehler! Verweisquelle konnte nicht gefunden werden.**Table 5.1, *N*=883)**

Personal morality:	-2SD		-1SD		Mean		+1SD		Max	
	ME	p	ME	p	ME	p	ME	p	ME	p
Self-control ability:										
1: -2SD	-0.03	0.960	-0.33	0.414	-0.63	0.118	-0.93	0.114	-1.04	0.126
2: -1SD	-0.51	0.181	-0.62	0.013	-0.73	0.004	-0.84	0.030	-0.88	0.051
3: Mean	-1.00	0.022	-0.92	0.001	-0.83	0.000	-0.75	0.002	-0.72	0.016
4: +1SD	-1.49	0.031	-1.21	0.006	-0.94	0.000	-0.66	0.017	-0.56	0.104
5: Max	-1.81	0.043	-1.41	0.016	-1.00	0.004	-0.60	0.114	-0.45	0.331
	Contrast									
1vs5	-1.78	0.096	-1.08	0.128	-0.37	0.483	0.33	0.643	0.59	0.475

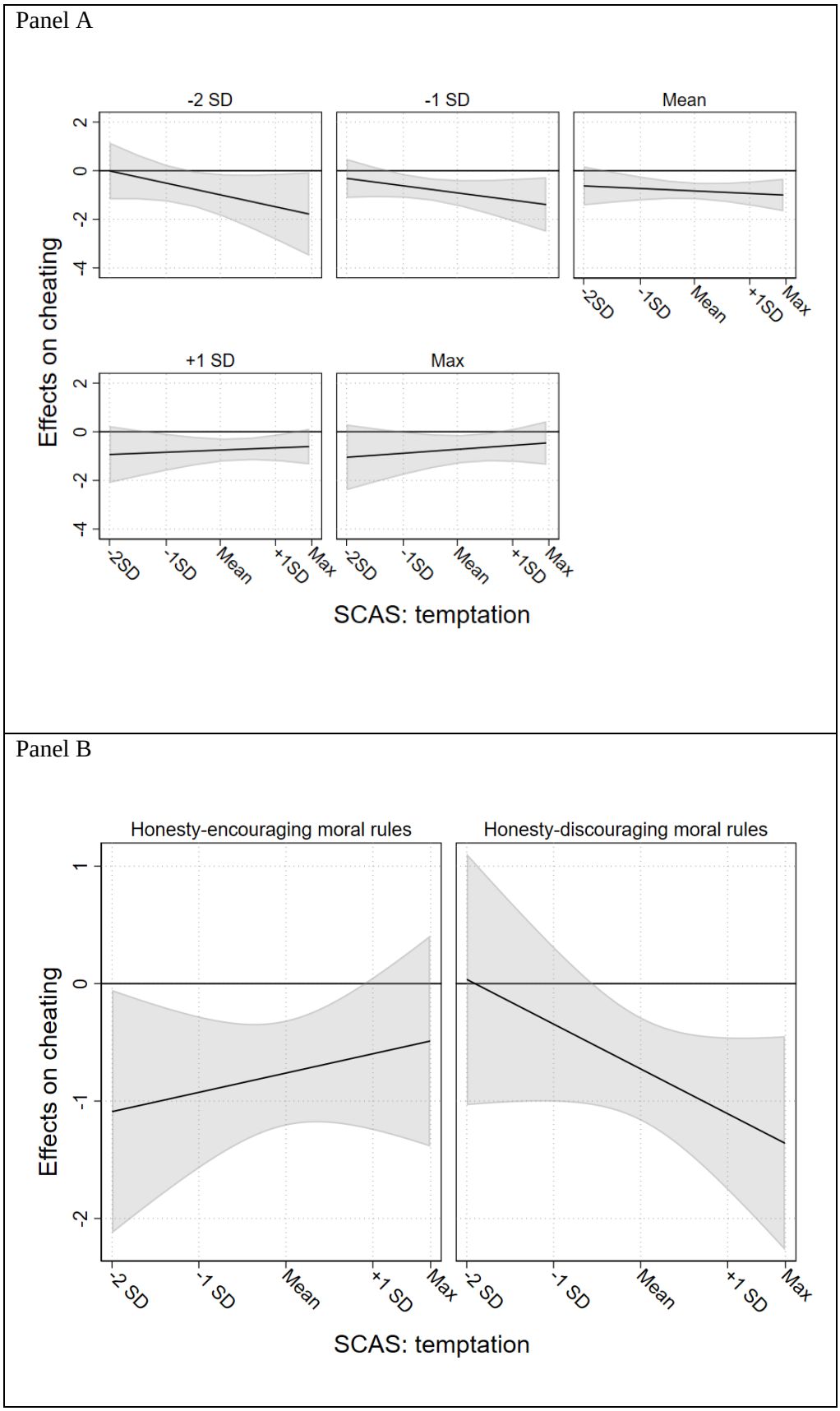
Notes: ME=Conditional marginal effect; SD=Standard deviation; Max=Maximum; Columns indicate different levels of self-control ability, rows different levels of personal morality.

