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Why Do Harsh and Unpredictable Environments Lead to Delinquency? The Case for Unpredictability Schemas and Short-Term Mindsets

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Abstract

Objectives: We test whether there is a shared mechanism between many environmental risk factors and delinquency. Youth developing in harsh and unpredictable environments can adopt the belief that the world is chaotic, people are undependable, and they are unable to control their circumstances (i.e., an unpredictability schema). They may then opt to focus on the present (i.e., a short-term mindset), rather than invest in a future that is not stable or guaranteed. ***Methods:*** We test this idea by examining whether harsh and unpredictable environments are associated with delinquency—first through unpredictability schemas and then short-term mindsets—using structural equation models of two representative and geographically diverse longitudinal datasets. ***Results:*** Results show that many indicators of harsh and unpredictable environments predict unpredictability schemas and short-term mindsets. Their relationships with delinquency are mediated through short-term mindsets, especially sensation-seeking, but less so through unpredictability schemas. ***Conclusions:*** Similar findings across the datasets suggest short-term mindsets may be evoked as a response to harsh and unpredictable environments, namely unpredictable parenting and violence among peers. This illuminates the consequences of exposure to adverse environments and lends credence to the idea that short-term mindsets can help explain the link between many risk factors and crime.

Keywords

short-term mindsets, self-control, longitudinal, structural equation modeling

Introduction

Throughout the history of criminology, researchers have shown a variety of environmental factors—including inconsistent, harsh, or unattached parenting, family instability, exposure to violence, socioeconomic status (SES), and delinquent peers—to increase the risk of adolescent delinquency. Despite finding consistent relationships between these diverse environmental risk factors and delinquent outcomes, perspectives that can provide an integrative account for these relationships have been less forthcoming. With few exceptions, theorists have thus far focused on explaining the processes through which a specific risk factor (or subset) is linked to delinquency, independent of the others. In this article, we address this dispersed state of current knowledge by providing an integrative perspective linking risk factors to delinquency.

Our perspective is premised on three key assumptions. First, drawing from developmental and evolutionary psychology, we argue that many environmental risk factors can be categorized as "harsh" and/or "unpredictable" (Doom, Vanzomeren-Dohm, and Simpson 2016; Dickerson, Milojevich, and Quas 2019; Ellis et al. 2009). Second, we argue that harsh and unpredictable environments may predispose adolescents to a delinquent lifestyle through a shared mechanism. Specifically, such environments change the ways adolescents view the world and make decisions. In harsh and unpredictable environments, adolescents may develop a pervasive belief that the world is unpredictable, uncontrollable, and untrustworthy (Ross and Hill 2002; Ross, Short, and Garofano 2016). This belief system, termed an *unpredictability schema*, can lead adolescents to have little faith in their own ability to alter or cope with their circumstances (i.e., low self-efficacy) and little trust in others' tendencies to act in predictable and reliable ways (Ross and Hill 2002).

Third, we argue that harsh and unpredictable environments—and the unpredictability schemas they beget—increase the salience of the present moment. Individuals will view their future as likely to be harsh and unpredictable, much like their present. Without confidence that future goals will come to fruition, it makes little sense to delay gratification. This can lead adolescents to adopt a *short-term mindset*, an umbrella term we use to capture multiple constructs that denote a tendency to focus on the present while disregarding or discounting the future (Daly and Wilson 2005; Frankenhuis, Panchanathan, and Nettle 2016; van Gelder et al. 2018, 2020). These constructs include (among others) impulsivity, an inability to resist immediate temptations, sensation-seeking, a preference for exciting and thrilling experiences in the moment, and (the lack of) future orientation, the tendency to make plans or goals for the future and act in accordance with them (Arneklev, Grasmick, and Bursik 1993; Burt et al. 2014; Corral-Verdugo and Pinheiro, 2006; Steinberg et al. 2009). As ample research bears out, present orientation increases delinquent involvement (Mamayek, Paternoster, and Loughran 2017; Pratt and Cullen 2000; van Gelder et al. 2020). We argue that this present orientation may stem from a reasonable response to harsh and unpredictable conditions.

In this article, we test the extent to which unpredictability schemas and/or short-term mindsets mediate the relationship between harsh and unpredictable environments and crime. We examine whether these two mediators act in parallel (separately) or in sequence, with unpredictability schemas contributing to short-term mindsets (see Figure 1), offering two potential mediators to account for the relationship between many well-known environmental risk factors and delinquency. To do so, we conduct preregistered

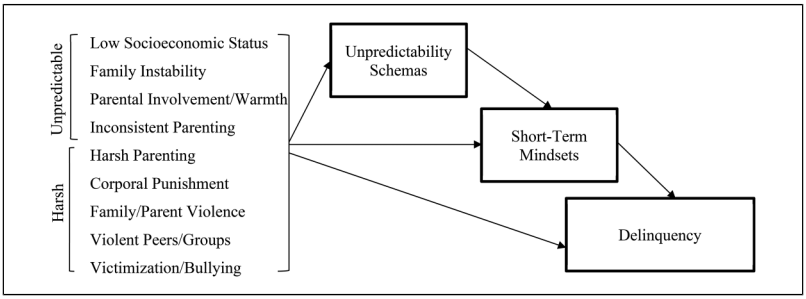

Figure 1. Hypothesized mediation model.

structural equation models amongst two geographically diverse longitudinal datasets containing adolescent self-report data (Ribeaud et al. 2022; Spoth et al. 2007). We thus present both a test of our theory and a conceptual replication, or an attempt to test the same hypotheses with different data or methods with the aim of extending the generalizability of results (Apicella and Barrett 2016; Pridemore, Makel, and Plucker 2018). In doing so, we identify areas of convergence for our hypotheses across two samples that vary on the domains of interests and differ in their measures of key constructs. Below, we elaborate on harsh and unpredictable environments and how these risk factors may feed into unpredictability schemas, short-term mindsets, and crime.

Theoretical Framework

Harsh and Unpredictable Environments

Both harsh and unpredictable environments are harmful for adolescent development and may foster behavior problems, including criminal involvement (Dickerson et al. 2019; Figueredo and Jacobs 2010). *Unpredictable environments* are characterized by "frequent, rapid, and/or chaotic changes in the home or local environment" (Doom et al. 2016: 2). Two examples of such environments are family instability, including change in family structure or residence (Cavanagh and Fomby 2019; Fomby and Cherlin 2007; Haynie and South 2005) and parenting inconsistently or without a securely attached, nurturing, and caring relationship (Patterson, Dishion, and Bank 1984; Simons, Simons, and Wallace 2004; van Gelder et al. 2018), both of which have been linked to delinquency. *Harsh environments* are those where insufficient resources or exposure to violence may

signal an enhanced risk of mortality or morbidity (Ellis et al. 2009). This includes many well-known predictors of delinquency, such as SES (Brooks-Gunn and Duncan 1997; Jarjoura, Triplett, and Brinker 2002; Rekker et al. 2015) and witnessing or experiencing violence through corporal punishment, violent family conflict, personal victimization, or violence amongst peers (Moylan et al. 2010; Osofsky 1999; Unnever, Cullen, and Agnew 2006; van Gelder et al. 2018; Warr 2002). The impact of harsh and unpredictable environments on delinquency may be explained, in part or in full, by what these environments teach adolescents about their world and future.

Unpredictable environments can signal that others—such as caregivers—will not predictably meet needs or reward behavior, leading adolescents to prioritize rewards when they become available. In households where family relationships are weak (i.e., low parental involvement or attachment) or unstable (i.e., family instability), adolescents may view these relationships as an unreliable source of physical or emotional care. Unfair and inconsistent discipline practices can also paint the future as unpredictable and people as unreliable (Ross and Hill 2002). In unpredictable environments, individuals often cannot count on delayed rewards to manifest themselves, reducing the utility of waiting (Pepper and Nettle 2017). For example, the famous "marshmallow test" assesses youths' ability to wait by leaving them alone in a room with a single marshmallow. They are told that if they can wait to eat the marshmallow until the experimenter returns, they will be given a second marshmallow. However, when experimenters show themselves to be untrustworthy prior to this instruction, adolescents are much less likely to delay gratification in hopes of a second marshmallow (Kidd, Palmeri, and Aslin 2013; replicated by Moffett, Flannagan, and Shah 2020). Children exposed to higher levels of family instability likewise exert less effortful control when faced with a tempting reward (Sturge-Apple et al. 2017). On a larger scale, children who have low attachment to, or inconsistent, caregivers are more likely to develop short-term mindsets (Janssen et al. 2016; Unnever et al. 2006; van Gelder et al. 2018).

In harsh economic circumstances, adolescents may similarly become preoccupied with satisfying their immediate needs over reaching longer-term goals (Bernheim, Ray, and Yeltekin 2015; Haushoffer and Fehr 2014). Low income can hinder a parent's ability to consistently provide necessities, and adolescents may lose trust in the ability of adults to do so in the future. In environments where there is a good deal of competition for resources and social status, individuals must be willing to take risks when rewards are available (Frankenhuis et al. 2016; Kruger, Reischl, and Zimmerman 2008). Such

rewards can lead to great life improvements, while punishments, if received, may not significantly worsen one's situation (De Courson and Nettle 2021). Resource deprivation can also "tap out" one's mental reserves, leaving little capacity for considering future consequences (Sheehy-Skeffington 2019; Mullainathan and Shafir 2013; Vohs 2013). Indeed, low income is linked to present orientation and discounting the future in both observational and experimental studies (Bernheim et al. 2015; Haushoffer and Fehr 2014).

In harsh violent environments, adolescents may come to view their world as chaotic and unsafe, and thus give little weight to the future (Brezina Tekin and Topalli 2009; Ross and Hill 2002). If violent environments lead one to believe their expected future is short, hopeless, or uncertain, it makes little sense to deliberate based on future costs and benefits (Brezina et al. 2009; Caldwell, Wiebe, and Cleveland 2006; Hill, Ross, and Low 1997; Gardner 1993; Wilson and Daly 1997). Violent environments may also require fast, intuitive decision-making to respond quickly to potential threats (Frankenhuis et al. 2016; Heller et al. 2017; Rivers, Gibbs, and Paternoster 2017). In support of these arguments, prior research finds witnessing or experiencing violence in the home and community, including corporal punishment, harsh parenting, family conflict, community violence, and victimization, to be associated with increased short-term mindsets, with some evidence that short-term mindsets (as well as hostile views of others and a cynical view of conduct norms; Simons and Burt 2011) mediate these risk factors' independent relationships with delinquency (Agnew et al. 2011; Davis et al. 2017; Kim, Siennick, and Hay 2020; Monahan et al. 2015; Tillyer 2015; Unnever et al. 2006; van Gelder et al. 2018).

Short-Term Mindsets and Crime

Criminologists find that individuals who are most focused on short-term rewards of their behaviors are more likely to engage in crime (Mamayek, Paternoster, and Loughran 2017; Pratt and Cullen 2000; van Gelder et al. 2020). A focus on the short term can make criminal behavior more appealing, as it is often accompanied by immediate rewards (e.g., money, property, social status, or thrill), despite the potential for long-term costs. Most attention has been given to Gottfredson and Hirschi's (1990) concept of self-control, "the idea that people also differ in the extent to which they are vulnerable to the temptations of the moment" (p. 87). Self-control has come to be understood as a multidimensional construct (Burt, Sweeten, and Simons 2014; Grasmick et al. 1993), two components of which are impulsivity, an inability to resist immediate temptations, and risk-seeking

(or sensation-seeking),[1] a preference for exciting and thrilling experiences in the moment. Researchers have found both to have robust associations with crime (Arneklev, Grasmick, and Bursik 1993; Burt et al. 2014).

