



Evaluating cognitive change in a batterer intervention program: a prospective examination of criminal thinking

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Abstract

Objectives Examine whether participation in a cognitive-behavioral Batterer Intervention Program (BIP) is associated with reductions in criminal thinking among individuals convicted of intimate partner violence (IPV), and whether such reductions persist after program completion.

Methods Using a prospective longitudinal design, we tracked changes in criminal thinking across repeated measurements spanning a two-year period among 624 court-mandated men and women from five Midwestern counties (1,717 total observations). Criminal thinking was assessed using a modified version of the Texas Christian University Criminal Thinking Scales (TCU-CTS). Growth curve modeling was used to estimate within-person change during and after program participation.

Results Criminal thinking declined significantly during program participation but stabilized after program completion, with no evidence of reversal.

Conclusions Cognitive change achieved during BIP participation may persist beyond program termination, underscoring the dynamic and modifiable nature of criminal thinking. Findings are based on a non-randomized, single-state sample, limiting causal inference and generalizability. Replication with randomized samples across diverse settings is needed to strengthen causal claims and inform policy on BIP effectiveness.

Keywords Criminal thinking · Batterer intervention programs (BIPs) · Cognitive behavioral therapy (CBT) · Intimate partner violence · Domestic violence · Principles of effective intervention · Risk-need-responsivity

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Introduction

In response to the intimate partner violence (IPV) crisis, the first generation of Batterer Intervention Programs (BIPs) emerged in the 1970s, beginning with EMERGE—a grassroots initiative characterized by community-based organizing and lacking a formal theoretical framework or structured curriculum (Adams, 2009; Buzawa & Buzawa, 2003). The 1980s marked the rise of a second generation of BIPs, alongside the development of coordinated community responses, the infusion of different program approaches, the establishment of state standards, and a substantial expansion in the number of programs nationwide (Adams, 2009; Wagers & Radatz, 2020). Early second-generation interventions, particularly those modeled after the Duluth approach, were grounded in feminist theory and emphasized power and control dynamics in male-perpetrated violence against women (Ferraro, 2017; Pence & McMahon, 1997; Pence & Paymar, 1993; Saunders, 1996). Although these models helped institutionalize community-based IPV intervention, empirical evaluations across program types have consistently reported small or minimal effects, regardless of theoretical orientation (Arce et al., 2020; Arias et al., 2013; Babcock et al., 2024, 2004; Feder & Wilson, 2005).

These findings contributed to a paradigm shift that is still unfolding, particularly since the 2010s, toward the integration of the Risk-Need-Responsivity (RNR) framework and the Principles of Effective Intervention (PEI) into BIP design and delivery (Radatz et al., 2021; Radatz & Wright, 2016; Travers et al., 2021). This shift emphasizes aligning treatment intensity with assessed risk, targeting dynamic criminogenic needs—such as antisocial cognitions—and using cognitive-behavioral responsivity strategies to improve intervention effectiveness (Bonta & Andrews, 2024; Radatz & Wright, 2016). In this context, cognitive-behavioral therapy (CBT) has gained increasing attention as one avenue through which BIPs may better align with evidence-based correctional practices. Emerging evidence suggests that CBT-informed BIPs may be associated with stronger reductions in IPV recidivism, particularly when delivered with high fidelity and tailored to individual risk profiles, although direct comparisons across BIPs remain difficult because programs often vary in structure, implementation, and hybridization (Beck, 2020; Beck & Dozois, 2011; Eckhardt et al., 2006; Ellis, 1980; Gondolf, 2004; Murphy, 2024; Polaschek, 2011; Szifris et al., 2025).

Despite these developments, fewer than half of IPV perpetrators are referred to the legal system (Tapp & Coen, 2024), and an even smaller proportion are mandated to attend treatment. Because the primary aim of BIPs is to reduce recidivism, most evaluation research has focused on outcomes such as re-arrest or re-conviction for IPV (Babcock et al., 2024; Bennett et al., 2007; Eckhardt et al., 2013; Taft & Campbell, 2024). BIP participation, however, may also produce a range of additional intended and unintended outcomes that remain comparatively underexplored, including changes in attitudes, relationship dynamics, and harmful cognitions associated with violence (Eckhardt et al., 2013; Taft & Campbell, 2024). Some of these outcomes may be more proximal to the mechanisms that underlie recidivism and, for that reason, may be especially useful for understanding how intervention operates before changes in official behavioral outcomes are observed.

Far less is known about whether BIPs reduce harmful cognitions associated with aggression and violence, even though such cognitions may be directly tied to the reasoning processes that support recidivism. This gap is compounded by ongoing debate over whether criminal thinking reflects a fixed trait or a dynamic and malleable construct (Morgan et al., 2015). The present study addresses this uncertainty by conceptualizing criminal thinking as a set of dynamic, modifiable criminogenic cognitions—distinct from stable antisocial personality traits—that shape how individuals justify, rationalize, and excuse harmful behavior, and that may be responsive to structured cognitive-behavioral intervention. The Literature Review develops this distinction in full.

The present study is also informed by theories of neutralization, which emphasize the justificatory beliefs individuals use to rationalize deviant conduct (Agnew, 1994; Kaptein & van Helvoort, 2019; Maruna & Copes, 2005). In the context of IPV, these cognitions may take the form of minimizing harm, shifting blame, or externalizing responsibility—patterns consistent with broader neutralization processes linked to violent behavior (Agnew, 1994; Maruna & Copes, 2005; Solinas-Saunders, 2026a). Although limited evidence suggests that CBT may reduce criminal thinking in other offender populations (Folk et al., 2016), this hypothesis has not been tested within the context of BIPs. Beyond demonstrating that criminal thinking can be reduced, a growing body of evidence from general criminal rehabilitation research suggests that such reductions may carry behavioral significance. Walters and Lowenkamp (2016) found that declines in criminal thinking scores predicted lower rates of recidivism among federal probationers, and Folk et al. (2018) reported that reductions in criminal thinking were associated with fewer subsequent offenses across demographically diverse offender samples. Together, these findings provide an empirical foundation for treating cognitive change as a meaningful proximal outcome—one that may precede downstream reductions in reoffending, including IPV. This omission persists despite longstanding recommendations that changes in criminal thinking should be prioritized in the assessment of recidivism risk (Knight et al., 2006; Walters, 2020; Walters & Lowenkamp, 2016).

The present study addresses this gap by examining whether participation in a multi-site BIP is associated with changes in criminal thinking over time among individuals convicted of IPV across Midwestern counties. The study is situated within the broader integration of RNR-informed principles into BIP programming, both at the programmatic level—reflected in the program’s cognitive-behavioral orientation—and at the individual level, where antisocial cognitions are increasingly recognized as dynamic criminogenic needs warranting targeted intervention. Using repeated assessments collected during program participation and after program completion, the study examines changes in criminal thinking over time during the program and following its conclusion. It addresses the following research questions: (1) Is participation in the BIP associated with measurable reductions in criminal thinking among IPV offenders? and (2) If reductions occur, do these cognitive changes persist beyond program completion?

Before presenting the data and methods used in this study, we summarize key findings from existing research on BIPs, CBT, and intervention effectiveness, and we outline the conceptual framework that informs the analysis.

Literature review

BIP effectiveness, cognitive-behavioral intervention, and the current paradigm shift

Efforts to reduce IPV through mandatory participation in Batterer Intervention Programs (BIPs) have yielded mixed results, with ongoing debate surrounding their theoretical foundations, implementation fidelity, and effectiveness. Early BIPs, such as those modeled after the Duluth approach, emphasized gendered power dynamics and accountability (Ferraro, 2017; Pence & Paymar, 1993). However, empirical evaluations have consistently found minimal or negligible effects on recidivism (Babcock et al., 2004; Feder & Wilson, 2005; Taft & Campbell, 2024). Meta-analyses suggest that even under optimal conditions, BIPs reduce reoffending by only 5

In response to these limitations, cognitive-behavioral therapy (CBT)-based interventions have gained prominence within BIPs and align closely with the responsivity principle of the Risk-Need-Responsivity (RNR) framework, which emphasizes the use of cognitive-behavioral approaches as the most effective modality for reducing criminal behavior (Radatz & Wright, 2016). CBT targets distorted thinking patterns and emotional dysregulation, offering a theoretically grounded and empirically supported alternative to psychoeducational models (Beck, 2020; Hansen, 2008; Lipsey et al., 2007). Although direct comparisons across BIP types remain complicated by program hybridization and variability in research designs (Cannon et al., 2016; Gondolf, 2004), emerging evidence suggests that CBT-informed BIPs may produce more meaningful reductions in IPV recidivism when delivered with high fidelity and tailored to individual risk profiles (Babcock et al., 2024; Murphy, 2024; Szifris et al., 2025). Several structured CBT programs—including Moral Reconnection Therapy (MRT), Reasoning and Rehabilitation (R&R), and Thinking for a Change (T4C)—have shown promise in reducing criminal behavior across offender populations, supporting their application within the BIP context (Allen et al., 2001; Wilson et al., 2005).