Figure S1. Marginal effects of deterrence on cheating depending on self-control ability (based on Model 2 in Table 5.1, *N*=883)



Notes: SD=Standard deviation; Max=Maximum

Figure S2. Marginal effects of deterrence on cheating depending on self-control ability and personal morality (Panel A) or moral rules of the setting (Panel B, based on Models 5 and 6 in Fehler! Verweisquelle konnte nicht gefunden werden.**, *N*=883)**



Notes: SD=Standard deviation; Max=Maximum

Table S7. Assessment of cheating instances

Question
In which year was the Spanish-language hit 'Obsesión' by the band Aventura released*
With which singer did the British band The Cinematic Orchestra collaborate on the albums 'Every Day' and 'Ma Fleur'?
What is the name of the daughter of folk musician Maddy Prior, who is also a singer?
With which song did the band Blond win the Swedish preliminary round of the European Song Contest in 1997?
What is the name of the cover version by the punk band Fluchtweg of the song '3-Tage-Bart'?
From the instrumentalists of which rock group did the band Secret Chiefs 3 emerge?
What is an Ophicleide?*
What is the name of the hydraulic air reservoir of an organ?
In which city was singer Thomas Godoj born?
Which American blues singer won three Handy Awards in 2000 with the album Wicked?
What is the real name of the Dancehall deejay Elephant Man?
Which song by Antonio Carlos Jobim is considered the first Bossa Nova song?
Response option: *[open text field]*

Notes: * Indicates a simple question that does not count as cheating if answered correctly. Original German wording and answers available upon request.

Table S8. Moral rules of the setting treatment (the original German version is shown in parentheses)

Introduction	Next, we would like to ask you a few questions about Clickworker itself. We would like to inform you about the platform beforehand. Please read the following information carefully and then answer the questions on the following pages. (Als Nächstes würden wir Ihnen gerne ein paar Fragen zu Clickworker selbst stellen. Zuvor möchten wir Sie noch einmal über die Plattform informieren. Bitte lesen Sie sich dazu folgende Informationen aufmerksam durch und beantworten Sie dann die Fragen auf den folgenden Seiten.)	
Treatment condition	Honesty-encouraging moral rules of the setting	Honesty-discouraging moral rules of the setting
Treatment text	The Clickworker community is open and reliable and aims to provide employment opportunities for its members. Mutual trust is essential to this effort. By joining the community, Clickworkers accept the "Crowdworker Code of Conduct" and are committed to upholding the principles of reliability, honesty and fairness. (Die Clickworker-Community ist eine verlässliche Gemeinschaft, die Ihren Mitgliedern Beschäftigungsmöglichkeiten	Clickworker.de is a profit-oriented, low-wage service where customers can hand over labor-intensive tasks to freelancers, so-called 'Clickworkers'. The 'Clickworkers' complete the tasks cost-efficiently and flexibly and help the customers to increase their profits. The 'Clickworkers' do not receive minimum wage and sick pay, nor do they have protection against dismissal. (Clickworker.de ist ein gewinnorientiertes Angebot im Niedriglohnbereich, bei dem