In this article, we use "short-term mindsets" as an umbrella term to capture these multiple constructs that denote a tendency to focus on the present while disregarding or discounting the future (van Gelder et al. 2018). In doing so, we depart from prior criminological research, which has focused largely on self-control (Burt 2020). We use this term rather than self-control for several reasons. First, self-control includes many components that do not reflect an orientation toward the present, while omitting many others that do. Our approach is in comparison more focused, including only the self-control components meant to indicate an (over)emphasis on the present and adding a previously excluded but important form of short-term mindset: future orientation, which denotes the tendency to make plans or goals for the future and act in accordance with them. Future orientation is also associated with less offending in adolescence (Corral-Verdugo, and Pinheiro 2006; Steinberg et al. 2009).

Second, we study the different forms of short-term mindsets separately, recognizing that they are interrelated but distinct in their meaning and impact (Steinberg et al. 2008). All three constructs (impulsivity, sensation seeking, and lack of future orientation) share an emphasis on the tendency to devalue or ignore the future and are linked with delinquent behavior; yet, future orientation reflects the tendency to *deliberately* discount the future, whereas impulsivity and sensation-seeking reflect an *inability* or a *failure* to do so (Jaynes et al. 2022; Nagin and Pogarsky 2004). The former is seen as more cognitive and deliberative, while the latter can be viewed as reflective of automatic processes or a desire to avoid effortful cognition. These are two disparate mechanisms through which adolescents may prioritize the present, and the causes and consequences of each differ (see Jaynes et al. 2022; Nagin and Pogarsky 2004). Moreover, studies find impulsivity, sensation-seeking, and future orientation exert independent effects on delinquency (Arneklev et al. 1993; Burt et al. 2014; van Gelder et al. 2018, 2020). They also follow distinct developmental trajectories (Shulman et al., 2016; Steinberg et al. 2008) and have different neurobiological underpinnings (Burt 2020).

Third, self-control is assumed to be a trait formed in early childhood through effective parental monitoring, after which it remains relatively stable (which has not been borne out by the empirical evidence; see Burt 2020). While parental monitoring certainly plays a role in the development of short-term mindsets (Janssen et al. 2016; Unnever et al. 2006), we posit

that the reasons extend far beyond what was specified in self-control theory. Namely, the harshness and unpredictability of one's environment may increase short-term mindsets either directly or indirectly, through unpredictability schemas. Directly, harsh and unpredictable environments may present a drain on cognitive capacity, limiting one's ability to deliberate based on long-term outcomes (Sheehy-Skeffington 2019; Mullainathan and Shafir 2013; Vohs 2013), or necessitate fast, intuitive decision-making in the face of present rewards or immediate threats (Frankenhuis et al. 2016; Heller et al. 2017; Kruger et al. 2008). Or, adolescents may simply perceive a lack of promising prospects ahead, leaving them with few reasons to value and prioritize their future when deciding on a present course of action (Jaynes et al. 2022).

Indirectly, one's environment may serve as an important source of information about the predictability, fairness, and safety of the future world (Ross and Hill 2002), which can likewise speak to whether it is rational or adaptive to consider the future and avoid risks (Hill et al. 1997). One's environment contributes to a belief system about the degree to which one's environment can be predicted, controlled, and trusted (i.e., an unpredictability schema), resembling the inverse of the analogous constructs of self-efficacy and social/interpersonal trust. Ross and Hill (2002) argue that short-term mindsets will also be heightened among those with unpredictability schemas. If individuals see their world as uncontrollable, untrustworthy, and uncertain, it reduces the utility of deliberation based on future consequences (Gardner 1993). As Burt (2020) wrote, "Having strongly held goals and self-efficacy and perceived control over the ability to reach one's goals is the sine qua non of self-control… Deprivation without purpose is both irrational and non-adaptive" (p. 64). We thus allow for environmental factors, personal experiences, and perceived self-efficacy and trust to alter one's level of short-term mindset.

Lastly, criminologists tend to view short-term mindsets as a deficit, in that they presume that certain individuals lack the ability to delay gratification or consider the future consequences given immediate rewards (Gottfredson and Hirschi 1990). Our perspective acknowledges that short-term mindsets may result from adaptive developmental processes that tailor cognition and behavior to harsh and unpredictable environments. A focus on the present may in fact be a reasonable response to the costs and benefits faced by people living in adverse conditions (Frankenhuis and Nettle 2020; Pepper and Nettle 2017). It can then be viewed as a mediator between environment and delinquency, rather than only an individual difference that predicts offending.

Criminological Research on Cognition in Harsh and Unpredictable Environments

Though the abundance of relevant work on how harsh and unpredictable environments alter cognition stems from evolutionary and developmental psychology, this is not an entirely new idea in criminology. A plethora of qualitative research highlights a "live for today" mindset amongst offenders; a common thread amongst these narratives is the sense that tomorrow is not guaranteed in their current environment and lifestyles (Anderson 1999; Hoffman 2004; Topalli and Wright 2004). For example, Brezina et al. (2009) asked active offenders about their views of the future, finding that many persons involved in crime either have negative, fatalistic views of the future or are "futureless," perceiving that it may be likely for them to die an early death. In a similar vein, quantitative analyses link exposure to violence to anticipated early death (Swisher and Warner 2013; Tillyer 2015; Warner and Swisher 2014) and anticipated early death to later offending (Brezina et al. 2009; Caldwell et al. 2006; Jaynes et al. 2022; Piquero 2016).

Other criminological work has begun to understand short-term mindsets as a potential response to environmental factors which can mediate its relationship with offending. For example, van Gelder et al. (2018) find inconsistent and harsh punishment to increase short-term mindsets, partially mediating its relationship with crime. Exposure to violence and bullying victimization has also been found to have indirect relationships with later offending through short-term mindsets (Stoddard et al. 2015; Walters and Espelage 2017). Most relevant to the current work, however, is Simons and Burt's (2011) argument that social schemas mediate the link between adverse environments and crime, including a hostile view of relationships, concern with immediate gratification, and a cynical view of conduct norms. Testing their ideas in a sample of African American adolescents in Georgia and Iowa, they find community violence and victimization, community collective efficacy, supportive parenting, experiences with discrimination, and deviant peers to alter this social schema, which fully mediates the relationship of these adverse circumstances (besides discrimination) with later delinquency.

Building on Prior Work

In the present study, we expand criminological work in this area by making both theoretical and empirical refinements. First, we approach criminological risk factors through the lens of environmental harshness and

unpredictability, suggesting that many risk factors that have traditionally been seen as disparate are invoking common processes. Second, we place present orientation at the forefront. Third, following the footsteps of theorists such as Brezina et al. (2009) and Simons and Burt (2011), we speak to the developmental and environmental roots of present orientation.

Fourth, we test our ideas amongst two geographically and culturally distinct longitudinal samples of adolescents which are designed to be representative of public-school students in their regions. In testing similar hypotheses in two different samples, we offer a conceptual replication that we hope will illuminate the generalizability and replicability of our findings (see Schmidt 2009). Replication research is rare in criminology, despite the potential for false positives leading to the publication of non-reproducible results, which can harm science, theory development, and—if policy follows suit—the world (Pridemore et al. 2018). Though we have differences in measures between samples, this variation is desirable in conceptual replication to (a) avoid assuming that a measure designed for one culture/language would measure the same underlying construct in another, (b) demonstrate that the theory can generalize across measures, and (c) reduce the likelihood that similarities in results are due to methodological artifacts (Apicella and Barrett 2016; Kline, Shamsudheen, and Broesch 2018). Here, we offer a conceptual replication designed to examine whether two distinct samples and two different operationalizations of similar constructs in the two datasets leads to convergent or divergent results for our hypotheses.

In the selection of cases for conceptual replications and cross-cultural research, two common criteria coalesce around (a) representativeness of the sample and (b) variation between cases or samples on domains of theoretical interest (Apicella and Barrett 2016; Seawright and Gerring 2008). Toward the first point, both datasets are school-based longitudinal samples of youth intended to be *representative* of youth in the area rather than oversampled for risk or exposure to adversity. Prior work on environmental risk factors' influence on social schemas and short-term mindsets has thus far focused on offender-only or solely African-American samples (e.g., Brezina et al. 2009; Simons and Burt 2011). Thus, while these studies do support the idea that there is a relationship between environment, social schemas, poor views of the future, and later offending, they tell us more about special populations than a representative sample of youth. Many influential risk factors for unpredictability schemas and short-term mindsets represent somewhat common childhood experiences that do not require sustained, severe exposure to adverse environments, such as experiencing inconsistent punishment, experiencing a move or divorce, having a violent friend, or being bullied. Our

study holds the additional benefit of testing these theoretical premises amongst general samples of youth who are nonetheless exposed to risk factors for unpredictability schemas and short-term mindsets.

Toward the second point, we use self-report surveys from school-aged adolescents measuring similar life experiences, attitudes, and behaviors both a European city and in rural America. Evidence suggests these two samples vary in our domains of interest due to residing in (semi)rural USA versus the z-proso sample residing in Zurich, Switzerland. Rural America includes greater levels of concentrated disadvantage (environmental unpredictability; Elder and Conger 2000) and the USA has higher rates of serious violence, such as homicide (environmental harshness; Grinshteyn and Hemenway 2019; Tonry 2023) compared to Switzerland, especially the affluent city of Zurich. There may thus be differences in the level of harshness and unpredictability or how their impact bears out due to the differences in our samples. Observing whether we see similar relationships in two distinct samples can increase our confidence in the generalizability of our results.

Hypotheses

Here, we use the Zurich Project on Social Development from Childhood to Adulthood (z-proso; Ribeaud et al. 2022) and the in-home subsample of the PROmoting School-community-university Partnerships to Enhance Resilience (PROSPER) Peers dataset (Spoth et al. 2007) to investigate whether environmental risk factors' impact on delinquency is mediated by unpredictability schemas and short-term mindsets with two pre-registered hypotheses:

(1) The effect of harsh and unpredictable environments on delinquency will be fully or partially mediated by unpredictability schemas.
    1a. Harsh and unpredictable environments will be positively associated with delinquency.
    1b. Unpredictability schemas will be positively associated with delinquency.
    1c. Harsh and unpredictable environments will be positively associated with unpredictability schemas.
(2) The effect of harsh and unpredictable environments on delinquency will be fully or partially mediated by both unpredictably schemas and short-term mindsets.
    2a. Short-term mindsets will be positively associated with delinquency.
    2b. Unpredictability schemas will be positively associated with short-term mindsets.

2c. The effect of unpredictability schemas on delinquency will be fully or partially mediated by short-term mindsets.
2d. Harsh and unpredictable environments will be positively associated with short-term mindsets, directly or indirectly through unpredictability schemas.
2e. The effect of harsh and unpredictable environments on delinquency will be fully or partially mediated by short-term mindsets, directly or indirectly through unpredictability schemas.

Methods

z-Proso Methods

Participants. The z-proso data collection began in 2004 and used randomized cluster sampling of public schools in Zurich, Switzerland. Zurich is the largest city in Switzerland with a population of about 400,000, and is also among the most affluent cities in the world. The z-proso team first sorted the schools into groups by enrollment size and school district, and then selected 56 schools (out of 90) for a total sample size of 1,675 public school children (Ribeaud et al. 2022). Schools from disadvantaged areas were slightly overrepresented. At the first wave of the study, the child's caregiver(s) provided informed consent; all waves thereafter participants provided informed consent and parents gave passive consent (until age 17). Participants were financially compensated for their time. The z-proso research team obtained ethics approval by the Ethics Committee at the Faculty of Arts and Social Sciences of the University of Zurich.