Yet even as these behavioral outcome studies accumulate, BIP participation may also produce other intended and unintended outcomes that remain comparatively underexplored, including changes in attitudes, relationship dynamics, and harmful cognitions associated with violence (Taft & Campbell, 2024). Among these, cognitive change may be especially important because it is more proximal to the psychological mechanisms that support or sustain abusive behavior.

Criminal thinking, antisocial cognitions, and recidivism

Criminal thinking—defined as a pattern of distorted beliefs that justify or rationalize harmful behavior—is increasingly recognized as a dynamic criminogenic risk factor for recidivism and a promising target for intervention (Walters, 2012; Knight et al., 2006; Bonta & Andrews, 2024). As one of the Central Eight criminogenic needs, antisocial cognitions represent a modifiable risk factor that, when targeted through structured intervention, may reduce the likelihood of future offending (Bonta & Andrews, 2024; Hilton & Radatz, 2018). Within the broader RNR framework,

antisocial cognitions are also among the “Big Four” strongest predictors of recidivism across offender populations (Bonta & Andrews, 2024).

Criminal thinking refers to the cognitive patterns and belief systems that facilitate and sustain habitual lawbreaking behavior (Walters, 2006). Although criminal thinking and antisocial personality traits are related constructs, they are conceptually distinct. Antisocial personality traits—such as impulsivity, callousness, and persistent disregard for social norms—reflect relatively stable dispositional characteristics, whereas criminal thinking encompasses the specific cognitive distortions, rationalizations, and neutralization processes that individuals actively employ to justify and enable harmful behavior (Walters, 2006; Bonta & Andrews, 2024). In this sense, criminal thinking is best understood as a dynamic and modifiable cognitive process rather than a fixed personality disposition—one that can be targeted through structured intervention.

The association between criminal thinking and recidivism is well established: higher baseline levels predict subsequent offending, whereas reductions over time are associated with a decreased likelihood of reoffending (Folk et al., 2018; Walters, 2012; Walters & Lowenkamp, 2016). These patterns have been observed across general offender populations and, more recently, among IPV offenders specifically (Walters, 2020; Hilton & Radatz, 2018; Hilton & Radatz, 2021). In the present study, we conceptualize criminal thinking as a dynamic criminogenic need within the Central Eight framework—one that is both measurable and modifiable—and examine whether structured CBT-based intervention within a BIP produces meaningful within-person reductions over time. In doing so, we address a gap in the application of RNR principles to IPV treatment contexts.

Two validated instruments are commonly used to assess criminal thinking in research and practice. The Psychological Inventory of Criminal Thinking Styles (PICTS) measures eight thinking styles associated with criminal behavior and has demonstrated strong predictive validity for recidivism across both community and institutional samples (Walters & Lowenkamp, 2016). The Texas Christian University Criminal Thinking Scales (TCU-CTS) assess six dimensions of criminal thinking—Entitlement, Justification, Personal Irresponsibility, Power Orientation, Cold Heartedness, and Criminal Rationalization—and have similarly been validated as reliable tools for tracking cognitive change over time (Knight et al., 2006; Sease & Knight, 2022). The present study employs a modified version of the TCU-CTS, selected for its alignment with the program’s emphasis on proactive cognitive accountability.

Criminal thinking as a mechanism of behavioral change

Although most BIP evaluations have prioritized behavioral recidivism outcomes over cognitive ones, criminal thinking is important not only conceptually but also empirically. The predictive relationship between criminal thinking and recidivism has been documented not only cross-sectionally but also longitudinally: reductions in criminal thinking over time have been shown to precede reductions in reoffending (Walters, 2012; Walters & Lowenkamp, 2016). Within the broader offender rehabilitation literature, programs that produce declines in criminal thinking scores are associated with lower rates of re-arrest at follow-up, suggesting that cognitive change is not merely

a correlate but a plausible mechanism of behavioral change (Folk et al., 2016, 2018). Although direct evidence of this pathway within BIP populations remains limited, these findings provide a conceptual and empirical foundation for expecting that cognitive shifts produced by BIPs may function as a meaningful precursor to reductions in IPV-related reoffending. This omission persists despite explicit calls for research on criminal thinking within community-supervised IPV populations to inform risk assessment and treatment planning (Taft & Campbell, 2024; Walters, 2020).

A growing body of research also suggests that criminal thinking may mediate the relationship between early trauma, peer influence, and subsequent offending (Cuadra et al., 2014; Healy, 2010; Walters, 2016). These findings further underscore the importance of examining criminogenic cognition not simply as a static marker of risk, but as a mechanism through which intervention may support desistance.

Neutralization theory and IPV

The theoretical foundation of criminal thinking is rooted in mid-20th-century criminology, particularly Sutherland's theory of differential association, which emphasizes the social learning of deviant behavior (Sutherland & Cressey, 1966). Building on this foundation, Sykes and Matza (1957) introduced the concept of neutralization techniques, arguing that individuals do not reject societal norms outright but instead develop cognitive strategies that allow them to temporarily suspend moral constraints, mitigate guilt, and maintain a positive self-concept. These techniques function as cognitive defenses that precede and enable deviant behavior.

Sykes and Matza identified five core neutralization techniques: (1) denial of responsibility—attributing one's actions to external forces or circumstances; (2) denial of injury—minimizing the harm caused; (3) denial of the victim—reframing the victim as deserving of harm; (4) condemnation of the condemners—discrediting those who enforce societal norms; and (5) appeal to higher loyalties—prioritizing group or subcultural values over legal norms (Sykes & Matza, 1957).

These techniques are particularly relevant in the context of interpersonal violence, where offenders may justify abusive behavior as discipline, retaliation, or adherence to patriarchal norms. Empirically, Agnew (1994) demonstrated that neutralization techniques are significantly associated with violent behavior, providing direct evidence that such justifications function as active enablers of aggression rather than merely post hoc rationalizations. Among IPV perpetrators specifically, offenders commonly minimize the severity of their violence, attribute responsibility to their partners, or frame abusive behavior as a justified response to perceived provocation—patterns that align closely with denial of injury, denial of responsibility, and condemnation of the condemners (Kaptein & van Helvoort, 2019; Maruna & Copes, 2005). Despite this strong theoretical fit, systematic empirical tests of neutralization theory within IPV contexts remain limited, representing a gap that the present study begins to address.

Subsequent research has expanded and refined neutralization theory. Maruna and Copes (2005) highlight that longitudinal and qualitative approaches provide deeper insights than survey-based studies alone, while desistance research suggests that neutralization techniques may support the maintenance of a non-criminal identity and

facilitate reform (Maruna, 2001). Kaptein and van Helvoort (2019) further advanced the field by developing a deductive-inductive taxonomy of neutralization techniques, offering a structured framework that enhances theoretical clarity and provides practical tools for examining deviant behavior across contexts.

Importantly, Walters (2006) notes that these cognitive distortions are not static—reductions in criminal thinking have been shown to precede reductions in criminal behavior—suggesting that neutralization processes are amenable to intervention and represent meaningful targets for change within BIPs.

Criminal thinking as dynamic, modifiable, and context-dependent

The dynamic nature of criminal thinking has been examined in intervention research. Folk et al. (2016) evaluated the “Taking a Chance on Change” program, a self-administered cognitive-behavioral intervention for incarcerated individuals in restrictive housing. Using the simplified version of the Psychological Inventory of Criminal Thinking Styles (PICTS-SV), they found significant reductions in general, reactive, and proactive criminal thinking, with reactive thinking showing the greatest change. Notably, reductions in reactive thinking were associated with fewer disciplinary infractions, and older, more educated participants demonstrated greater cognitive shifts.

However, the extent to which criminal thinking is modifiable remains debated. Morgan et al. (2015), using samples of both college students and incarcerated individuals, concluded that criminal thinking may exhibit trait-like stability. This finding suggests that while some cognitive patterns may be resistant to change, others may remain amenable to targeted interventions, with important implications for assessment and treatment. These findings align with the psychological inertia model, which posits that quasi-stable cognitive traits mediate the relationship between past and future criminal behavior (Walters, 2019).

The distinction between reactive and proactive criminal thinking is also relevant. Reactive criminal thinking—characterized by impulsivity and emotional dysregulation—has been shown to predict crime continuity more strongly than proactive thinking, which involves more calculated and goal-oriented rationalizations (Morgan et al., 2015; Walters, 2016). Reactive cognitions have also been found to be more amenable to short-term change, whereas proactive, calculative cognitions are generally considered more resistant to intervention (Folk et al., 2016; Walters, 2016). This distinction is especially relevant to the present study, which focuses on proactive criminal thinking in a BIP context.