	bieten möchte. Wesentlich für dieses Bestreben ist gegenseitiges Vertrauen. Mit dem Beitritt zur Community akzeptieren die Clickworker den „Crowdworker Verhaltenskodex". Sie verpflichten sich, die im Verhaltenscodex verankerten Prinzipien der Verlässlichkeit, Ehrlichkeit und Fairness zu wahren.)	Kunden arbeitsintensive Aufgaben an freie Mitarbeiter, sogenannte „Clickworker", abgeben können. Die „Clickworker" erledigen die Aufgaben kostengünstig und flexibel und ermöglichen so die Gewinne der Kunden zu steigern. Die „Clickworker" bekommen keinen Mindestlohn und keine Lohnfortzahlung im Krankheitsfall und haben auch keinen Kündigungsschutz.)
Question	To confirm that you have read the information, please write the last sentence of this information in the following text field: (Bitte schreiben Sie zur Bestätigung, dass Sie die Informationen gelesen haben, den letzten Satz dieser Informationen in das folgende Textfeld:) [*open text field*]	

Table S9. Assessment of personal morality (the original German version is shown in parentheses) as well as exploratory factor analysis (*N*=883)

Question	Here you will find behaviours about which you can have different opinions. How guilty would you feel if you did any of the following? (Hier finden Sie Verhaltensweisen, über die man verschiedener Meinung sein kann. Wie schuldig würden Sie sich fühlen, wenn Sie etwas von den folgenden Dingen tun würden?)	
Offense		**Factor loading**
Wardrobing	Ordering something online (e.g. clothing or technology) to use it and return it after use. (Im Internet etwas bestellen (z. B. Kleidung oder Technik), um es zu benutzen und nach Gebrauch zurückzuschicken.)	0.47
Dishonest selling	Concealing defects when selling something online (e.g. on eBay classifieds). (Bei einem Verkauf im Internet (z. B. bei ebay-Kleinanzeigen) Mängel verschweigen.)	0.59
Dishonest crowdwork	Not always being completely honest when processing orders on crowdsourcing platforms. (Bei der Bearbeitung von Aufträgen bei Crowdsourcing-Plattformen nicht immer ganz ehrlich sein.)	0.78
Careless crowdwork	Carelessly processing orders on crowdsourcing platforms in order to earn money as quickly as possible. (Aufträge bei Crowdsourcing-Plattformen unachtsam bearbeiten, um möglichst schnell Geld zu verdienen.)	0.78
Response options	1 *not guilty at all* - 2 - 3 - 4 - 5 - 6 - 7 *very guilty*	

	(1 *überhaupt nicht schuldig* - 2 - 3 - 4 - 5 - 6 - 7 *sehr schuldig*)

Notes: A exploratory factor analysis revealed one factor (Eigenvalue is 1.78). The Kaiser-Mayer Olkin (KMO) score was 0.66.

Table S10. Assessment of the Self-Control Ability Scale (the original German version is shown in parentheses) as well as exploratory factor analysis (*N*=883)

Question	Sometimes people get into situations in which they experience personal moral conflict. The following statements show how people deal with these situations. *Please read them through and state how you deal with such situations in general.(*Manchmal kommen Menschen in Situationen, in denen sie Konflikte mit ihren moralischen Prinzipen erleben. Im Folgendem finden Sie einige Aussagen dazu, wie Menschen damit umgehen. *Bitte lesen Sie diese durch und geben Sie an, wie Sie im Allgemeinen mit solchen Situationen umgehen.)*	
Item		**Factor loading**
t1	Even in a situation in which I can get something I absolutely want, I don't abandon my moral principles. (Auch wenn ich in einer Situation etwas bekommen kann, was ich unbedingt haben will, werfe ich meine moralischen Prinzipien nicht über Bord.)	0.80
t2	No matter how tempting a situation is, I stand firm and don't give in. (Egal wie verlockend eine Situation ist, ich bleibe standhaft und reagiere nicht darauf.)	0.63
t3	Even if I have a favorable opportunity to obtain something valuable, I manage to stick to my principles. (Trotz einer günstigen Gelegenheit etwas Wertvolles zu bekommen, schaffe ich es, meinen Prinzipien treu zu bleiben.)	0.83
t4	Regardless of what personal advantages I can gain, I make decisions in accordance with my moral principles. (Unabhängig	0.75