We restrict our analyses to Waves 4–8 as only these waves include a combination of adolescent's perceptions and self-report measures of delinquency, which tend to have higher reliability and validity than parent and teacher reports of student delinquency (Thornberry and Krohn 2000). In Waves 4–7, the students filled out paper-and-pencil questionnaires in a classroom setting. The most recently completed eighth wave was collected in 2018, when participants were age 20, using CAPI at a social science research laboratory in central Zurich.

Summary of Measures. See Table 1 for a list of z-proso measures. We provide a complete list of z-proso variable items, descriptive statistics, and modifications of measures used in the extended waves and factor models in the online supplementary materials.

All scales are averages of the items unless otherwise specified, and all items were coded such that high values of the variable signify high values of the construct at hand.

Table 1. Description of z-Proso and PROSPER Measures.

	z-Proso	Prosper
Outcome		
Delinquency	Variety scale of 14 delinquent acts during the past 12 months	Variety scale of 9 criminal acts during the past 12 months
Short-term mindsets		
Impulsivity	Average of 2 items measuring acting without considering future costs	1-item measure of how often adolescent does what feels good, regardless of the consequences
Sensation-seeking	Average of 2 items measuring doing things that are exciting despite risks	Average of 2 items measuring doing something dangerous for fun
Future school (z-proso)/goal orientation (PROSPER)	Average of 3 items measuring adolescent's aspirations to gain later life success through school	Average of 2 items measuring adolescent's aspirations to reach their goals in life
Unpredictability schemas		
Self-efficacy	Average of 5 items measuring adolescent's perception of their ability to overcome problems	Average of 7 items measuring how capable adolescent's felt dealing with problems and controlling their lives
Trust	Average of 3 items measuring adolescent's general predisposition to trusting others	1-item measure of whether adolescents felt that others were out to get them
Independent variables		
Socioeconomic status (SES)	International Socio-Economic Index of occupational status score (based on parent occupation)	Natural log of the total reported family income by the adolescent's parent(s)
Family instability	Variety score of 7 items that were part of a scale of stressful life events that assesses instability in the home and family	Variety score of 5 items constructed to measure instability in the home and family

(continued)

Table 1. (continued)

	z-Proso	Prosper
Parental involvement (z-proso)/warmth (PROSPER)	Average of 6 items measuring parental concern for and activities with adolescent	1-item measure of how often parents act loving and affectionate toward adolescent
Inconsistent punishment	Average of 3 items measuring whether parents change or reduce punishments	Average of 5 items measuring whether parents give inconsistent punishments
Harsh parenting	—	Average of 5 items measuring parental verbal aggression toward adolescent
Corporal punishment	Average of 3 items measuring physical violence from parents as punishment	Average of 2 items measuring physical violence from parents as punishment
Violent victimization	Variety score of 4 forms of serious violence victimization	—
Bullying victimization	Variety score of 3 items of victimization by peers	Variety score of 2 forms of victimization by peers
Violent group	Dichotomous variable where 1 = any reported violence in the friend group	—
Violent friends (z-proso)/ perceived friend violence (PROSPER)	The proportion of friends that adolescent reported had engaged in assault (out of 2 possible friends)	Average of 2 items measuring what proportion of the adolescent's friends had done 2 different violent behaviors
Friend-reported violence	—	Proportion of friends that self-reported any violence (out of 7 possible friends)
Parent threat appraisals	—	Average of 2 items measuring whether adolescent worries something bad will happen or someone will get hurt when their parents argue

(continued)

Table 1. (continued)

	z-Proso	Prosper
Family violence	—	Average of 2 items measuring whether members of their family throw things or hit each other
Control variables		
Sex	Dichotomous variable where 1 = male	Dichotomous variable where 1 = male
Ethnicity (z-proso)/ race (PROSPER)	Dichotomous variable where 1 = at least 1 parent born in Switzerland	Dichotomous variable where 1 = White
Age	Continuous measure of age	—
Parental monitoring	Average of 5 items measuring whether parents monitor who adolescent is with and where they go	Average of 10 items measuring whether parents monitor who adolescent is with and their behavior
Unstructured, unsupervised socializing (UUS)	Average of 4 items measuring how often adolescents socialize with friends without adults and in public places	An additive measure of time spent UUS with all nominated friends divided by the square root of the number of friends
Number of friends	Number of friends (out of 2) that adolescents reported	Number of friends (out of 7) that adolescents reported
Member of group	Dichotomous variable where 1 = reported having a friend group	—

Outcome Variable. We measured delinquency using a variety scale of 14 delinquency items adapted from Wetzels et al. (2001). Variety scales are considered one of the most reliable and valid method of measuring criminal offending (Sweeten 2012).

Mediating Variables. We measured unpredictability schemas with scales assessing self-efficacy and trust. People with strong unpredictability schemas have low self-efficacy, or confidence in their own ability to influence outcomes, and less trust in others' tendencies to act in predictable and reliable ways (Ross and Hill 2002). Deriving measurement of unpredictability schemas from the related constructs of locus of control, self-efficacy, and social trust has been found to be reasonably valid (Cabeza de Baca et al.

2016; Ross et al. 2016). Self-efficacy was the average of the following five items assessing the adolescent's perception of their ability to overcome problems (Wetzels et al. 2001). Trust was measured with three items assessing the adolescent's general predisposition to trusting others adapted from the World Values Survey Questionnaires (Nivette et al. 2015).

We measured short-term-mindsets with scales assessing impulsivity, sensation-seeking, and future (school) orientation. Impulsivity and sensation-seeking each included two items per scale adapted from an abbreviated version of the self-control scale developed by Grasmick et al. (1993). Future (school) orientation included three items focused on participants' aspirations to gain later life success through school (van Gelder et al. 2018, 2020).

Unpredictability. We measure unpredictable environments with SES, family instability, parental involvement, and inconsistent punishment. We measure SES using the International Socio-Economic Index of occupational status score (Ganzeboom et al. 1992). We measure family instability using a variety score of how many of six unstable life events, including parental divorce, new parental cohabitation, move/school change, going into foster care, parent going away for at least a month, and parental unemployment, that the adolescent reported experiencing over the past 2 years; these items were derived from a scale of stressful life events that assesses instability in the home and family (Steinhoff et al. 2020). We measure parental involvement (six items) and inconsistent discipline (three items) with items adapted from the Alabama Parenting Questionnaire (Shelton et al. 1996).

Harshness. We capture harsh environments with measures of corporal punishment, violent and bullying victimization, and violent friends and peer groups. We measure corporal punishment with four items adapted from the Alabama Parenting Questionnaire (Shelton et al. 1996). We measure violent victimization with a variety scale computed from participants' answers to four dichotomous questions from the Serious Victimization Questionnaire [adapted from the Students Survey Series by the Kriminologisches Forschungsinstitut Niedersachsen (KFN); Wetzels et al. 2001]. We measure bullying victimization with three items assessing violent victimization by peers from the Zurich Brief Bullying Scale (Murray et al. 2021). We measured violent friends with the proportion of their best friends (out of two) that the participant reported had hit or kicked another adolescent in the past year. We generated a dichotomous measure of whether or not adolescents reported a violent peer group from variables which represented if adolescents had a group of friends or "clique" that participated in at least one of two measured violent acts.

Control variables. We controlled for sex and migration status using dummy variables (1 = male; 1 = at least one Swiss-born parent, respectively) and age with a continuous measure of their age, measured in years with two decimal points. We controlled for the impact of parental monitoring using the mean score across four items adapted from the Alabama Parenting Questionnaire (Shelton et al. 1996) and the Parenting Scale from the KFN (Wetzels et al. 2001). We measured unstructured, unsupervised socializing using the mean of five items adapted from an instrument by the KFN. We also controlled for whether the adolescent reported having a friend group (1 = yes), as only participants who responded "yes" to this question were asked about whether their peer group engages in violent activities, and the number of friends (out of two potential closest friends) that adolescents reported having at the current wave.

PROSPER Methods

Participants. The PROSPER Peers data was collected from a stratified sample of school districts in rural towns and semi-rural cities in Pennsylvania and Iowa (Spoth et al. 2007). A rural area was constituted of those covering small populations of less than 45,000 people, with only four districts gaining half or more of their populations from urbanized areas of over 50,000. School districts in each state were included if (a) between 1,300 and 5,200 students were enrolled in the school district, (b) at least 15% of students were eligible for free or reduced-cost school lunches, and (c) at least 95% of students spoke English. Fourteen school districts in Pennsylvania and 14 in Iowa were matched by enrollment size and geographic locations, and then one district in each matched pair was randomly assigned to intervention and control conditions. The PROSPER study used a sequential cohort design, with one cohort of sixth graders enrolled in 2002 and another in 2003. The first wave of data was collected in the Fall of sixth grade, and the second wave was collected in the Spring of sixth grade. Each of the following waves was assessed in the Spring of the subsequent year through 12th grade.

The present study analyzes the data from the in-home subsample, though a few variables do draw information from the in-home subsample's responses in their in-school surveys.[2] The in-home data was collected from a random subsample of about 20% of students in the second cohort that participated in the in-school surveys. The researchers recruited 2,267 families for in-home assessments. However, only 980 (43%) agreed to participate for at least one wave (Lippold et al. 2013).[3] This subset was then

followed through the fifth wave, when students were in the Spring of ninth grade, even if the child left the school district. As part of the in-home subsample, students completed written questionnaires at home. Researchers also collected survey data from the adolescent's primary caregiver(s), typically their mother and, if present, father. Most included variables reflect adolescents' self-reports. We used Waves 3–5 (seventh–ninth grade) to be as close in age to the z-proso sample as possible. However, the time lags between waves differ by dataset (annual in PROSPER Peers and bi- or triannual in z-proso).

Prosper Measures. See Table 1 for a list of PROSPER measures. We provide a complete list of PROSPER variables and descriptive statistics in the online supplementary materials.

All scales are averages of the items unless otherwise specified, and all items were coded such that high values of the variable signify high values of the construct at hand.

Outcome Variable. We measured delinquency using a variety scale of 14 items derived from Elliott et al. (1989).

Mediating Variables. Consistent with the z-proso study, we measured unpredictability schemas using self-efficacy and trust. Self-efficacy was assessed with seven items asking the adolescents how capable they felt of dealing with problems and controlling their lives (Pearlin Mastery Scale adapted from Pearlin and Schooler 1978). Trust was measured with a single item asking adolescents whether they feel that others are out to get them. We measured short-term mindsets with impulsivity, sensation-seeking, and future goal orientation. Impulsivity (one item assessing how often adolescents do what feels good, regardless of the consequences) and sensation-seeking (two items measuring how often adolescents do dangerous or crazy things) are both derived from a scale originally designed to assess sensation-seeking (Zuckerman 1994). We measured future (goal) orientation with two items focused on participants' aspirations to reach their goals in life.

Unpredictability. We measure unpredictable environments with measures of SES, family instability, parental warmth, and inconsistent punishment. We measure SES with the natural log of the total reported family income by the adolescent's parent(s) (divided by number of parents). We measure family instability with a variety score constructed to be similar in nature to the z-proso measure; this was a count score of how many of a series of five events (parental unemployment, new divorce, new parental cohabitation or marriage, a residential move, or switching schools) adolescents experienced

in the last year. We included measures of parental warmth (one item per parent assessing how loving and affectionate the adolescent reports the parent acting) and inconsistent parenting (five items per parent) with items adapted from the Iowa Youth and Families Project (Conger 1989).