Importantly, much of the existing evidence on criminal thinking interventions derives from incarcerated populations, whereas BIPs typically serve community-based samples (Folk et al., 2016; Mennicke et al., 2015). These settings differ in meaningful ways. Individuals mandated to community-based programs may present with lower baseline levels of criminal thinking than incarcerated populations, reflecting differences in offense severity and criminal history. At the same time, they are embedded in ongoing social contexts—including intimate relationships, employment demands, and broader community stressors—that may shape both the content of their criminogenic cognitions and their responsiveness to intervention (Morgan et

al., 2015; Walters, 2012). These setting-based distinctions underscore the importance of examining criminal thinking trajectories specifically within community-based BIP contexts, rather than assuming that findings from institutional settings generalize directly.

Nevertheless, interventions targeting criminal thinking have demonstrated meaningful reductions in criminogenic cognitions and improvements in attitudes, providing a foundation for examining similar processes within BIPs (Folk et al., 2016; Mennicke et al., 2015). Yet few studies have examined whether BIPs reduce criminal thinking over time among community-supervised IPV offenders, despite explicit calls for such research to inform risk assessment and treatment planning (Taft & Campbell, 2024; Walters, 2020).

Related intervention developments: CBT and ACT

Innovative approaches to batterer intervention have further illuminated how targeting cognition-related processes can support desistance, albeit through mechanisms that differ in important ways from traditional CBT. Zarling and colleagues developed and evaluated a program based on Acceptance and Commitment Therapy (ACT)—Achieving Change Through Values-Based Behavior (ACTV)—which does not seek to eliminate or restructure distorted thoughts but instead aims to reduce their behavioral influence by fostering psychological flexibility and values-based action. Unlike CBT, which targets the content of criminal thinking directly, ACT-based approaches focus on helping individuals observe and disengage from harmful thought patterns without necessarily altering them.

Across a growing body of research, ACTV has demonstrated consistently promising results among domestic violence offenders. Initial findings indicated that ACTV was more effective than traditional Duluth/CBT models in reducing recidivism at one year post-intervention (Zarling et al., 2019), with effects maintained at a five-year follow-up (Zarling et al., 2020). The first randomized controlled trial directly comparing ACT with the Duluth Model in community-based corrections further supported its effectiveness (Zarling & Russell, 2022), and more recent work has begun to examine the mechanisms of change—including reductions in psychological inflexibility—that may account for these outcomes (Zarling et al., 2025). The program's emphasis on psychological flexibility, values-based behavior, and individualized learning may reduce the behavioral influence of harmful cognitions and support pathways to desistance.

Broader social, demographic, and structural contexts

These theoretical and empirical contributions highlight criminal thinking as a dynamic construct shaped by cognitive distortions, social learning, and lived experience. Neutralization techniques provide a valuable lens for understanding how offenders justify harmful behavior, while intervention research underscores the potential for cognitive change. This framework informs the present study's examination of whether BIP participation leads to reductions in criminal thinking over time.

At the same time, criminal thinking does not develop in a vacuum. While some studies suggest that criminal thinking predicts recidivism regardless of demographic differences (Folk et al., 2018), others point to important variation. For example, gender differences have been observed across specific cognitive domains, with women typically scoring lower than men on measures such as Power Orientation and Cold Heartedness, suggesting distinct pathways to criminal cognition (Vaske et al., 2017; Solinas-Saunders & Stacer, 2024). Race and socioeconomic status also intersect with these patterns. Although some studies report no significant racial differences in BIP outcomes, higher dropout rates among African American participants indicate structural barriers that may influence engagement (Pike & Buttell, 2005). Younger individuals and those with lower socioeconomic status often exhibit higher levels of criminal thinking, underscoring the role of social disadvantage in shaping cognitive risk (Solinas-Saunders, 2026b; Solinas-Saunders, 2022).

Adverse life experiences—including childhood abuse, mental health challenges, and substance use—are consistently associated with elevated criminal thinking (Cuadra et al., 2014; Hubbard & Matthews, 2007). Trauma histories may foster cognitive distortions that rationalize harmful behavior, lending support to theories of intergenerational violence (Widom & Wilson, 2015). Mental health problems are also linked to higher levels of criminal thinking, whereas recovery-oriented orientations are associated with lower levels of criminogenic cognition (Bartholomew et al., 2018). Substance use disorders frequently co-occur with criminal thinking, compounding recidivism risk and underscoring the need for integrated interventions (Timko et al., 2022).

Beyond individual-level factors, structural inequalities rooted in gender, race, and class shape the context in which criminal thinking develops. Experiences of marginalization—including economic instability, discrimination, and limited access to services—can exacerbate stressors that contribute to maladaptive cognitive patterns (Link & Oser, 2018). For women, these dynamics often intersect with histories of victimization, which may influence both the motivations underlying IPV and the cognitive strategies used to justify it (Chesney-Lind, 2006; Miller, 2001). Although the present study does not directly examine these intersectional differences, they represent an important context for interpreting findings and a critical direction for future research that builds on cognitive change as a foundational outcome in BIP evaluation.

The present study

The present study addresses questions about the efficacy of treatment over time by examining longitudinal changes in criminal thinking among participants in a multi-site, community-based BIP. Drawing on neutralization theory (Agnew, 1994; Maruna & Copes, 2005; Sykes & Matza, 1957), it investigates whether participation in a CBT-based BIP—aligned with the responsivity principle of the RNR framework—leads to reductions in distorted cognitions associated with aggression and IPV.

Method

This study examines cognitive change among individuals convicted of IPV and mandated to attend a BIP. At the time of the study, the program adhered to state standards for certified batterer intervention programs in a Midwestern state; the state is not identified due to IRB confidentiality requirements. Because state standards for BIPs are subject to ongoing revision (Richards et al., 2022), the standards in effect at the time of data collection shaped the program's structure and delivery. The program was delivered through weekly group sessions over a 36-week period.

Formal program fidelity was not assessed; however, the program director served as the primary facilitator across multiple sites, providing a degree of consistency in program delivery. More broadly, BIPs commonly exhibit program hybridization—the blending of multiple approaches within a single program—which may influence treatment outcomes and should be considered when interpreting findings (Cannon et al., 2016). Although multiple facilitators were involved across sites, the program director—who held a clinical psychology background and an undergraduate degree from a research institution—served as the primary facilitator and taught at multiple locations. As the sole author of the program curriculum, the program director also served as the trainer for all program facilitators.

The BIP utilized a cognitive-behavioral approach that the director uniquely labeled cognitive accountability training to emphasize the program's focus on accountability as a cornerstone of behavioral change. The curriculum was structured into modules addressing attitudes and behaviors that contribute to harm—emotional, physical, sexual, and financial—as well as the breakdown of intimate relationships. Core principles were communicated through simplified accountability concepts grounded in the “golden rule” (treat others as you would want to be treated), illustrating how selfishness, blame-shifting, and rationalization perpetuate harm. Instructional strategies included structured presentations, interactive exercises, and role-playing scenarios, supported by video demonstrations produced by the program director to depict common IPV-related situations. Classes were gender segregated for men and women; however, the curriculum followed the same CBT-based protocol for all participants (Solinas-Saunders & Stacer, 2024).

Importantly, participants identified at intake as having mental health disorders or substance use problems—whether through prior diagnosis or screening—were required to attend additional specialized treatment programs alongside the BIP to address these needs. This integrated approach reflects the program's commitment to addressing co-occurring risk factors that may influence treatment outcomes.

The first author established a long-standing partnership with the BIP and related community agencies, including domestic violence shelters, the state Coalition Against Domestic Violence, and child protective services. After extensive program observation, the first author and the program director determined that measuring proactive criminal thinking would provide the most valid assessment of program impact. Proactive criminal thinking, as conceptualized by Walters (2016), reflects a calculated cognitive style characterized by rationalizations and neutralization techniques that justify harmful behavior.

The research team consisted of the principal investigator (PI; first author), the program director, four additional program facilitators, and one research assistant, all of whom held at least a bachelor's degree. Prior to data collection, the PI conducted structured training for all team members on research ethics, data integrity, and data collection procedures. Training included role-playing exercises and discussions of potential challenges to prepare team members for real-world data collection scenarios. The program director and facilitators were responsible for data collection at each phase of the study.

The study included only individuals mandated to attend the program following an IPV conviction. All procedures adhered to the ethical principles outlined in the Belmont Report and were approved by the Institutional Review Board (IRB) of a U.S. research university. Written informed consent was obtained from all participants, including agreement to participate in longitudinal prospective data collection.