	davon, welche persönlichen Vorteile ich haben kann, treffe ich Entscheidungen entsprechend meiner moralischen Prinzipien.)	
t5	Even when I am exposed to strong temptations, I still stay true to my moral principles. (Auch wenn ich in einer Situation starken Versuchungen ausgesetzt bin, kann ich mich an meine moralischen Grundsätze halten.)	0.86
Response options	1 *doesn't apply at all* – 2 – 3 – 4 – 5 – 6 – 7 *applies completely* (1 *trifft überhaupt nicht zu* - 2 - 3 - 4 - 5 - 6 - 7 *trifft voll und ganz zu)*	

Notes: A exploratory factor analysis revealed one factor (Eigenvalue is 3.02). The Kaiser-Mayer Olkin (KMO) score was 0.88.

Table S11. Descriptive statistics (*N*=883)

	Mean	Standard Deviation	Minimum	Maximum	Skewness	Kurtosis
Cheating instances	1.49	2.43	0.00	10.00	1.73	5.02
Self-control ability scale (SCAS)	0.68	0.19	0.00	1.00	-.46	2.82
Personal morality	0.78	0.16	0.00	1.00	-.82	3.71

Table S12. Pearson correlations (*N*=883)

	1.	2.	3.	4.	5.	6.
1. Cheating	1.00					
2. Moral rules of the setting (honesty-encouraging 0, honesty-discouraging 1)	0.08*	1.00				
3. Deterrence (low 0, high 1)	-0.16***	-0.01	1.00			
4. Self-control ability scale (SCAS)	-0.08*	0.00	0.05	1.00		
5. PADS+ self-control	-0.09**	-0.03	0.02	0.27***	1.00	
6. Personal morality	-0.14***	-0.02	0.03	0.48***	0.26***	1.00

Notes: *p<.05, **p<.01, ***p<.001.

Table S13. Conditional marginal effects of self-control ability, and deterrence on cheating depending on the level of personal morality and moral rules of the setting and representative contrasts (based on Model 3 and Model 4 in Table 5.1, *N*=883)

		Self-control ability		Deterrence	
		ME	p	ME	p
Level of conforming personal morality	Moral rules of the setting				
1: -2SD	Honesty-encouraging	-3.17	0.012	-0.76	0.173
2: -1SD	Honesty-encouraging	-2.16	0.013	-0.76	0.027
3: Mean	Honesty-encouraging	-1.15	0.083	-0.76	0.001
4: +1SD	Honesty-encouraging	-0.15	0.856	-0.77	0.023
5: Max	Honesty-encouraging	0.23	0.802	-0.77	0.062
6: -2SD	Honesty-discouraging	-0.32	0.794	-0.79	0.134
7: -1SD	Honesty-discouraging	0.16	0.846	-0.76	0.020
8: Mean	Honesty-discouraging	0.65	0.345	-0.73	0.001
9: +1SD	Honesty-discouraging	1.13	0.197	-0.70	0.034
10: Max	Honesty-discouraging	1.31	0.193	-0.69	0.087
		Contrast			
5vs1		3.40	0.030	-0.01	0.986
6vs1		2.85	0.105	-0.04	0.959
10vs1		4.48	0.006	0.07	0.920
6vs5		-0.55	0.720	-0.03	0.968
10vs5		1.08	0.432	0.08	0.888
10vs6		1.63	0.303	0.11	0.871

Notes: ME=Conditional marginal effect; SD=Standard deviation; Max=Maximum.