Harshness. We capture harsh environments with measures of harsh parenting, corporal punishment, family violence, parental threat appraisals, bullying victimization, perceived friend violence, and friend-reported violence. We included measures of harsh parenting (five items per parent) and corporal punishment (two items per parent) with items adapted from the Iowa Youth and Families Project (Conger 1989). We measured parent threat appraisals with two items pulled from the Children's Perceptions of Interparental Conflict Scale (Grych et al. 1992; Fosco and Feinberg 2018). We measured violence in the family with two questions asking adolescents about family members throwing things or hitting other family members. We assessed bullying victimization with a variety scale assessing whether adolescents have experienced two forms of bullying over the past 12 months. We include both measures of both perceived and friend-reported violence, as perceived and friend-reported delinquency have been found to be conceptually distinct (McGloin and Thomas 2016). We measure perceived friend violence with two variables measuring the proportion of adolescents' close friends that had engaged in two acts of violence. We measured friend-reported violence with the proportion of adolescents' reported friends (up to seven) who self-reported committing at least one of the two violent acts from the same Elliott et al. (1989) delinquency scale.

Control Variables. We controlled for sex and ethnicity using dummy variables (1 = male; 1 = white, respectively). We controlled for the impact of parental monitoring using five items (per parent) adapted from the Iowa Youth and Families Project (Conger 1989). We measured unstructured, unsupervised socializing with measures of how often the adolescent spent time socializing with each friend without adults around across all of the adolescent's nominated friends (up to seven); we added these scores together and then divided by the square root of the number of nominated friends (Haynie and Osgood 2005). We also controlled for the number of friends (out of seven) the adolescent nominated at the current wave.

Analyses

To test our hypotheses using z-proso, we estimated two pre-registered (the recent and expanded wave models) and one exploratory structural equation model (the factor model) with mediation paths. These models examine

whether unpredictability schemas and short-term mindsets mediate the impact of harsh and unpredictable environments on delinquency, either alone or in series.[4]

We refer to the first model as the recent waves model. This included delinquency measured at Wave 8, short-term mindsets at Wave 7, and unpredictability schemas, harsh and unpredictable environments, and control variables at Wave 6. We also tested another model which included information about independent variables (harsh and unpredictable environments) in Waves 5 and (if available) 4. This model, referred to as the expanded wave model, was chosen in order to observe how relationships between variables changed when capturing harsh and unpredictable environments over a longer time period. Lastly, we tested an exploratory model that was similar to the recent waves model but measured self-efficacy, trust, and short-term mindsets as factors rather than as observed variables, referred to as the factor model. We did so because measuring constructs as factors can reduce measurement error in the model (Kim and Mueller 1978). In this model, impulsivity, sensation-seeking, and future (school) orientation all loaded onto a single factor, while self-efficacy and trust remained distinct (see supplementary materials for more information). We clustered standard errors on school class in each model.

Since there were more similarities than differences in the results of the three z-proso models, we conducted a single PROSPER structural equation model that was pre-registered after the z-proso models. The independent and control variables were measured at Wave 3, the first level of mediators (unpredictability schemas) at Wave 3, the second level of mediators (short-term mindsets) at Wave 4, and the outcome measure (delinquency) at Wave 5. We clustered standard errors on school class and cohort.

The hypotheses and analyses for both datasets were pre-registered on the Open Science Framework platform (https://osf.io/).[5] Both were time-stamped and made publicly available after the article was accepted for publication (First DOI: 10.17605/OSF.IO/BXZH; Second DOI: 10.17605/OSF.IO/M6G2H, for z-proso and PROSPER, respectively). We cleaned the data, coded variables, assessed our measures, and conducted descriptive analyses using Stata 16 (StataCorp 2019). We conducted all structural equation models using Mplus 8 (Muthén and Muthén 1998–2017), basing our code on Stride et al. (2015) mediation model code. Since the outcome of interest (delinquency) is measured as a count variable in both datasets, we used negative binomial regression, which can accommodate rare events, such as crime (Piza 2012). We estimated all models with a robust maximum likelihood estimator. This estimator accommodates missing data using full information maximum likelihood.

Results

z-Proso Results

Hypothesis 1: We do not observe partial mediation of harsh and unpredictable environments through solely self-efficacy or trust in the recent, expanded waves, or factor models (Tables 1–3). *Hypothesis 1a:* Except for violent victimization, SES, and family instability, all variables have significant relationships in the expected direction with delinquency. *Hypothesis 1b:* The estimated effects of self-efficacy and trust on delinquency, while in the expected direction, are not statistically significant. Trust has an overall indirect significant effect on delinquency in the recent waves and factor models. *Hypothesis 1c:* Parental involvement is positively associated with both self-efficacy and trust (Tables 4–7). Bullying victimization is associated with less self-efficacy in all models, and less trust in the expanded waves model. Having violent friends is associated with less trust in all models and being a member of a violent group is associated with less trust in the expanded waves model.

Hypothesis 2: In support of our hypothesis, we observe partial mediation through both unpredictability schemas and short-term mindsets for parental involvement, which has an indirect positive association with delinquency through (less) trust and (more) sensation-seeking in both the recent waves and factor models, but not the expanded waves model. We do not observe any indirect associations through both sets of mediators in series for any other variables. *Hypothesis 2a:* Short-term mindsets are positively associated with delinquency in the factor model. Impulsivity and sensation-seeking are both associated with more delinquency in the recent waves and expanded models; the effect of future (school) orientation on delinquency is not significant, though it is in the expected direction. *Hypothesis 2b:* Higher trust is associated with less sensation-seeking (or short-term mindsets in the factor model) in all models. Self-efficacy is associated with more future orientation in the expanded waves model. *Hypothesis 2c:* The impact of trust on delinquency is fully mediated by short-term mindsets in the recent waves or factor model, with a total negative indirect effect which largely occurs through sensation-seeking in the recent waves model. In the expanded waves model, neither trust nor self-efficacy have significant indirect effects on delinquency through short-term mindsets.

Hypothesis 2d: Corporal punishment is associated with more sensation-seeking in the recent waves model and more impulsivity in the expanded waves model but is not associated with short-term mindsets in the factor

Table 2. Direct Effects on Mediators and Outcome for z-Proso Recent Waves Model.

	Delinquency *b* (SE)	Impulsivity *b* (SE)	Sens.-Seeking *b* (SE)	Future-Orientation *b* (SE)	Self-Efficacy *b* (SE)	Trust *b* (SE)
Impulsivity	.23** (.09)	—	—	—	—	—
Sensation-seeking	.39*** (.08)	—	—	—	—	—
Future-orientation	−.11 (.09)	—	—	—	—	—
Self-efficacy	−.06 (.13)	.06 (.04)	.08 (.05)	.17*** (.04)	—	—
Trust	−.03 (.08)	−.02 (.03)	−.08** (.03)	.05 (.03)	—	—
Corporal punishment	.29 (.15)	.08 (.05)	.12** (.04)	.03 (.05)	−.05 (.04)	−.03 (.04)
Inconsistent parenting	.02 (.06)	.02 (.02)	.07*** (.02)	−.03 (.02)	.03 (.02)	−.04 (.02)
Parental involvement	−.26** (.08)	−.09** (.03)	−.06** (.02)	.10** (.03)	.07*** (.02)	.14*** (.03)
Family instability	.11 (.06)	−.02 (.02)	.01 (.02)	−.00 (.02)	.00 (.01)	−.03 (.02)
SES (ISEI)	.00 (.00)	.00 (.00)	.00 (.00)	−.00** (.00)	.00 (.00)	−.00 (.00)
Violent victimization	.14 (.08)	−.07* (.03)	.03* (.01)	−.03 (.04)	.00 (.02)	−.04 (.04)
Bullying victimization	−.04 (.07)	.06** (.02)	.06* (.03)	−.01 (.02)	−.03* (.01)	−.03 (.02)
Violent friends	.28 (.19)	.23** (.07)	.07 (.04)	−.09 (.07)	.04 (.04)	−.20** (.07)
Member of violent group	.25 (.19)	−.02 (.06)	.25*** (.04)	−.09 (.07)	−.00 (.05)	−.03 (.06)
Number of friends	−.16 (.11)	.00 (.04)	−.01 (.05)	−.06 (.04)	.06* (.03)	.11** (.03)
Member of group	.23* (.10)	.01 (.04)	.02 (.05)	.00 (.04)	.02 (.02)	−.04 (.03)
UUS	.09 (.06)	.09*** (.02)	.12*** (.01)	−.04 (.02)	.02 (.01)	−.04* (.02)
Parental monitoring	.13 (.08)	−.09** (.04)	−.08** (.02)	.07** (.03)	.03 (.02)	−.10*** (.03)
Age	−.43** (.13)	−.03 (.05)	−.10** (.03)	.00 (.04)	.01 (.03)	−.04 (.04)
Sex (male)	.63*** (.12)	−.02 (.04)	.19** (.06)	−.15*** (.04)	.06** (.02)	.04 (.04)
Ethnicity (Swiss)	.32* (.13)	.03 (.03)	.09*** (.02)	−.19*** (.04)	−.03 (.03)	.11*** (.03)

Note: N = 1674; SES = socioeconomic status; Sens.-Seeking = sensation-seeking; *$p < .05$; **$p < .01$, ***$p < .001$.

Table 3. Direct Effects on Mediators and Outcome for z-proso Expanded Waves Model.

	Delinquency *b* (SE)	Impulsivity *b* (SE)	Sens.-Seeking *b* (SE)	Future-Orientation *b* (SE)	Self-Efficacy *b* (SE)	Trust *b* (SE)
Impulsivity	.21* (.09)	—	—	—	—	—
Sensation-seeking	.39*** (.08)	—	—	—	—	—
Future-orientation	−.09 (.09)	—	—	—	—	—
Self-efficacy	−.09 (.14)	.06 (.04)	.05 (.05)	.18*** (.04)	—	—
Trust	−.01 (.08)	−.02 (.03)	−.07* (.04)	.05 (.04)	—	—
Corporal punishment	.37* (.16)	.14* (.06)	-.01 (.09)	.09 (.05)	−.05 (.04)	−.03 (.05)
Inconsistent parenting	.07 (.07)	.04 (.03)	.09* (.04)	−.08* (.03)	.05* (.02)	−.06* (.03)
Parental involvement	−.33** (.11)	−.09* (.04)	−.05 (.06)	.16*** (.04)	.08*** (.02)	.14*** (.04)
Family instability	.07 (.04)	−.03 (.02)	−.00 (.02)	.02 (.02)	.00 (.01)	−.02 (.02)
SES (ISEI)	.01 (.00)	.00 (.00)	.00 (.00)	−.00** (.00)	.00 (.00)	−.00 (.00)
Violent victimization	−.04 (.06)	−.03 (.02)	.03 (.02)	.02 (.02)	.02 (.01)	−.01 (.02)
Bullying victimization	.06 (.06)	.05* (.02)	.06** (.02)	−.01 (.02)	−.03** (.01)	−.05** (.02)
Violent friends	.48* (.24)	.22* (.10)	−.01 (.11)	−.16 (.09)	−.04 (.05)	−.17* (.08)
Member of violent group	.23 (.15)	−.08 (.05)	.21** (.07)	−.06 (.05)	.01 (.04)	−.10* (.05)
Number of friends	.02 (.04)	.01 (.01)	−.00 (.01)	−.03* (.01)	.00 (.01)	.02* (.01)
Member of group	.19 (.16)	.02 (.05)	.02 (.05)	−.05 (.04)	.03 (.03)	−.02 (.03)
UUS	.12 (.07)	.11*** (.02)	.13*** (.03)	−.03 (.03)	.03* (.01)	−.07*** (.02)
Parental monitoring	.11 (.13)	−.13** (.05)	−.03 (.05)	.03 (.04)	.05* (.03)	−.13*** (.04)
Age	−.37** (.13)	−.04 (.05)	−.10 (.05)	.01 (.04)	.00 (.03)	−.03 (.04)
Sex (male)	.60*** (.13)	−.02 (.04)	.20*** (.04)	−.16*** (.04)	.07** (.02)	.05 (.04)
Ethnicity (Swiss)	.30* (.13)	.04 (.03)	.08 (.05)	−.19*** (.04)	−.02 (.02)	.11*** (.03)

Note: N=1674; SES = socioeconomic status; Sens.-Seeking = sensation-seeking; *$p < .05$; **$p < .01$, ***$p < .001$.