Participants were first invited to take part in the study at program intake. Prior to each subsequent survey administration, a brief refresher on the study's purpose and procedures was provided. All surveys were administered in paper format at the facility where program sessions were held, before the start of each class. Surveys were linked using a unique research ID generated at intake by the BIP director. Participants who completed all surveys received a \$25 token of appreciation in recognition of their full participation. None of the individuals invited to participate declined, resulting in a 100% initial response rate, though the number of additional responses varied across individuals.

The study employed a longitudinal design, collecting data through paper-and-pencil surveys administered during program participation and during post-program follow-up. It is important to note that missing surveys in the longitudinal data collection do not necessarily indicate attrition from the program. Because participation was court-mandated, attendance was closely monitored by facilitators and managed by the program director. In addition, participant compliance was overseen by case managers and probation or parole officers, who submitted regular progress reports to the referring court. As such, a missing survey response at any given wave is more likely to reflect absence from a specific session rather than withdrawal from the program.

Data entry was completed by a trained research assistant under the supervision of the principal investigator.

Measures

The primary dependent variable was Proactive Criminal Thinking, assessed using a modified version of the Texas Christian University Criminal Thinking Scale (TCU-CTS) (Knight et al., 2006; Sease & Knight, 2022). The TCU-CTS consists of 36 items measuring six dimensions: Entitlement – sense of superiority over others; Justification – cognitive distortions that rationalize wrongdoing; Personal Irresponsibility – unwillingness to accept responsibility; Power Orientation – desire to exert control over others; Cold Heartedness – lack of empathy; Criminal Rationalization – negative attitudes toward law and authority. Two minor wording modifications were made to adapt the instrument for a community-based sample: the term “prison” was replaced with “under the supervision of the criminal justice system,” and the phrase

“you might be a criminal” was replaced with “you are under the supervision of the criminal justice system.” These adjustments were made to ensure that the language was appropriate and meaningful for individuals mandated to a community-based BIP rather than an incarcerated population, while preserving the construct validity of the original instrument.

An overall criminal thinking score was computed by summing all items. Responses were recorded on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree). Six items were reverse coded to maintain directional consistency.

We also recorded the following demographic and experiential factors: Sex (0 = male, 1 = female); Race (0 = White, 1 = non-White); Ethnicity (0 = non-Hispanic, 1 = Hispanic); Age (continuous, in years); Education (ordinal: less than high school, high school/GED, some college, associate degree, bachelor’s degree); Employment status (0 = unemployed, 1 = employed); Childhood abuse (0 = no, 1 = yes). Mental health problems were measured using the mean of 15 items from the Mental Health Screening Form III (Carroll & McGinley, 2000); responses to the original items were binary. Substance use disorders were assessed as the mean of 20 items from the Drug Abuse Screening Test (Skinner, 1982); responses to the original items were binary. Other continuous measures recorded included the number of prior incarcerations, and the number of years of military experience.

Descriptives

Six hundred and twenty-four (624) unique participants sat for 1,717 total surveys. Participants were surveyed between one and eight times, including up to four post-program surveys. Not all individuals completed post-program surveys. Figures 1 and 2 describe the distributions of the number of observations per individual and observations by week in the program, respectively.

As shown in Table 1, Criminal thinking scores ranged from 1 to 5 ($M = 1.78$, $S.E. = 0.46$). Subscale means ranged from 1.38 (Entitlement) to 2.32 (Cold Heartedness). Missing data were minimal (3.3%).

Demographic and experiential variables are described in Tables 2 and 3. Participants’ ages ranged from 18 to 67 years ($M = 32$, $S.E. = 9.4$). Mental health problems ranged between 0 and 1 ($M = 0.28$, $S.E. = 0.22$). Substance abuse ranged from 0 to 1 ($M = 0.30$, $S.E. = 0.26$). Past incarcerations ranged from 0 to 48 ($M = 2.4$, $S.E. = 4.3$), and military experience ranged from 0 to 13 years ($M = 0.38$, $S.E. = 1.5$).

Male participants were 87% of the sample, while female participants were 13%. Overall, 18% identified as non-white, while 82% identified as white. A small percentage of participants (4%) identified as hispanic. As for education, 21% of participants reported having less than twelfth grade education, 45% completed high school or equivalent, 21% had some college credit but no degree, 7.5% completed an associate’s degree, while 4.8% completed a bachelor’s degree. Less than half of participants (49%) reported being employed at the time of the study, while 51% reported being unemployed. Participants in the study reported high rates of past trauma with 39% reporting abuse during childhood or adolescence.

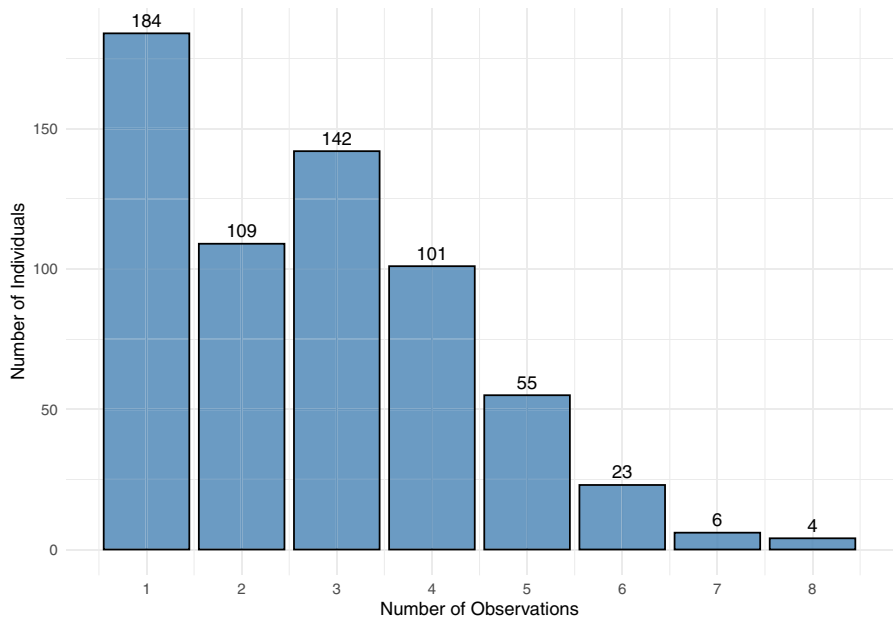


Fig. 1 Number of observations by individual

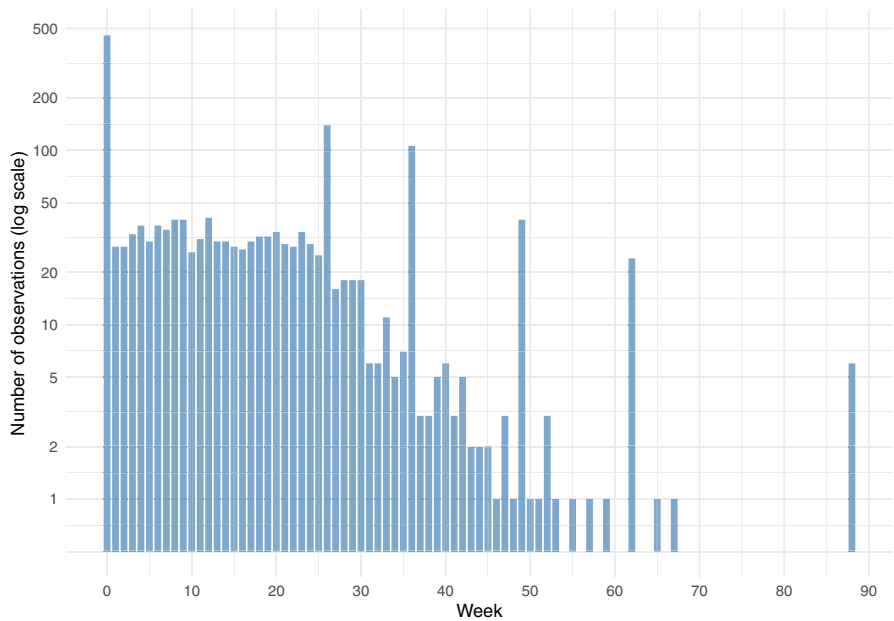


Fig. 2 Number of observations by week in the program (log scale). There were 456 observations at orientation (i.e., zero weeks); six participants completed a one-year follow-up (i.e., 88 weeks)

Table 1 Descriptive statistics: measures

Measure	Range	Mean (s.e.)	Cronbach α	Missing (%)
Entitlement	1-5	1.38 (0.49)	0.87	0.41
Justification	1-5	1.40 (0.55)	0.86	0.12
Personal Irresponsibility	1-5	1.49 (0.58)	0.82	0.81
Power Orientation	1-5	1.81 (0.73)	0.85	0.58
Cold Heartedness	1-5	2.32 (.80)	0.81	0.64
Criminal Rationality	1-5	2.30 (0.78)	0.80	1.1
Criminal Thinking	1-5	1.78 (0.46)	0.92	3.3

Table 2 Descriptive statistics: continuous variables

Variable	Range	Mean (s.e.)	n	Missing (%)
Age	18-67	32 (9.4)	624	0
Mental Health Problems	0-1	0.28 (0.22)	624	0
Substance Abuse	0-1	0.30 (0.26)	624	0
Previous Incarcerations	0-48	2.4 (4.3)	624	0
Military Experience (years)	0-13	0.38 (1.5)	624	0

Table 3 Descriptive statistics: binary and categorical variables.