Table S14. Linear regressions models on cheating - speeder included (*N*=897)

	Model 1	Model 2	Model 3	Model 4
High deterrence	-0.73***	-0.21	-0.21	0.11
	(0.000)	(0.799)	(0.798)	(0.927)
Honesty-discouraging moral rules	0.42**	0.67	0.29	0.93
	(0.008)	(0.415)	(0.891)	(0.376)
Self-control ability scale (SCAS)	-0.25	-3.51	-3.84	-3.51
	(0.599)	(0.068)	(0.138)	(0.069)
Personal morality	-1.67**	-2.99	-3.23	-2.84
	(0.003)	(0.050)	(0.100)	(0.073)
High deterrence×honesty-discouraging moral rules		-0.05	-0.05	-0.67
		(0.872)	(0.868)	(0.670)
High deterrence×SCAS		-0.60	-0.59	-0.60
		(0.524)	(0.530)	(0.528)
High deterrence×personal morality		-0.10	-0.11	-0.51
		(0.929)	(0.926)	(0.738)
Honesty-discouraging moral rules×SCAS		1.52	2.17	1.51
		(0.107)	(0.540)	(0.110)
Honesty-discouraging moral rules×personal morality		-1.60	-1.11	-1.94
		(0.156)	(0.698)	(0.168)
SCAS×personal morality		3.61	4.02	3.62
		(0.100)	(0.191)	(0.101)
SCAS×honesty-discouraging moral rules×personal morality			-0.83	
			(0.849)	
High deterrence×honesty-discouraging moral rules×personal morality				0.79
				(0.688)

Notes: *p<.05, **p<.01, ***p<.001.

Table S15. Linear regressions models on cheating - participants with deviant personal morality excluded (*N*=876)

	Model 1	Model 2	Model 3	Model 4
High deterrence	-0.74***	-0.41	-0.51	-0.41
	(0.000)	(0.543)	(0.458)	(0.619)
Honesty-discouraging moral rules	0.36*	-0.41	-1.55	-0.42
	(0.025)	(0.538)	(0.329)	(0.608)
Self-control ability scale (SCAS)	-0.21	-2.36	-3.45	-2.36
	(0.660)	(0.105)	(0.086)	(0.109)
Personal morality	-1.06**	-2.14	-3.09	-2.15
	(0.008)	(0.081)	(0.072)	(0.104)
High deterrence×honesty-discouraging moral rules		0.04	0.04	0.06
		(0.891)	(0.899)	(0.956)
High deterrence×SCAS		-0.42	-0.34	-0.42
		(0.659)	(0.726)	(0.659)
High deterrence×personal morality		-0.10	-0.05	-0.09
		(0.899)	(0.952)	(0.932)
Honesty-discouraging moral rules×SCAS		1.69	3.59	1.69
		(0.078)	(0.165)	(0.078)
Honesty-discouraging moral rules×personal morality		-0.60	1.12	-0.59
		(0.448)	(0.629)	(0.565)
SCAS×personal morality		2.25	3.74	2.25
		(0.188)	(0.142)	(0.193)
SCAS×honesty-discouraging moral rules×personal morality			-2.75	
			(0.429)	
High deterrence×honesty-discouraging moral rules×personal morality				-0.02
				(0.989)

Notes: *p<.05, **p<.01, ***p<.001.

Table S16. Linear regressions models on cheating - PADS+ self-control instead of Self-control ability scale (*N*=883)

	Model 1	Model 2	Model 3	Model 4
High deterrence	-0.75***	-0.26	-0.26	0.14
	(0.000)	(0.790)	(0.790)	(0.915)
Honesty-discouraging moral rules	0.37*	0.59	0.49	0.90
	(0.022)	(0.533)	(0.873)	(0.437)
PADS+ self-control	-0.94	-8.98***	-9.05*	-9.06***
	(0.089)	(0.001)	(0.011)	(0.001)
Personal morality	-1.78***	-7.78***	-7.84**	-7.63***
	(0.001)	(0.000)	(0.003)	(0.000)
High deterrence×honesty-discouraging moral rules		0.02	0.02	-0.72
		(0.946)	(0.948)	(0.657)
High deterrence×SCAS		-0.21	-0.21	-0.22
		(0.849)	(0.852)	(0.843)
High deterrence×personal morality		-0.44	-0.44	-0.93
		(0.677)	(0.677)	(0.533)
Honesty-discouraging moral rules×SCAS		-0.21	-0.06	-0.19
		(0.848)	(0.991)	(0.862)
Honesty-discouraging moral rules×personal morality		-0.13	-0.01	-0.55
		(0.899)	(0.997)	(0.688)
SCAS×personal morality		10.47**	10.56*	10.56***
		(0.001)	(0.014)	(0.001)
SCAS×honesty-discouraging moral rules×personal morality			-0.20	
			(0.975)	
High deterrence×honesty-discouraging moral rules×personal morality				0.94
				(0.641)

Notes: *p<.05, **p<.01, ***p<.001.