Table 4. Decomposed Indirect Effects for z-proso Recent Waves Model.

	Total Effect	Total Indirect	Self-Efficacy				Trust						
			—	Imp.	Sens.	Future	—	Imp.	Sens.	Future	Imp.	Sens.	Future
	b (SE)	*b* (SE)	*b* (SE)	*b* (SE)	*b* (SE)	*b* (SE)	*b* (SE)	*b* (SE)	*b* (SE)	*b* (SE)	*b* (SE)	*b* (SE)	*b* SE)
Self-efficacy	−.03	.03	—	—	—	—	—	—	—	—	.01	.03	-.02
	(.14)	(.03)									(.01)	(.02)	(.02)
Trust	-.07	-.04**	—	—	—	—	—	—	—	—	−.01	-.03*	-.01
	(.08)	(.02)									(.01)	(.02)	(.01)
Corporal punishment	.35*	.06	.00	−.00	−.00	.00	.00	.00	.00	.00	.02	.05	−.00
	(.14)	(.04)	(.01)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.01)	(.03)	(.01)
Inconsistent parenting	.06	.04*	−.00	.00	.00	.00	.00	.00	.00	.00	.01	.03*	.00
	(.06)	(.02)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.01)	(.01)	(.00)
Parental involvement	−.32***	−.07*	−.00	.00	.00	−.00	−.01	−.00	−.01*	−.00	−.02	−.02	−.01
	(.08)	(.03)	(.01)	(.00)	(.00)	(.00)	(.01)	(.00)	(.00)	(.00)	(.01)	(.02)	(.01)
Family instability	.11	−.01	.00	.00	.00	.00	.00	.00	.00	.00	−.01	−.00	.00
	(.06)	(.01)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.01)	(.01)	(.00)
SES (ISEI)	.01	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)
Violent victimization	.15	.00	.00	.00	.00	.00	.00	.00	.00	.00	−.02	.01	.00
	(.08)	(.02)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.01)	(.02)	(.01)
Bullying victimization	−.00	.04**	.00	.00	−.00	.00	.00	.00	.00	.00	.01*	.02**	.00
	(.08)	(.01)	(.01)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.01)	(.00)

(continued)

Table 4. (continued)

	Total Effect	Total Indirect	Self-Efficacy				Trust						
			—	Imp.	Sens.	Future	—	Imp.	Sens.	Future	Imp.	Sens.	Future
	.38*	.10	–.00	.00	.00	–.00	.01	.00	.01	.00	.05*	.02	.01
Violent friends	(.20)	(.05)	(.01)	(.00)	(.00)	(.00)	(.02)	(.00)	(.00)	(.00)	(.03)	(.04)	(.01)
Member of		.02*	.00	.00	.00	.00	.00	.00	.00	.00	–.00	.02*	.00
violent group	.08 (.04)	(.01)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.01)	(.00)

Note: N = 1674; Imp. = impulsivity; Sens = sensation-seeking; Future = future (school) orientation; SES = socioeconomic status. *p<.05; **p<.01, ***p<.001.

Table 5. Decomposed Indirect Effects for z-Proso Expanded Waves Model.

	Total Effect	Total Indirect	Self-Efficacy				Trust						
			—	Imp.	Sens.	Future	—	Imp.	Sens.	Future	Imp.	Sens.	Future
	b (SE)	*b* (SE)	*b* (SE)	*b* (SE)	*b* (SE)	*b* (SE)	*b* (SE)	*b* (SE)	*b* (SE)	*b* (SE)	*b* (SE)	*b* (SE)	*b* (SE)
Self-efficacy	−.07	.02	—	—	—	—	—	—	—	—	.01	.02	−.02
	(.15)	(.03)									(.01)	(.02)	(.02)
Trust	−.05	−.04	—	—	—	—	—	—	—	—	−.00	−.03	−.00
	(08)	(.02)									(.01)	(.02)	(.01)
Corporal punishment	.39*	.02	.00	−.00	−.00	.00	.00	.00	.00	.00	.03	−.00	−.01
	(.15)	(.04)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.02)	(.03)	(.01)
Inconsistent parenting	.12	.05*	−.00	.00	.00	−.00	.00	.00	.00	.00	.01	.04*	.01
	(.07)	(.02)	(.01)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.01)	(.02)	(.01)
Parental involvement	−.40***	−.07	−.01	.00	.00	−.00	−.00	−.00	−.00	−.00	−.02	−.02	−.02
	(.11)	(.04)	(.01)	(.00)	(.00)	(.00)	(.01)	(.00)	(.00)	(.00)	(.01)	(.02)	(.02)
Family instability	.06	−.01	.00	.00	.00	.00	.00	.00	.00	.00	−.01	−.00	−.00
	(.04)	(.01)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.01)	(.00)
SES (ISEI)	.01	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)
Violent victimization	−.04	.01	−.00	.00	.00	.00	.00	.00	.00	.00	−.01	.01	−.00
	(.06)	(.02)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.01)	(.01)	(.00)
Bullying victimization	.01	.04**	.00	.00	−.00	.00	.00	.00	.00	.00	.01	.02**	.00
	(.06)	(.01)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.01)	(.01)	(.00)

(continued)

Table 5. (continued)

	Total Effect	Total Indirect	Self-Efficacy				Trust						
			—	Imp.	Sens.	Future	—	Imp.	Sens.	Future	Imp.	Sens.	Future
	b (SE)	*b* (SE)	*b* (SE)	*b* (SE)	*b* (SE)	*b* (SE)	*b* (SE)	*b* (SE)	*b* (SE)	*b* (SE)	*b* (SE)	*b* (SE)	*b* (SE)
Violent friends	.55*	.07	.00	.00	–.00	.00	.00	.00	.01	.00	.05	–.00	.02
	(.24)	(.06)	(.01)	(.00)	(.00)	(.00)	(.01)	(.00)	(.00)	(.00)	(.03)	(.04)	(.02)
Member of violent group	.30*	.07	–.00	.00	.00	.00	.00	.00	.00	.00	–.02	.08*	.01
	(.15)	(.04)	(.00)	(.00)	(.00)	(.00)	(.01)	(.00)	(.00)	(.00)	(.01)	(.03)	(.01)

Note: N=1674; Imp. = impulsivity; Sens = sensation-seeking, Future = future (school) orientation; SES = socioeconomic status; *$p < .05$; **$p < .01$, ***$p < .001$.

Table 6. Decomposed Indirect Effects for z-Proso Short-Term Mindset Factor Model.

			Self-Efficacy		Trust		
	Total Effect *b* (SE)	Total Indirect *b* (SE)	— *b* (SE)	STM *b* (SE)	— *b* (SE)	STM *b* (SE)	Short-Term Mindset *b* (SE)
Self-efficacy	–.09 (.27)	–.06 (.09)	—	—	—	—	–.06 (.09)
Trust	–.09 (.11)	–.09* (.04)	—	—	—	—	–.09* (.04)
Corporal punishment	.35** (.13)	.07 (.05)	.00 (.01)	.00 (.00)	.00 (.00)	.00 (.00)	.06 (.05)
Inconsistent parenting	.07 (.06)	.06* (.02)	–.00 (.00)	–.00 (.00)	.00 (.00)	.00 (.00)	.05* (.02)
Parental involvement	–.33*** (.08)	–.10** (.04)	–.00 (.01)	–.00 (.01)	–.00 (.01)	–.01* (.01)	–.08** (.03)
Family instability	.11 (.06)	–.00 (.02)	.00 (.00)	.00 (.00)	.00 (.00)	.00 (.00)	–.01 (.02)
SES (ISEI)	.01 (.00)	.00 (.00)	.00 (.00)	.00 (.00)	.00 (.00)	.00 (.00)	.00 (.00)
Violent victimization	–.14 (.08)	.01 (.03)	.00 (.01)	.00 (.00)	.00 (.00)	.00 (.00)	.01 (.03)
Bullying victimization	.00 (.07)	.06* (.02)	.00 (.01)	.00 (.00)	.00 (.00)	.00 (.00)	.05* (.02)
Violent friends	.40* (.20)	.14* (.07)	–.00 (.01)	–.00 (.00)	.00 (.02)	.02 (.01)	.13 (.07)
Member of violent group	.37 (.20)	.14* (.07)	.00 (.00)	.00 (.00)	.00 (.00)	.00 (.01)	.14* (.06)

Note: N = 1674; SES = socioeconomic status; STM = short-term mindset; *$p < .05$; **$p < .01$, ***$p < .001$.

Table 7. Direct Effects on Mediators and Outcome for z-proso Short-Term Mindset Factor Model.

	Delinquency *b* (SE)	Short-Term Mindset *b* (SE)	Self-Efficacy *b* (SE)	Trust *b* (SE)
Short-term mindsets	1.70*** (.28)	—	—	—
Self-efficacy	–.03 (.29)	–.03 (.05)	—	—
Trust	–.01 (.10)	–.05* (.02)	—	—
Corporal punishment	.29* (.14)	.04 (.03)	–.04 (.04)	–.02 (.04)
Inconsistent parenting	.02 (.06)	.03* (.01)	.02 (.02)	–.04 (.02)
Parental involvement	–.22** (.08)	–.05** (.02)	.05** (.02)	.15*** (.03)
Family instability	.11 (.06)	–.00 (.01)	–.00 (.01)	–.03 (.02)
SES (ISEI)	.00 (.00)	.00 (.00)	.00 (.00)	–.00 (.00)
Violent victimization	.13 (.08)	.01 (.02)	.00 (.02)	–.04 (.04)
Bullying victimization	–.05 (.07)	.03* (.01)	–.02* (.01)	–.03 (.02)
Violent friends	.26 (.20)	.08 (.04)	.04 (.04)	–.19** (.07)
Member of violent group	.22 (.20)	.08* (.04)	–.00 (.04)	–.04 (.06)
Number of friends	–.17 (.11)	.02 (.02)	.05* (.02)	.10** (.03)
Member of group	.23* (.10)	.00 (.02)	.02 (.02)	–.03 (.03)
UUS	.07 (.06)	.05*** (.01)	.02 (.01)	–.03 (.02)
Parental monitoring	.17* (.08)	–.05** (.01)	.02 (.02)	–.09** (.03)
Age	–.45** (.14)	–.01 (.02)	–.02 (.06)	–.01 (.02)
Sex (male)	.58*** (.11)	.08*** (.02)	.05** (.02)	.03 (.04)
Ethnicity (Swiss)	.27* (.13)	.07*** (.02)	–.03 (.02)	.10** (.03)

Note: $N = 1674$; SES = socioeconomic status; *$p < .05$; **$p < .01$, ***$p < .001$.

model. Inconsistent parenting is robustly associated with more sensation-seeking (or short-term mindsets in the factor model). Parental involvement is also associated with less of all forms of short-term mindsets, with the exception of sensation-seeking in the expanded waves model. Bullying victimization is associated with more impulsivity and sensation-seeking in the recent and expanded waves model and more short-term mindsets in the factor model. Having violent friends is associated with more impulsivity,

while being a member of a violent group is associated with more sensation-seeking in recent waves models. Being a member of a violent group is associated with more short-term mindsets in the factor model. Violent victimization is associated with more sensation-seeking, but also unexpectedly with less impulsivity in the recent waves model. It has no significant associations in the other two models. SES is associated with less future orientation, contrary to expectations, in both the recent and expanded waves models.