Variable	Groups	n (%)	Missing (%)
Gender			0
	Male	544 (87)	
	Female	80 (13)	
Race			0
	White	510 (82)	
	Non-white	114 (18)	
Ethnicity			0
	Non-hispanic	596 (96)	
	Hispanic	28 (4)	
Education			0.80
	Less than 12th grade	132 (21)	
	High school equivalent	279 (45)	
	Some college credit	131 (21)	
	Associates degree	47 (7.5)	
	Bachelor's degree	30 (4.8)	
Employed			0
	No	317 (51)	
	Yes	307 (49)	
Abuse in childhood			1.8
	No	372 (61)	
	Yes	241 (39)	

Analytical strategy

To examine changes in criminal thinking over time, we work in the context of a class of panel data models represented by

$$y_{i,t} = \alpha_i + \gamma z_i + \beta x_{i,t} + u_{i,t}, \quad (1)$$

where $y_{i,t}$ is a relevant measurement for subject i at time t , $x_{i,t}$ is a vector of time-varying variables, z_i is a vector time-invariant variables observed at the beginning of the program, α_i is a time-invariant individual effect, and $u_{i,t}$ is an idiosyncratic disturbance.

To study subjects' responses to treatment and the possible reversion of behavior post-treatment, we include in $x_{i,t}$ the number of weeks (say $w_{i,t}$) since subject i began participation in the BIP and the number of weeks since completion of the program. The elements of z_i may include any characteristics of participant i at the beginning of the program such as gender, ethnicity, mental health and substance abuse history, military experience, and education.¹

Estimation of Eq. 1 usually requires strong assumptions about the relationship between the unobserved individual effect α_i and the other elements on the right-hand side of the equation. Fortunately, our analysis does not hinge on such assumptions. In particular, most of our analysis will focus on estimates of the “within” or “Fixed Effects” form of Eq. 1, which may be written

$$\tilde{y}_{i,t} = \beta \tilde{x}_{i,t} + \tilde{u}_{i,t}. \quad (2)$$

This representation of the model may be obtained by differencing the right- and left-hand-sides of Eq. 1 and writing

$$\tilde{y}_{i,t} = y_{i,t} - \sum_{\tau=1}^{T_i} y_{i,\tau}, \quad \tilde{x}_{i,t} = x_{i,t} - \sum_{\tau=1}^{T_i} x_{i,\tau}, \quad \text{and} \quad \tilde{u}_{i,t} = u_{i,t} - \sum_{\tau=1}^{T_i} u_{i,\tau}. \quad (3)$$

It is important to notice that, while terms in the time-invariant variables drop out of the equation with this differencing, the parameters of Eq. 2 still include all those that describe the effects of participation in the program over time (i.e., β). It is generally accepted that results gleaned from estimation of the Fixed Effects equation are more robust than those from full estimation of Eq. 1 under the assumptions of a “Random Effects” model. Thus, it is convenient that the questions of interest in this paper may

¹ Variables like education that may be subject to change during the course of treatment may still be included in z_i by fixing the value as of the beginning of treatment.

be fully studied in under the Fixed Effects form.² For completeness, we will briefly discuss results from estimation of the Random Effects model, as well.³

Further evidence for our main result is obtained by replacing the continuous variables in $x_{i,t}$ (i.e., weeks since beginning treatment and weeks since completing treatment) with week interval dummy variables in our Fixed Effects equation. In these regressions, variables on the right hand side are set equal to one if the observation occurred during the relevant interval and zero otherwise. In addition to providing easily interpretable evidence on the questions of interest, these results admit an intuitive graphical presentation of the results.

Results

Table 4 shows our main findings.

Participation in the BIP is effective at reducing subjects' Criminal Thinking across all measures, as indicated by the significant negative coefficients on *weeks since orientation* in each regression. The coefficients on the number of *weeks post-treatment* are positive and significant in each regression, suggesting a possible reversal of the accumulated benefits after cessation of treatment. To interpret these results, we tested the hypotheses that the coefficients on *weeks since orientation* and *weeks post-treatment* sum to zero for each regression.

For example, the estimated coefficient on *weeks since orientation* in the Criminal Thinking (CT) regression suggests a decrease of 0.00794 (S.E. = 7.42×10^{-4}) for each week in treatment, while the estimate of 0.00942 (S.E. = 0.00173) on *weeks post-treatment* suggests a reversal of $-0.00794 + 0.00942 = 0.00148$ per week thereafter. However, the *post-treatment* χ^2 test statistic of 1.14 (df = 1) fails to reject the hypothesis that this reversal is equal to zero.

The *post-treatment* χ^2 test results reported in Table 4 show that the hypothesis is not rejected at a conventional level of significance for any of our measures. This is interpreted as evidence that benefits accrued from participation in the BIP are not significantly reversed after treatment has concluded.

Further evidence for this phenomenon may be gleaned from the interval dummy variable results shown in Table 5 and Fig. 3. Negative coefficients for weeks beyond the beginning of the program show that measures of criminal thinking are reduced relative to measurements taken at orientation (i.e., zero weeks). Many of these coefficients show a high level of significance in each regression, and this effect becomes more pronounced as weeks of treatment advance further from orientation.

Figure 3 summarizes these results graphically.

²The parameters of Eq. 2 may be consistently estimated by generalized Least Squares if $u_{i,t}$ is assumed to satisfy the following conditions:

$$Eu_{i,t} = Ex_{i,t}u_{i,\tau} = 0 \text{ for all } i, t, \text{ and } \tau, \quad (4)$$

³Consistent estimation of Eq. 1 requires the these additional assumptions:

$$E\alpha_i x_{it} = E\alpha_i z_i = E\alpha_i u_{i,t} = 0 \text{ for all } i \text{ and } t. \quad (5)$$

Table 4 Fixed effects regression results. Column headings indicate the dependent variables of each regression, the TCU-CTS measures Criminal Thinking (CT), Entitlement (EN), Justification (JU), Personal Irresponsibility (PI), Power Orientation (PO), Cold Heartedness (CH), and Criminal Rationalization (CR). “Regression χ^2 ” reports the Wald statistic for the joint significance of regression coefficients. “Post-treatment χ^2 ” reports the Wald statistic for the constraint that the coefficients on Weeks since orientation and Weeks post-treatment sum to zero. “n” is the number of different individuals, and “N” is the total number of observations available for each regression. “*”, “**”, and “***” indicate significance at the 95%, 99%, and 99.9% levels, respectively

	CT	EN	JU	PI	PO	CH	CR
	B (s.e.)	B (s.e.)	B (s.e.)	B (s.e.)	B (s.e.)	B (s.e.)	B (s.e.)
Weeks since orientation	-7.94e-03*** (7.42e-04)	-7.15e-03*** (8.92e-04)	-6.5e-03*** (1.09e-03)	-9.52e-03*** (1.06e-03)	-1.19e-02*** (1.35e-03)	-3.16e-03* (1.39e-03)	-9.27e-03*** (1.35e-03)
Weeks post-treatment	9.42e-03*** (1.73e-03)	6.38e-03** (2.26e-03)	8.17e-03*** (2.41e-03)	8.72e-03*** (2.55e-03)	1.33e-02*** (3.17e-03)	7.19e-03 (4.88e-03)	9.42e-03** (3.43e-03)
Regression $\chi^2(df)$	117 (2)***	67.5 (2)***	35.3 (2)***	89.8 (2)***	78.6 (2)***	5.19 (2)	49.2 (2)***
Post-treatment $\chi^2(df)$	1.14 (1)	0.161 (1)	0.727 (1)	0.153 (1)	0.237 (1)	0.903 (1)	2.99e-03 (1)
n	430	430	430	430	430	430	430
N	1449	1492	1495	1484	1489	1487	1482

The Cold Heartedness (CH) regressions show the weakest response in each of these approaches.⁴

To provide some context for the overall magnitude of the change in Criminal Thinking achieved, Table 6 tallies the means of subjects’ first and last observations for the subjects for which at least two measurements were available. For example, the mean of earliest measurements of these subjects Criminal Thinking (CT) was 1.874, and that of their latest observation was 1.675 for a reduction of 0.200 measurement points. These differences are analogous to the accumulated effects of the coefficients showing per-week effects in Table 4.