Table S17. Linear regressions models on cheating - two questions known (*N*=883)

	Model 1	Model 2	Model 3	Model 4
High deterrence	-0.48***	-0.29	-0.31	-0.23
	(0.000)	(0.645)	(0.615)	(0.786)
Honesty-discouraging moral rules	0.21	-0.02	-1.17	0.02
	(0.071)	(0.970)	(0.476)	(0.979)
Self-control ability scale (SCAS)	-0.16	-3.81**	-4.82*	-3.80**
	(0.640)	(0.009)	(0.015)	(0.009)
Personal morality	-1.33**	-3.58**	-4.31**	-3.55**
	(0.001)	(0.002)	(0.005)	(0.004)
High deterrence×honesty-discouraging moral rules		-0.12	-0.13	-0.22
		(0.598)	(0.587)	(0.850)
High deterrence×SCAS		-0.26	-0.22	-0.26
		(0.707)	(0.750)	(0.708)
High deterrence×personal morality		0.07	0.07	-0.00
		(0.938)	(0.936)	(0.999)
Honesty-discouraging moral rules×SCAS		1.08	3.05	1.08
		(0.118)	(0.259)	(0.119)
Honesty-discouraging moral rules×personal morality		-0.57	0.94	-0.62
		(0.495)	(0.664)	(0.552)
SCAS×personal morality		4.14*	5.38*	4.14*
		(0.013)	(0.022)	(0.013)
SCAS×honesty-discouraging moral rules×personal morality			-2.50	
			(0.452)	
High deterrence×honesty-discouraging moral rules×personal morality				0.13
				(0.931)

Notes: *p<.05, **p<.01, ***p<.001.

Table S18. Linear regressions models on cheating - self-reported music knowledge included as covariate (*N*=833)

	Model 1	Model 2	Model 3	Model 4
High deterrence	-0.82***	-0.72	-0.74	-0.78
	(0.000)	(0.393)	(0.378)	(0.507)
Honesty-discouraging moral rules	0.37*	0.19	-0.83	0.14
	(0.018)	(0.820)	(0.710)	(0.896)
Self-control ability scale (SCAS)	-0.40	-4.65*	-5.55*	-4.66*
	(0.396)	(0.018)	(0.038)	(0.018)
Personal morality	-1.87***	-4.33**	-4.98*	-4.36**
	(0.001)	(0.006)	(0.016)	(0.008)
Self-reported music knowledge	0.24***	0.24***	0.24***	0.24***
	(0.000)	(0.000)	(0.000)	(0.000)
High deterrence×honesty-discouraging moral rules		0.02	0.01	0.13
		(0.959)	(0.967)	(0.937)
High deterrence×SCAS		-0.43	-0.40	-0.43
		(0.644)	(0.672)	(0.644)
High deterrence×personal morality		0.24	0.24	0.31
		(0.831)	(0.830)	(0.839)
Honesty-discouraging moral rules×SCAS		1.50	3.23	1.50
		(0.111)	(0.376)	(0.111)
Honesty-discouraging moral rules×personal morality		-1.08	0.25	-1.02
		(0.335)	(0.932)	(0.470)
SCAS×personal morality		4.77*	5.86	4.77*
		(0.034)	(0.064)	(0.034)
SCAS×honesty-discouraging moral rules×personal morality			-2.21	
			(0.622)	
High deterrence×honesty-discouraging moral rules×personal morality				-0.14
				(0.944)

Notes: *p<.05, **p<.01, ***p<.001.