Hypothesis 2e: We observe little evidence of mediation through both unpredictability schemas and short-term mindsets in series, as discussed in *Hypothesis 2.* Yet, there is mediation through short-term mindsets alone in all of the models. Inconsistent parenting, bullying victimization, and being a member of a violent group all have indirect positive associations with delinquency through sensation-seeking or short-term mindsets in all models. This shows full mediation for inconsistent parenting and bullying victimization in all models and being a member of a violent group in the factor model. Being a member of a violent group is partially mediated in recent and expanded waves models. In the factor model, parental involvement has a negative indirect effect on delinquency through short-term mindsets and through (less) trust and (more) short-term mindsets, showing partial mediation.

PROSPER Results

Hypothesis 1: We do not observe partial mediation of harsh and unpredictable environments through solely self-efficacy or trust (Table 8). *Hypothesis 1a:* Family instability, inconsistent and harsh parenting, friend-reported violence, perceived friend violence, bullying victimization, and family violence, have significant associations with delinquency in the expected directions, while parental warmth, corporal punishment, parent threat appraisals, and SES do not. *Hypothesis 1b:* The estimated effects of self-efficacy and trust on delinquency, while in the expected directions, are also not statistically significant. Self-efficacy has an overall indirect negative effect on delinquency. *Hypothesis 1c:* As shown in Table 9, harsh parenting is associated with less trust. SES is associated with more self-efficacy, while bullying victimization is associated with less self-efficacy. Family violence is associated with less self-efficacy, but more trust, contrary to expectations. Parent threat appraisals are also associated with less self-efficacy.

Hypothesis 2: We observe partial mediation through both unpredictability schemas and short-term mindsets for bullying victimization and parent threat appraisals. Both have positive indirect effects on delinquency

Table 8. Decomposed Indirect Effects for PROSPER Model.

	Total effect	Total indirect	Self-efficacy				Trust						
			—	Imp.	Sens.	Future	—	Imp.	Sens.	Future	Imp.	Sens.	Future
	b (SE)	*b* (SE)	*b* (SE)	*b* (SE)	*b* (SE)	*b* (SE)	*b* (SE)	*b* (SE)	*b* (SE)	*b* (SE)	*b* (SE)	*b* (SE)	*b* (SE)
Self-efficacy	−.23	−.12**	—	—	—	—	—	—	—	—	−.03	−.08*	−.01
	(.18)	(.04)									(.02)	(.03)	(.01)
Trust	−.28	.01	—	—	—	—	—	—	—	—	.01	−.01	.00
	(.19)	(.05)									(.02)	(.03)	(.01)
Corporal punishment	−.02	−.05	−.00	−.00	−.00	.00	−.00	.00	.00	.00	−.02	−.03	−.00
	(.21)	(.08)	(.01)	(.00)	(.01)	(.00)	(.02)	(.01)	(.00)	(.00)	(.02)	(.05)	(.01)
Harsh parenting	.09	.11**	−.00	.00	.00	.00	.04	−.00	.00	.00	.01	.07*	−.00
	(.15)	(.04)	(.00)	(.00)	(.00)	(.00)	(.03)	(.00)	(.00)	(.00)	(.01)	(.03)	(.01)
Inconsistent parenting	.00	.11*	.01	.00	.00	.00	.01	.00	.00	.00	.02	.06*	.00
	(.12)	(.04)	(.01)	(.00)	(.00)	(.00)	(.01)	(.00)	(.00)	(.00)	(.02)	(.03)	(.01)
Parental warmth	−.12	−.03	.00	.00	.00	.00	−.01	.00	.00	.00	-.01	−.01	−.01
	(.07)	(.02)	(.00)	(.00)	(.00)	(.00)	(.01)	(.00)	(.00)	(.00)	(.01)	(.01)	(.01)
Family instability	.38**	.01	−.01	−.00	−.00	.00	.00	.00	.00	.00	−.01	.01	.00
	(.12)	(.04)	(.01)	(.00)	(.00)	(.00)	(.01)	(.00)	(.00)	(.00)	(.01)	(.02)	(.01)
SES (income)	−.16	−.03	−.00	−.00	−.00	−.00	−.00	.00	.00	.00	−.01	−.01	.00
	(.15)	(.04)	(.01)	(.00)	(.00)	(.00)	(.01)	(.00)	(.00)	(.00)	(.01)	(.03)	(.00)
Bullying victimization	.42**	.10	.02	.01	.01*	.00	.01	.00	.00	.00	.00	.04	.01
	(.13)	(.05)	(.03)	(.01)	(.01)	(.00)	(.01)	(.00)	(.00)	(.00)	(.01)	(.03)	(.01)

(continued)

Table 8. (continued)

	Total effect	Total indirect	Self-efficacy				Trust						
			—	Imp.	Sens.	Future	—	Imp.	Sens.	Future	Imp.	Sens.	Future
	b (SE)	*b* (SE)	*b* (SE)	*b* (SE)	*b* (SE)	*b* (SE)	*b* (SE)	*b* (SE)	*b* (SE)	*b* (SE)	*b* (SE)	*b* (SE)	*b* (SE)
Perceived friend violence	.64** (.23)	.12 (.07)	.00 (.01)	.00 (.00)	.00 (.00)	.00 (.00)	.01 (.02)	−.00 (.00)	.00 (.00)	.00 (.00)	.02 (.02)	.09* (.04)	−.01 (.01)
Friend-reported violence	1.05** (.39)	.08 (.09)	−.01 (.02)	−.00 (.00)	−.01 (.01)	−.00 (.00)	−.02 (.02)	.00 (.00)	.00 (.00)	.00 (.00)	.03 (.03)	.11 (.06)	−.02 (.02)
Family violence	.20* (.10)	.03 (.04)	.01 (.02)	.00 (.00)	.01 (.00)	.00 (.00)	−.01 (.01)	.00 (.00)	.00 (.00)	.00 (.00)	−.00 (.01)	.01 (.03)	.01 (.01)
Parent threat appraisals	−.16 (.12)	−.00 (.02)	.01 (.02)	.00 (.00)	.01* (.00)	.00 (.00)	.00 (.01)	.00 (.00)	.00 (.00)	.00 (.00)	.00 (.01)	−.03** (.01)	.00 (.00)

Note: $N = 752$; SES = socioeconomic status; Imp. = impulsivity; Sens = sensation-seeking, Future = future (goal) orientation; SES = socioeconomic status; *$p < .05$; **$p < .01$, ***$p < .001$

through (less) self-efficacy and (more) sensation-seeking (Table 8). *Hypothesis 2a:* Shown in Table 8, sensation-seeking is associated with more delinquency. The estimates for impulsivity and future orientation are not significant, though they are in the expected directions. *Hypothesis 2b:* In line with expectations, self-efficacy is associated with less impulsivity and sensation-seeking. Trust does not have any significant associations with short-term mindsets. *Hypothesis 2c:* Self-efficacy's negative association with delinquency is entirely indirect, largely through sensation-seeking. *Hypothesis 2d:* Looking at Table 10, inconsistent parenting is associated with more impulsivity and sensation-seeking. Parental warmth is associated with less impulsivity and more future orientation. Perceived friend violence is associated with more sensation-seeking, while parent threat appraisals are associated with less sensation-seeking, contrary to expectations. *Hypothesis 2e:* Bullying and parent threat appraisals have positive indirect effects on delinquency through self-efficacy and sensation-seeking, as mentioned in Hypothesis 2, which shows partial mediation. There are also indirect positive associations of inconsistent parenting, harsh parenting, and perceived friend violence with delinquency that largely operate through sensation-seeking; inconsistent and harsh parenting are fully mediated, while perceived friend violence maintains a direct effect. Parent threat appraisals have a negative indirect effect on delinquency through sensation-seeking, contrary to expectations.

Summary of Results

Although the z-proso and PROSPER samples differ from each other in important ways, including in how our key constructs are captured, the results of each analysis carry remarkable similarities (see Table 9 and Figures 2 and 3 for a summary of the results). In regards to Hypothesis 1, we found little evidence in either sample that the effect of harsh or unpredictable environments on delinquency was mediated by unpredictability schemas. In fact, unpredictability schemas were not directly positively associated with delinquency in either sample.

In regards to Hypothesis 2, we found overall support in both the z-proso and PROSPER samples that harsh and unpredictable environments were associated with delinquency and that short-term mindsets partially mediated that association. We find evidence in both PROSPER and z-proso that unpredictability schemas, inconsistent parenting, the violence of friends, and bullying were associated with delinquency indirectly through short-term mindsets—largely, sensation-seeking. Harsh parenting also had an indirect

Table 9. Summary of Support for Hypotheses Across Models.

Hypothesis		z-Proso			Prosper
		Recent Waves	Expanded Waves	Factor	
1.	UP/harsh environments mediated by UP schema	X	X	X	X
1a.	UP/harsh environments positively associated with delinquency	Most variables	Most variables	Most variables	Most variables
1b.	UP schema positively associated with delinquency	Indirect only	X	Indirect only	Indirect only
1c.	UP/harsh environments positively associated with UP schema	Some variables	Most variables	Some variables	Some variables
2.	UP/harsh environments mediated by UP schema and STM	Only parental involvement	X	Only parental involvement	Bullying victimization and parent threat appraisal
2a.	STM positively associated with delinquency	Impulsivity and sensation-seeking	Impulsivity and sensation-seeking	Yes (factor)	Only sensation-seeking
2b.	UP schema positively associated with STM	Only trust	Trust and self-efficacy	Only trust	Only self-efficacy
2c.	UP schema mediated by STM	Only trust	X	Only trust	Only self-efficacy
2d.	UP/harsh environments	Most variables	Most variables	Some variables	Some variables

(continued)

Table 9. (continued)

Hypothesis	z-Proso			Prosper
	Recent Waves	Expanded Waves	Factor	
positively associated with STM				
2e. UP/harsh environments mediated by STM	Some variables	Some variables	Some variables	Some variables

Note: UP = unpredictable/unpredictability; STM = short-term mindsets; most variables = over half (at least five variables in z-proso or at least 6 in PROSPER); some variables = less than half (four or less variables in z-proso and five or less variables in PROSPER); X = no evidence.

Table 10. Direct Effects on Mediators and Outcome for PROSPER Model.