In any study of longitudinal data with an unbalanced panel, the possibility of attrition bias may be a concern. Figure 2 shows a significant drop in the number of responses beyond program completion at thirty-six weeks, and one may be concerned that participants who return for post-treatment follow-ups are different from their

⁴ While the weaker response of the CH measure is generally apparent, the positive coefficient for *week 41-45* (235, S.E. = 0.295) reported in Table 5, and the expansive confidence interval shown in Fig. 3 for this point are conspicuous. The *week 41-45* interval includes 14 observations for the CH regression. Two of these observations (14%) show a measure of 5.0 (i.e., the highest possible measure) for the dependent variable. This compares with only about 1.4% of observations showing 5.0 for this measure in the wider dataset. In fact, a single subject was responsible for both of these observations.

Table 5 Results of fixed effects regression with week interval dummy variables. “F” reports the F-test statistic for the joint significance of regression coefficients. See Table 4 for the meaning of column headers and other symbols

	CT	EN	JU	PI	PO	CH	CR
	B (s.e.)	B (s.e.)	B (s.e.)	B (s.e.)	B (s.e.)	B (s.e.)	B (s.e.)
<i>Week interval</i>							
Week 1-5	-2.39e-02 (2.8e-02)	-6.45e-02 (3.84e-02)	4.35e-02 (4.88e-02)	2.27e-02 (4.7e-02)	-9.29e-03 (5.69e-02)	-0.116* (4.57e-02)	-3.2e-03 (4.39e-02)
Week 6-10	-9.72e-02*** (2.83e-02)	-0.142*** (3.54e-02)	-6.58e-02 (4.4e-02)	-3.35e-02 (4.41e-02)	-0.126* (5.32e-02)	-0.145** (5.54e-02)	-2.08e-02 (4.67e-02)
Week 11-15	-6.48e-02* (3.16e-02)	-7.55e-02* (3.8e-02)	-2.03e-02 (4.64e-02)	-8.2e-02 (4.31e-02)	-7.59e-02 (5.87e-02)	-0.149** (4.87e-02)	2.84e-02 (4.72e-02)
Week 16-20	-8.99e-02** (2.95e-02)	-0.112** (3.78e-02)	-3.16e-02 (4.1e-02)	-6.62e-02 (4.57e-02)	-0.18*** (5.28e-02)	-0.118 (6.5e-02)	-3.68e-02 (5.12e-02)
Week 21-25	-0.166*** (3.26e-02)	-0.176*** (3.83e-02)	-0.135** (4.26e-02)	-0.157*** (4.56e-02)	-0.254*** (5.44e-02)	-0.126 (6.73e-02)	-9.08e-02 (5.47e-02)
Week 26-30	-0.234*** (2.9e-02)	-0.246*** (3.65e-02)	-0.133*** (4e-02)	-0.259*** (4.21e-02)	-0.356*** (4.98e-02)	-8.38e-02 (6.06e-02)	-0.298*** (4.54e-02)
Week 31-35	-0.302*** (5.38e-02)	-0.312*** (7.05e-02)	-0.246** (8.82e-02)	-0.311*** (8.73e-02)	-0.399*** (8.17e-02)	-0.264** (8.62e-02)	-0.304** (0.102)
Week 36-40	-0.296*** (3.07e-02)	-0.255*** (3.67e-02)	-0.249*** (4.76e-02)	-0.347*** (4.5e-02)	-0.403*** (5.92e-02)	-0.196*** (5.91e-02)	-0.307*** (6.05e-02)
Week 41-45	-0.244*** (3.63e-02)	-0.263*** (5.35e-02)	-0.113* (5.16e-02)	-0.368** (0.118)	-0.406*** (7.93e-02)	0.235 (0.295)	-0.567*** (0.108)
Week 46-50	-0.286*** (4.7e-02)	-0.308*** (5.43e-02)	-0.224** (7.93e-02)	-0.348*** (6.64e-02)	-0.433*** (9.44e-02)	-0.182* (8.34e-02)	-0.289** (9.07e-02)
Week 51+	-0.236*** (4.95e-02)	-3e-01*** (6.86e-02)	-0.178* (6.91e-02)	-0.345*** (6.61e-02)	-0.421*** (0.108)	-3.42e-02 (0.13)	-0.264** (8.62e-02)
F(df1,df2)	14.2 (11,439)***	8.85 (11,439)***	4.28 (11,439)***	10.1 (11,439)***	11.1 (11,439)***	2.22 (11,439)*	9.77 (11,439)***
N	1484	1528	1531	1519	1525	1523	1518

peers.⁵ For example, if those who continue to respond show greater reductions of criminal thinking over time, this could bias a finding of treatment effectiveness.

To shed light on this possibility, we augmented the regressions of Table 4 by constructing an indicator for participants who complete at least one follow-up reponse survey (i.e., those who completed one or more surveys at 37 weeks or later). By interacting this variable with the number of weeks since treatment began, we have a

⁵ Out of 539 individuals with at least two observations, 76 have at least one observation after week 36 (i.e., $wk \geq 37$).

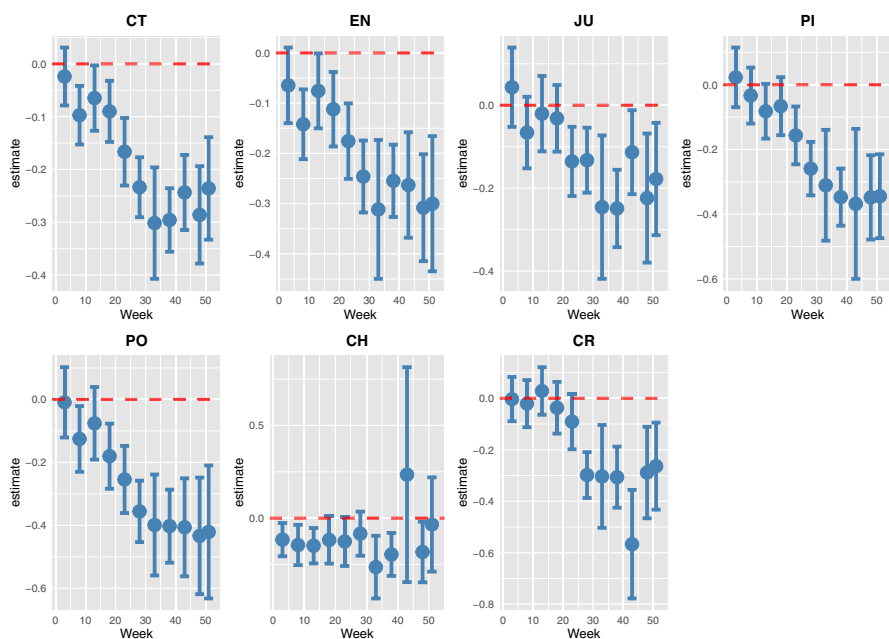


Fig. 3 Plot of interval dummy means and 90% confidence intervals. See Table 4 for the meaning of sub-plot titles

Table 6 Comparison of means of Criminal Thinking measures at first and final observations for each subject for whom matched observations are available. Row labels indicate the Criminal Thinking measures; these abbreviations are defined in Table 4

Measure	Mean of first obsn (s.e.)	Mean of final obsn (s.e.)	Difference of means
CT	1.874 (0.456)	1.675 (0.446)	-0.200
EN	1.487 (0.491)	1.289 (0.476)	-0.198
JU	1.476 (0.595)	1.338 (0.508)	-0.138
PI	1.570 (0.599)	1.369 (0.535)	-0.210
PO	1.957 (0.808)	1.648 (0.636)	-0.310
CH	2.381 (0.743)	2.293 (0.838)	-0.088
CR	2.407 (0.787)	2.140 (0.762)	-0.267

variable that captures how such responders' response to treatment is different from that of other participants.⁶

The results of our tests for attrition bias are shown in Table 7. The coefficients on the added indicator variables have mixed signs, they are generally small, and none of them appears to be significant in any of our regressions. For example, the *post-treatment responder* coefficient of 1.93×10^{-4} (S.E. = 0.00174) in the CT regression in the table suggests that subjects that responded in later weeks showed a slightly

⁶ Our approach is similar to that of Fitzgerald et al. (1998), who compare the results of separate regressions for subjects observed in each period and those who attrited. See also the discussion of related tests in Section 19.9 of Wooldridge (2010).