	Delinquency *b* (SE)	Impulsivity *b* (SE)	Sens.-Seeking *b* (SE)	Future-Orientation *b* (SE)	Self-Efficacy *b* (SE)	Trust *b* (SE)
Impulsivity	.12 (.08)	—	—	—	—	—
Sensation-seeking	.37*** (.08)	—	—	—	—	—
Future-orientation	−.06 (.08)	—	—	—	—	—
Self-efficacy	−.11 (.17)	−.24* (.09)	−.21** (.08)	.16 (.08)	—	—
Trust	−.29 (.18)	.11 (.13)	−.01 (.08)	−.06 (.11)	—	—
Corporal punishment	.03 (.19)	−.13 (.12)	−.07 (.14)	.07 (.17)	.03 (.07)	.00 (.05)
Harsh parenting	−.02 (.16)	.05 (.08)	.18** (.07)	.02 (.07)	.01 (.03)	−.12** (.03)
Inconsistent parenting	−.11 (.13)	.21* (.09)	.17** (.06)	−.07 (.07)	−.05 (.05)	−.02 (.03)
Parental warmth	−.08 (.07)	−.09** (.04)	−.03 (.03)	.14*** (.02)	.00 (.03)	.02 (.02)
Family instability	.37** (.13)	−.05 (.08)	.03 (.06)	−.06 (.07)	.04 (.03)	−.01 (.03)
SES (income)	−.13 (.13)	−.09 (.09)	−.02 (.07)	.01 (.05)	.06* (.03)	.01 (.03)
Bullying victimization	.33* (.12)	.03 (.07)	.10 (.07)	−.10 (.07)	−.17*** (.03)	−.04 (.02)
Perceived friend violence	.52** (.19)	.17 (.14)	.24* (.11)	.08 (.09)	.00 (.06)	−.04 (.06)
Friend-reported violence	.97* (.40)	.23 (.23)	.30 (.17)	.27 (.18)	.09 (.13)	.07 (.08)
Family violence	.17 (.11)	−.01 (.10)	.04 (.07)	−.10 (.06)	−.10*** (.03)	.05* (.02)
Parent threat appraisals	−.16 (.10)	.02 (.04)	−.09** (.03)	−.00 (.04)	−.11*** (.03)	−.02 (.02)
Number of friends	−.07 (.06)	−.02 (.03)	.03 (.03)	—.02 (.03)	.01 (.02)	.01 (.01)
UUS	−.02 (.03)	.07*** (.02)	.04* (.02)	.03 (.02)	−.00 (.01)	.00 (.01)
Parental monitoring	−.20 (.19)	.04 (.07)	−.02 (.08)	.27** (.08)	.10* (.04)	−.00 (.03)
Sex (male)	−.21 (.22)	.00 (.11)	.26*** (.06)	−.03 (.07)	.10* (.04)	−.02 (.05)
Race (white)	.25 (.28)	−.05 (.15)	.03 (.13)	−.08 (.12)	−.04 (.07)	.01 (.04)

Note. $N = 752$; SES = socioeconomic status; Sens.-Seeking = sensation-seeking; *$p < .05$; **$p < .01$, ***$p < .001$.

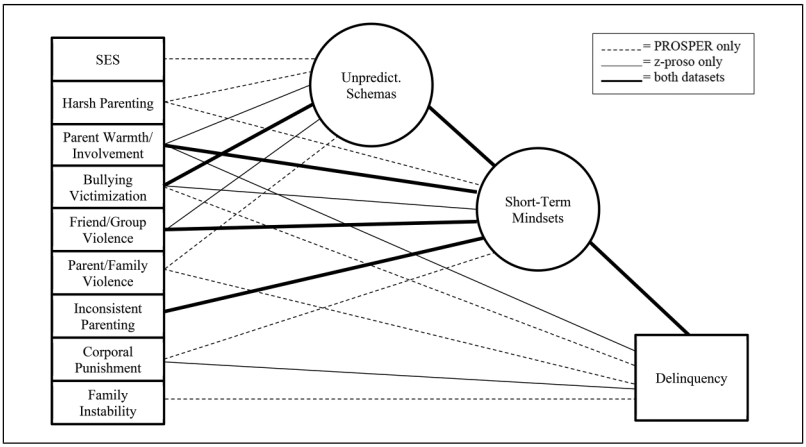

Figure 2. Summary of results across both studies. Both unpredictability schemas and short-term mindsets are depicted as factors (i.e., with circles). The z-proso factor model measures short-term mindsets as a factor and trust and self-efficacy as separate factors measuring unpredictability schemas. All other models measure trust and self-efficacy as two distinct observed variables that capture unpredictability schemas, and impulsivity, sensation-seeking, and future orientation as three distinct observed variables that capture short-term mindsets. The above use of factors is meant only to provide a visual summary of results. Violent victimization was left out, as it did not have any significant relationships with the mediators or outcome in a consistent direction. All pathways denoted above are significant at the $p < .05$ level. We represent significant paths found only in PROSPER with dotted lines, significant paths found only in z-proso with solid lines, and significant paths found in both datasets with bold lines.

impact on delinquency through sensation-seeking, but this construct was only measured in the PROSPER sample.

There was evidence of mediation through both unpredictability schemas and short-term mindsets, but to a lesser degree. In both samples, bullying had an indirect effect on delinquency through both unpredictability schemas and short-term mindsets. In PROSPER, parent threat appraisals (not measured in z-proso), and in z-proso, parental involvement (not measured in PROSPER, though it did include a one-item measure on parental warmth) also held indirect effects through both unpredictability schemas and short-term mindsets. Another notable finding is the variables that held no significant indirect effects in either sample: SES, family instability, and corporal punishment.

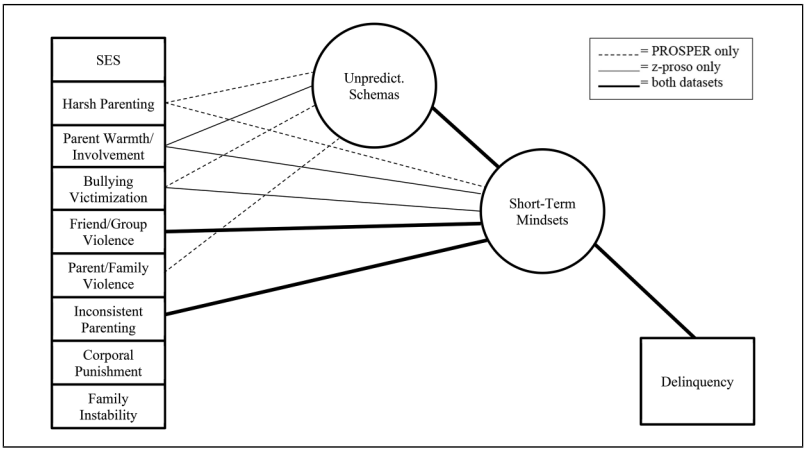

Figure 3. Summary of significant indirect pathways across both studies. Both unpredictability schemas and short-term mindsets are depicted as factors (i.e., with circles). The z-proso factor model measures short-term mindsets as a factor and trust and self-efficacy as separate factors measuring unpredictability schemas. All other models measure trust and self-efficacy as two distinct observed variables that capture unpredictability schemas, and impulsivity, sensation-seeking, and future orientation as three distinct observed variables that capture short-term mindsets. The above use of factors is meant only to provide a visual summary of results. Violent victimization was left out, as it did not have any significant relationships with the mediators or outcome in a consistent direction. All pathways denoted above are significant at the $p < .05$ level. We represent significant paths found only in PROSPER with dotted lines, significant paths found only in z-proso with solid lines, and significant paths found in both datasets with bold lines.

Discussion

In this article, we tested the hypothesis that harsh and unpredictable environments are associated with delinquency through unpredictability schemas and short-term mindsets, offering a shared mechanism for many separate predictors of delinquency. We used four models with two separate longitudinal datasets comprised of youth self-report survey data, thus offering a conceptual replication of our hypotheses (Schmidt 2009). Ostensibly, the results that remain consistent across samples (and types of models in z-proso) are the strongest. There were many consistent findings in the two datasets, despite differences in the samples, measures, and time lags between waves. First, most of the forms of harsh and unpredictable environments

we measured were linked to later unpredictability schemas and short-term mindsets. Furthermore, their relationship with delinquency was consistently mediated by short-term mindsets, primarily sensation-seeking, but less so unpredictability schemas. Having inconsistent, uninvolved, or harsh parents, being victimized (bullied) by one's peers, and having violent friends were associated with more short-term mindsets, which partially or fully mediated their relationships with delinquency. Put simply, two forms of unpredictability and harshness held the most importance for short-term mindsets and later delinquency: unpredictability in parenting and exposure to peer violence.

These risk factors were consistently related to increased delinquency through a shared mechanism: sensation-seeking, or the preference for exciting and thrilling experiences in the moment, even in the face of risks. Indeed, most mediation of the relationship between harsh and unpredictable environments and delinquency occurred through sensation-seeking, which was the sole mediator that consistently predicted delinquency 1–3 years later across all models and both datasets. This is in line with research demonstrating that middle adolescence is a time of enhanced preference for and vulnerability to, exciting, rewarding behaviors—and our measures of short-term mindsets were assessed at a time where sensation-seeking is at or just past its peak, while impulsivity may be declining (Harden and Tucker-Drob 2011; Steinberg et al. 2008, 2018). Short-term mindsets played a larger mediating role than self-efficacy and trust, used to capture unpredictability schemas, which underscores their importance as a shared cognitive mechanism through which harsh and unpredictable environments impact delinquency.

This study moves the field forward in several important ways. In criminology, it is often assumed that while exposure to different risk factors is influencing criminal behavior contemporaneously, these effects are happening extraneously to each other (Simons and Burt 2011). Our research suggests that there are common cognitive processes at work, providing a shared mechanism behind many different important predictors of offending. In this way, we heed the call to integrate both internal, cognitive factors and environmental predictors in our explanation of crime, which criminologist Daniel Nagin described one of the discipline's largest challenges (Box-Steffensmeier et al. 2022: 16). This article also addresses the need to better embed research on decision-making regarding offending within social and environmental context (Hoeben and Thomas 2019). Specifically, we offer two environmental frameworks, harshness and unpredictability, that can influence people's intertemporal preferences.

This research supports the idea that short-term mindsets change in response to environmental factors above and beyond just parental monitoring, often touted as the root of one's short-term mindset in criminological theory (Gottfredson and Hirschi 1990). If short-term mindsets are malleable, then they may also be malleable to interventions designed to prevent negative outcomes that may stem from these mindsets. For example, cognitive behavior therapy programs amongst inner-city youth can reduce delinquency through a lessening impulsive, automatic thinking style (Heller et al. 2017). Envisioning one's future self is also linked to a reduction in delinquency (van Gelder et al. 2022; van Gelder, Hershfield, and Nordgren 2013; van Gelder et al. 2015), and developing positive future selves has been identified as an important component of criminal desistance (Maruna 2001; Paternoster and Bushway 2009).

Yet, programs interested in delinquency prevention in adolescence and desistance from crime in adulthood should consider the link between environmental harshness/unpredictability and short-term mindsets and how it should inform such interventions. Whether present-oriented and exploitative behaviors, like crime, payoff in the long run depends on whether individuals have sufficient access to, and can predict and control, valuable resources in their environments (Fenneman and Frankenhuis 2020). If conditions are harsh and unpredictable, adopting a short-term mindset may be a reasonable response, even if such a mindset increases the likelihood of risky behaviors, which entails the possibility of costs both for the individuals who engage in them and society at large. Thus, policies and interventions should target not only impulsive thinking and future orientation directly, but also early intervention in parenting and reducing violence amongst adolescents, which our results suggest are environmental factors that can shape adolescents' outlooks and futures.

Mixed or Unexpected Results

We found little evidence of direct mediation through unpredictability schemas—measured with self-efficacy and trust—either alone or in series (see Table 9). There was a fully indirect relationship between unpredictability schemas (trust in z-proso and self-efficacy in PROSPER) and later delinquency, largely occurring through sensation-seeking; this differs from prior studies which have found a more pronounced link between unpredictability beliefs and delinquency (Cabeza de Baca, Barnett, and Ellis, 2016; Dickerson et al. 2019; Hill et al. 1997). Many indicators of harsh and unpredictable environments were, however, associated with unpredictability schemas, some of which contributed to significant total indirect effects on

delinquency (see Figures 2 and 3). These findings alone are important, as self-efficacy and trust are integral to adolescent development. Trust is vital to social relationships and cooperation (Balliet and Van Lange 2013), and both general self-efficacy and trust are linked to a myriad of outcomes such as physical health, mental health, and alcohol consumption (Luszczynska, Scholz, and Schwarzer 2005; Shafikhani, Bagherian, and Shokri 2018; Sjödin et al. 2021).