Table 7 Fixed effects regressions augmented with indicator for individuals with observations beyond 36 weeks (Post-treatment responder). See Table 4 for the meaning of column headers and other symbols

	CT	EN	JU	PI	PO	CH	CR
	B (s.e.)	B (s.e.)	B (s.e.)	B (s.e.)	B (s.e.)	B (s.e.)	B (s.e.)
Weeks since orientation	-7.98e-03*** (8.49e-04)	-7.35e-03*** (1.04e-03)	-5.97e-03*** (1.22e-03)	-9.81e-03*** (1.18e-03)	-1.14e-02*** (1.52e-03)	-3.28e-03* (1.52e-03)	-9.5e-03*** (1.44e-03)
Weeks post-treatment	9.15e-03*** (2.54e-03)	5.1e-03 (2.81e-03)	1.15e-02** (3.74e-03)	6.88e-03 (4.14e-03)	1.67e-02*** (4.14e-03)	6.41e-03 (7.57e-03)	7.95e-03 (5.81e-03)
Post-treatment responder	1.93e-04 (1.74e-03)	9.26e-04 (2e-03)	-2.41e-03 (2.73e-03)	1.34e-03 (2.64e-03)	-2.45e-03 (3.28e-03)	5.65e-04 (3.64e-03)	1.08e-03 (3.66e-03)
Regression $\chi^2(df)$	117 (2)***	67.5 (2)***	35.3 (2)***	89.8 (2)***	78.6 (2)***	5.19 (2)	49.2 (2)***
Post-treatment $\chi^2(df)$	1.14 (1)	0.161 (1)	0.727 (1)	0.153 (1)	0.237 (1)	0.903 (1)	2.99e-03 (1)
n	430	430	430	430	430	430	430
N	1449	1492	1495	1484	1489	1487	1482

Table 8 Results of two tests of Random Effects vs. Fixed Effects specification. “Hausman test” column reports results of test based on Hausman (1978). “Wooldridge test” column reports results of test based on auxiliary regression described in Wooldridge (2010), Sec.10.7.3. Row labels indicate the dependent variables of the regressions; these abbreviations and other symbols are defined in Table 4

Scale	Hausman test $\chi^2(df)$	Wooldridge test $\chi^2(df)$
CT	1.7(2)	41.8(2)***
EN	0.4(2)	18.0(2)***
JU	1.4(2)	22.9(2)***
PI	3.9(2)	35.9(2)***
PO	1.0(2)	23.7(2)***
CH	0.4(2)	30.2(2)***
CR	3.9(2)	25.7(2)***

smaller per-week-in-treatment reduction in measured Criminal Thinking, but that coefficient is not statistically significant at any conventional level.

We repeated the exercise with thresholds of 13-, 26-, and 49-weeks rather than thirty-six, and in only one of these 28 regressions did any of these variables (CR with threshold 26-weeks) show significance at the 90% level. In summary, we did not find evidence that attrition affects our main result.

Table 8 show that the results of two tests designed to discriminate between Random Effects and Fixed Effects models contrast sharply. Hausman’s (1978) test does

not reject the consistency of the Random Effects specifications, while tests based on an auxiliary regression utilizing robust standard errors reject the Random Effects model with a high degree of significance (99.9%).

While emphasizing that our previous results based on the Fixed Effects equation remain valid, in any case; and despite the caveats warranted in light of the specification test results, we discuss results of our estimation of the Random Effects model. These results are summarized in Table 9.

First, note that the results gleaned from the Fixed Effects regressions are broadly supported by those from the the Random Effects ones. Coefficients on the number of weeks since the beginning of the program and the number of weeks post-treatment have the same signs, and – with the exception of those in the CH regression – are strongly significant. Moreover, in no case is the hypothesis that these coefficients sum to zero rejected, providing further support that the effect of treatment on criminal thinking does not revert after treatment completion.

To summarize, our main result is broadly supported by several modes of analysis: the thirty-six week program reduces subjects' criminal thinking while subjects participate; and criminal thinking stops decreasing, but does not revert to pre-treatment baselines, upon program completion.

Discussion

We investigated changes in criminal thinking at multiple time points during and after participation in a batterer intervention program (BIP) among individuals convicted of IPV. Findings indicate that criminal thinking declined significantly during program participation and stabilized following program completion, with no evidence of reversal during the follow-up period. These results suggest that cognitive shifts achieved within a CBT-oriented BIP are both observable during treatment and sustained after program completion, although they do not continue to deepen once structured intervention ends.

These findings contribute to Neutralization Theory and the broader criminal thinking framework in several ways. First, the observed within-person declines support the proposition that criminal thinking is a dynamic and modifiable construct rather than a fixed trait (Walters, 2006, 2012, 2019). This pattern is particularly evident for proactive (calculative) cognitions, which are closely aligned with rationalizations and neutralization techniques and which declined during treatment. In this respect, the findings qualify claims that criminal thinking is largely stable (Morgan et al., 2015) by demonstrating short-term responsiveness to targeted cognitive-behavioral intervention within a justice-involved IPV sample.

Second, the post-program plateau is consistent with a “maintenance without momentum” pattern, in which gains achieved during structured intervention are preserved but do not continue to accumulate. This pattern aligns with cognitive-behavioral theory, which emphasizes repeated practice and reinforcement in sustaining and extending cognitive change (Beck, 2020; Beck & Dozois, 2011). The results therefore suggest that continued intervention exposure, such as booster or aftercare

components, may be necessary to produce additional gains beyond those observed during the active treatment phase.

The findings also inform the growing application of the Risk-Need-Responsivity (RNR) framework to IPV intervention. Antisocial cognition is identified as one of the Central Eight criminogenic needs (Bonta & Andrews, 2024), and the present results demonstrate that this domain can be measurably reduced within a CBT-based BIP (Hilton & Radatz, 2018; Hilton & Radatz, 2021; Hilton & Radatz, 2025). In doing so, the study provides evidence that criminal thinking functions as a dynamic target within IPV populations, consistent with broader findings from general offender rehabilitation research (Folk et al., 2016; Walters & Lowenkamp, 2016), and supports the use of skill-based, cognitively focused interventions in place of purely psychoeducational approaches (Gondolf, 2004; Szifris et al., 2025).

The results further contribute to the distinction between reactive and proactive forms of criminal cognition. Although reactive cognitions are often considered more amenable to short-term change, the present findings indicate that proactive criminal thinking—characterized by deliberate rationalization and justification—can also be reduced through a structured CBT-based program. This extends prior work by demonstrating that even cognitively entrenched forms of justification are responsive to intervention when directly targeted (Folk et al., 2016; Walters, 2016). Additional subscale analyses (once finalized) may clarify whether specific domains (e.g., Justification, Personal Irresponsibility, Power Orientation) are driving these effects (Solinas-Saunders & Stacer, 2024; Knight et al., 2006).

At the same time, these findings should be interpreted within the broader context of IPV intervention research. Although reductions in criminal thinking are theoretically meaningful, this study does not directly assess behavioral outcomes. Prior work in general correctional populations suggests that changes in criminal thinking are associated with reduced recidivism (Folk et al., 2018; Walters, 2012; Walters & Lowenkamp, 2016), but whether similar relationships hold for IPV-specific behaviors remains an open empirical question. Establishing this link is critical for evaluating the practical significance of cognitive change in BIPs.

Future research should therefore examine the extent to which changes in criminal thinking correspond to changes in IPV behavior, including both self-reported outcomes and, where feasible, corroborating reports from intimate partners or other collateral sources. In addition, BIPs operate within complex social contexts shaped by structural and intersectional factors, including socioeconomic conditions, race, gender, mental health, and substance use. These factors likely influence both program engagement and trajectories of change and should be incorporated into future analytic models using approaches capable of capturing interactional and structural effects.

Limitations

Several limitations of the study warrant consideration. First, although the study was conceptually informed by risk and need principles—reflected in discussions between the PI and program director and in elements of the survey design—the RNR framework was not formally operationalized. Future research should more directly assess

Table 9 Random Effects regression results. s_u and s_α report, respectively, the estimated standard deviation of the idiosyncratic disturbance term, u_{it} , and that of the time-invariant individual specific effect, α_i , in Eq. 1 in the text. See Table 4 for the meaning of column headers and other symbols