Our more nuanced results for the importance of unpredictability schemas could boil down to two issues with measurement. First, it is possible there was too long a time lag between our measures of unpredictability schemas and delinquency (2–5 years), or especially between unpredictability schemas and short-term mindsets (1–2 years), which likely unfold contemporaneously rather than in such a delayed manner (Ross and Hill 2002). It is possible we presented too-conservative estimates of these effects, with time lags that do not reflect the true causal lags between our explanatory and outcome variables (Vaisey and Miles 2017). It is noteworthy that there is greater evidence of significant associations with unpredictability schemas, including those contributing to indirect effects, in the PROSPER dataset, which only had lags of 1 year (see Figures 2 and 3). Second, the measures we used to operationalize unpredictability schemas are close correlates of unpredictability schemas, rather than direct measures of unpredictability schemas themselves (Ross and Hill 2002). Other researchers have worked on developing and validating direct measures or composite scales of unpredictability beliefs. Generally, these scales have had low reliability, though they have empirical relationships in the theorized directions (Cabeza de Baca et al. 2016; Carey and Paulhus 2013; Hill et al. 1997; Paulhus and Carey 2011). Ross, Short, and Garofano's (2016) recently developed a Scale of Unpredictability Beliefs and found a three-factor loading (beliefs that pertain to self, other people, and world) to have an adequate fit and correlate with related constructs, such as self-efficacy. Future research should replicate and extend this study by using measures that directly measure these beliefs.

However, it is also true that unpredictability schemas are likely not the sole mechanism through which harsh and unpredictable environments encourage short-term thinking. As discussed in the literature review, present orientation in these environments may just be more necessary (i.e., in the face of immediate threats), less cognitively taxing (i.e., when mental reserves are "tapped out"), or more adaptive in these environments (i.e., more beneficial to reproductive, economic, or other success) (Frankenhuis et al. 2016; Jaynes et al. 2022; Kruger et al. 2008;

Mullainathan and Shafir 2013; Vohs 2013). In this case, harsh and unpredictable environment would encourage short-term thinking whether or not adolescents hold doubts about their own ability to cope with life's challenges or trust other people.

Many associations between environmental factors, especially exposure to violence, and delinquency were not fully mediated in our models, signifying that these mediators do not explain the totality of their effects on later offending. Having violent friends, perceived or friend-reported, generally maintained or had only a direct relationship with delinquency in both datasets. Bullying victimization (in the PROSPER model) and corporal punishment and parental involvement (in the z-proso models) also maintained direct effects. These direct effects may come as no surprise to those familiar with other mechanisms through which these variables have established relationships with delinquency. Yet, our results demonstrate that unpredictability schemas and short-term mindsets are important pieces of the puzzle.

For some variables, we did not find support for our expectations. Future orientation was not significantly associated with delinquency in any of the models, though its coefficient was in the expected direction. Furthermore, we did not observe consistent significant relationships with delinquency among (non-bullying) violent victimization, SES, family instability, and parent threat appraisals. Family instability only had a significant relationship with delinquency in the PROSPER dataset, which may signify a greater impact in less-affluent rural America. Violent victimization, SES, parent threat appraisals, family violence also had occasional relationships with mediators in opposite directions as expected.

There are some differences between our results between samples. This is unsurprising, especially given that this is a conceptual and external replication using a different sample collected from a different place and time (Pridemore et al. 2018). In the neighboring field of psychology, in which stronger research designs are more commonplace, only one-third of results were found to replicate (Open Science Collaboration 2015). Areas where there is diverging evidence between samples can also be of theoretical interest, as these can shed light on which findings do not generalize and generate ideas about cultural differences which may have produced this variation (Apicella and Barrett 2016). Yet where the two sets of results differ, it is difficult to draw conclusions. It may be because the variables do not act in the same ways across samples or if may be due to things outside the scope of theory such as statistical artifacts or measurement error; this is a common issue with conceptual replication (Schmidt 2009). Thus, we require further evidence. Yet, we speculate that to some degree, variation in measurement may be to blame.

Differences in our results that are central to our hypotheses include: (a) for unpredictability schemas, only trust is significantly (indirectly) related to reduced delinquency in the z-proso sample, where this is true only of self-efficacy in the PROSPER sample, (b) impulsivity is not significantly related to an increase in delinquency in the PROSPER sample, (c) we do not see an indirect effect of parental warmth in PROSPER as we do for parental involvement in z-proso. In all of these instances, our measures suffer from some limitations. For example, the PROSPER measure of trust, impulsivity, and parental warmth are all one-item measures selected to test for conceptual replication but with weaker validity compared to the corresponding measures in z-proso. The measures of self-efficacy also differ between z-proso and PROSPER; while both measure ability to overcome and deal with problems, only the latter includes views about the controllability of one's world, which captures the idea of the unpredictability schema most accurately. This could explain why self-efficacy is significantly related to delinquency in the PROSPER sample. However, it could also be that these results just don't generalize across cultures. Convergent (or divergent) evidence across a greater degree of cultures and countries, especially those which contain measures that are similar to the fullest extent possible, can help illuminate these remaining questions.

Limitations and Future Directions

Although we found similar supportive findings using data from two very different populations—one sample of urban Swiss youth and one of rural American youth—we cannot be sure whether our findings generalize to other populations or age groups. Future research should especially examine these processes in early childhood. This may be a fruitful avenue given the hypothesis that individuals learn many things about their world during windows of heightened plasticity ("sensitive periods"; Frankenhuis and Walasek 2020; Gabard-Durnam and McLaughlin 2019) and findings that exposure to harsh and unpredictable environments may be more important in early life, especially the first five years (Dickerson et al. 2019; Doom et al. 2016; Simpson et al. 2012; Szepsenwol et al. 2015).

Examining prolonged and more severe exposure to harsh and unpredictable environments may be particularly illuminating. For example, our mostly null results for SES may be because we do not have adequate measures of consistent childhood exposure to poverty, which often has the strongest link with delinquency (Jarjoura et al. 2002). Additionally, they may be because the samples included here were not especially likely to suffer from

poverty consistent and severe enough to constitute a harsh environment that may lead one to doubt their later likelihood of morbidity and mortality. SES was related to a decrease in unpredictability schemas (specifically, an increase in self-efficacy) in the PROSPER sample; yet, the effect was not great enough in magnitude to produce an indirect effect on delinquency. It may be notable that we see a relationship between SES and unpredictability schemas only in the less-affluent sample; testing these hypotheses in samples that include starker variation on this domain of interest or stronger measures of unpredictability schemas may thus find evidence of an effect. We believe follow-up work in (a) less affluent cities and (b) especially harsh and unpredictable environments to be an important step for future research.

Finally, our non-experimental panel design does not afford conclusions about causality. We cannot rule out the possibility that unobserved variables or earlier levels of our measured variables drive our results. For example, it may be possible that more delinquent adolescents or those who have short-term mindsets select into criminogenic contexts, including violent peers and groups (McGloin and Thomas 2019) or more negative interactions with parents (Clark, Donnellan, and Robins 2018; Narusyte et al. 2007). If this is true, failure to observe initial conditions (i.e., the first chains in the causal processes, such as the earliest instances of delinquency, which may precede the experience of harsh and unpredictable environments) may result in biased and inconsistent parameter estimates (see Brame et al. 1999; Nagin and Paternoster 1991).

While including lagged measures of dependent and mediating variables, including prior delinquency, can help solve this potential confounder, we omitted these for several reasons. First, this introduces bias in and of itself. Such measures are often "too strong" a control; the prior measure of the dependent variable will be correlated with the structural error term, downwardly biasing other effect estimates (Achen 2001; Haynie and Osgood 2005; McGloin and Thomas 2019; Thomas, McGloin, and Sullivan 2019). Second, the inclusion of lagged dependent variables made little sense in the theoretical context of this study, where exposure to unpredictability and harshness likely began and may have had more impact in early life (Doom et al. 2016; Simpson et al. 2012). Adolescents' answers to questions about harshness and unpredictability could have been based on experiences that preceded the measurement of the lagged dependent or mediating variables. Earlier levels of harshness and unpredictability could have influenced these lagged measures of the dependent variables, essentially "cannibalizing" their effect (Thomas et al. 2019). In instances where

there is little scope for observing true initial conditions of the causal processes at work, Brame et al. (1999) recommend omitting lagged dependent variables. These results should still be interpreted with caution, and future research should consider early and bidirectional pathways between exposure to harsh and unpredictable environments and aversive child behavior.

Conclusion

We find that the developmental context surrounding adolescents, including both parents and peers, alters their perceptions of self, the world, and their expected future. Harsh and unpredictable environments can teach individuals that the world is a chaotic, uncontrollable, and untrustworthy place where they may be unable to bring a positive future to fruition. Short-term mindsets, a consistent and important predictor of criminal behavior, can become a reasonable response in the face of an uncertain or harsh future. In short, the present work helps explain why individuals in harsh or unpredictable environments learn or adapt with a short-term mindset, even if such a mindset doesn't generalize to success in all contexts (Heller et al. 2017; Rivers et al. 2017). This provides a shared mediator for many predictors of crime and situates cognitive decision-making inside of its environmental context in order to further our understanding of crime (Box-Steffensmeier et al. 2022; Hoeben and Thomas 2019).

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Notes

1. Though the term risk-seeking is often used in criminology, its conceptualization and measures often more closely resemble the concept of sensation seeking, also similar to novelty, excitement, or reward seeking. Sensation-seeking reflects a preference for immediately gratifying behaviors, even in the face of risk, consistent with the idea that adolescents fail to consider the full scope of future outcomes in favor of present rewards. On the other hand, risk-seeking in the economic literature refers to having a high tolerance for risk in decisions involving losses versus gains (i.e., preferring more variance in outcomes). This definition of risk-seeking is conceptually distinct and decreases linearly throughout adolescence, compared to the curvilinear peak of sensation-seeking in adolescence (Steinberg et al. 2008). Sensation-seeking, compared to risk-seeking, may also be a better predictor of later behavioral outcomes (Morrongiello and Lasenby 2006; Morrongiello et al. 2009). There is evidence that adolescent risky behaviors are driven less by a preference for risk, and more so this strong pull of immediate rewards (Roberti 2004).
2. Only the in-school surveys had information about peer violence using social network information, impulsivity, and sensation-seeking; we thus matched the students from the in-home subsample to their responses in the in-school surveys to gather their measures for these items.
3. Though intended to be a representative sample, there are some small, statistically significant differences between the larger PROSPER in-school sample and the in-home subsample that agreed to participate. Students in the 2003 in-home subsample were more likely to be White, report more in-school friends, and were somewhat less likely to report engaging in substance use and delinquency (Jacobsen 2020).

4. We do not control for multiple testing as the two pre-registered models are designed to test different hypotheses (i.e., the effect of harsh and unpredictable environments recently versus over a period of years) and the factor model is only exploratory.
5. We filed a third preregistration for fixed effects structural equation models using both z-proso and PROSPER Peers. However, upon running both analyses, Mplus produced warnings that suggested the model may not have been properly identified. We conducted tests to determine the cause of the warning. These were inconclusive, but we believe that lack of sufficient variation and loss of sample size when isolating within-person change produced unreliable output. We therefore present only between-person analyses in this article.

Supplemental Material

Supplemental material for this paper is available online.

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