	CT		EN		JU		PI		PO		CH		CR	
	B (s.e.)	B (s.e.)	B (s.e.)	B (s.e.)	B (s.e.)	B (s.e.)	B (s.e.)	B (s.e.)	B (s.e.)	B (s.e.)	B (s.e.)	B (s.e.)	B (s.e.)	B (s.e.)
Intercept	1.99*** (6.53e-02)	1.57*** (6.65e-02)	1.54*** (7.62e-02)	1.67*** (8.19e-02)	1.67*** (8.19e-02)	1.67*** (8.19e-02)	1.67*** (8.19e-02)	1.67*** (8.19e-02)	2*** (9.88e-02)	2*** (9.88e-02)	2.6*** (0.115)	2.6*** (0.115)	2.57*** (0.118)	2.57*** (0.118)
Weeks since orientation	-7.67e-03*** (6.86e-04)	-6.98e-03*** (8.03e-04)	-6.06e-03*** (9.76e-04)	-8.97e-03*** (9.54e-04)	-8.97e-03*** (9.54e-04)	-8.97e-03*** (9.54e-04)	-8.97e-03*** (9.54e-04)	-8.97e-03*** (9.54e-04)	-1.15e-02*** (1.21e-03)	-1.15e-02*** (1.21e-03)	-3.3e-03* (1.31e-03)	-3.3e-03* (1.31e-03)	-8.57e-03*** (1.26e-03)	-8.57e-03*** (1.26e-03)
Weeks post-treatment	9.09e-03*** (1.7e-03)	6.21e-03*** (2.16e-03)	7.58e-03*** (2.4e-03)	8.7e-03*** (2.47e-03)	8.7e-03*** (2.47e-03)	8.7e-03*** (2.47e-03)	8.7e-03*** (2.47e-03)	8.7e-03*** (2.47e-03)	1.25e-02*** (3.06e-03)	1.25e-02*** (3.06e-03)	7.84e-03 (4.87e-03)	7.84e-03 (4.87e-03)	8.47e-03*** (3.27e-03)	8.47e-03*** (3.27e-03)
Female	-0.156*** (4.29e-02)	-0.105* (4.31e-02)	-8.54e-02 (4.91e-02)	-0.139** (5.15e-02)	-0.139** (5.15e-02)	-0.139** (5.15e-02)	-0.139** (5.15e-02)	-0.139** (5.15e-02)	-0.121 (7.71e-02)	-0.121 (7.71e-02)	-0.344*** (8.19e-02)	-0.344*** (8.19e-02)	-0.139 (7.97e-02)	-0.139 (7.97e-02)
Non-white	0.233*** (4.91e-02)	0.16** (5.47e-02)	0.198*** (5.48e-02)	0.295*** (6.4e-02)	0.295*** (6.4e-02)	0.295*** (6.4e-02)	0.295*** (6.4e-02)	0.295*** (6.4e-02)	0.258*** (7.56e-02)	0.258*** (7.56e-02)	0.205** (6.98e-02)	0.205** (6.98e-02)	0.27*** (8.08e-02)	0.27*** (8.08e-02)
Hispanic	-1.35e-03 (8.77e-02)	5.42e-02 (0.117)	-5.44e-02 (0.111)	-0.186* (9.13e-02)	-0.186* (9.13e-02)	-0.186* (9.13e-02)	-0.186* (9.13e-02)	-0.186* (9.13e-02)	-4.37e-05 (0.143)	-4.37e-05 (0.143)	0.179 (0.161)	0.179 (0.161)	-0.129 (0.156)	-0.129 (0.156)
Age	-6.4e-03*** (1.56e-03)	-4.42e-03*** (1.56e-03)	-5.77e-03*** (1.73e-03)	-3.37e-03 (1.86e-03)	-3.37e-03 (1.86e-03)	-3.37e-03 (1.86e-03)	-3.37e-03 (1.86e-03)	-3.37e-03 (1.86e-03)	-1.32e-02*** (2.39e-03)	-1.32e-02*** (2.39e-03)	-1.82e-03 (2.82e-03)	-1.82e-03 (2.82e-03)	-9.31e-03*** (2.85e-03)	-9.31e-03*** (2.85e-03)
College	-3.49e-02 (3.49e-02)	-2.81e-02 (3.52e-02)	-6.78e-02 (3.88e-02)	-7.77e-02 (4.23e-02)	-7.77e-02 (4.23e-02)	-7.77e-02 (4.23e-02)	-7.77e-02 (4.23e-02)	-7.77e-02 (4.23e-02)	8.34e-02 (5.24e-02)	8.34e-02 (5.24e-02)	-8.86e-02 (5.81e-02)	-8.86e-02 (5.81e-02)	-2.57e-02 (6.24e-02)	-2.57e-02 (6.24e-02)
Substance abuse	0.143 (7.4e-02)	0.104 (7.8e-02)	0.252** (7.99e-02)	5.81e-04 (9e-02)	5.81e-04 (9e-02)	5.81e-04 (9e-02)	5.81e-04 (9e-02)	5.81e-04 (9e-02)	0.436*** (0.111)	0.436*** (0.111)	-9e-02 (0.123)	-9e-02 (0.123)	0.176 (0.127)	0.176 (0.127)
Mental health problems	0.11 (8.74e-02)	0.103 (9.06e-02)	0.238* (9.94e-02)	0.138 (0.105)	0.138 (0.105)	0.138 (0.105)	0.138 (0.105)	0.138 (0.105)	0.608*** (0.137)	0.608*** (0.137)	-0.605*** (0.161)	-0.605*** (0.161)	0.193 (0.143)	0.193 (0.143)
Previous incarcerations	1.01e-02 (6.84e-03)	1.28e-03 (7.8e-03)	1.29e-03 (8.04e-03)	3.98e-03 (8.95e-03)	3.98e-03 (8.95e-03)	3.98e-03 (8.95e-03)	3.98e-03 (8.95e-03)	3.98e-03 (8.95e-03)	2.1e-02 (1.11e-02)	2.1e-02 (1.11e-02)	2.44e-02 (1.38e-02)	2.44e-02 (1.38e-02)	1.01e-03 (1.19e-02)	1.01e-03 (1.19e-02)
Military experience	9.04e-03 (1.42e-02)	-4.95e-03 (1.01e-02)	2.13e-03 (1.41e-02)	1.51e-02 (1.9e-02)	1.51e-02 (1.9e-02)	1.51e-02 (1.9e-02)	1.51e-02 (1.9e-02)	1.51e-02 (1.9e-02)	1.48e-02 (1.38e-02)	1.48e-02 (1.38e-02)	-8.89e-03 (1.81e-02)	-8.89e-03 (1.81e-02)	4.56e-02 (2.63e-02)	4.56e-02 (2.63e-02)
Abuse in Childhood	4.73e-02 (3.58e-02)	5.04e-03 (3.79e-02)	5.52e-02 (4.11e-02)	7.16e-02 (4.49e-02)	7.16e-02 (4.49e-02)	7.16e-02 (4.49e-02)	7.16e-02 (4.49e-02)	7.16e-02 (4.49e-02)	3.64e-02 (5.6e-02)	3.64e-02 (5.6e-02)	4.35e-02 (6.37e-02)	4.35e-02 (6.37e-02)	6.6e-02 (6.27e-02)	6.6e-02 (6.27e-02)

Table 9 (continued)

	CT	EN	JU	PI	PO	CH	CR
	B (s.e.)	B (s.e.)	B (s.e.)	B (s.e.)	B (s.e.)	B (s.e.)	B (s.e.)
s_u	6.37e-02	0.108	0.154	0.148	0.216	0.287	0.198
s_α	0.118	0.112	0.123	0.157	0.224	0.309	0.378
Regression χ^2 (df)	230 (13)***	132 (13)***	118 (13)***	156 (13)***	221 (13)***	69.7 (13)***	94.5 (13)***
Post-treatment χ^2 (df)	1.05 (1)	0.173 (1)	0.582 (1)	1.79e-02 (1)	0.114 (1)	1.11 (1)	1.36e-03 (1)
n	601	606	608	608	606	608	605
N	1620	1668	1673	1662	1665	1665	1657

the extent to which BIPs explicitly align with RNR principles and evaluate the effects of such alignment (Travers et al., 2021).

Second, the study design limits causal inference. The absence of random assignment or a matched comparison group raises the possibility that observed changes reflect regression to the mean or the influence of unmeasured co-interventions rather than program effects (Arce et al., 2020; Feder & Wilson, 2005). Third, all measures are based on self-report, including criminal thinking. Although the TCU-CTS has demonstrated reliability and predictive validity (Knight et al., 2006; Walters & Lowenkamp, 2016), responses may be influenced by social desirability or legal incentives. In addition, data collection occurred in the program setting and was administered by facilitators during class sessions to minimize disruption to program flow. While this approach supported consistent data collection, it may have introduced response bias, as participants could have perceived implicit pressure to provide program-consistent responses or to present themselves favorably in a court-mandated context.

Fourth, generalizability is limited to a multi-site program within a single state featuring a distinct cognitive accountability curriculum. Program fidelity was not formally measured, and facilitator effects were not modeled, which may affect interpretation of the findings (Gondolf, 2004). However, the program's delivery incorporated several features that likely contributed to consistency across sites: the program director was solely responsible for the development of the curriculum, created a standardized training manual and protocol, and personally trained each facilitator. In addition, the director served as a primary facilitator across multiple locations. At the same time, batterer intervention programs frequently exhibit program hybridization—the integration of multiple treatment approaches—which may independently influence outcomes (Cannon et al., 2016).

Finally, the study focuses exclusively on proactive criminal thinking. Without concurrent measurement of reactive cognition, it is not possible to assess differential responsiveness across cognitive domains (Walters, 2016).

Implications for research and practice

Future research should prioritize designs that strengthen causal inference, including randomized or rigorously matched comparison studies, and should incorporate longer follow-up periods to assess the durability of cognitive change. Measuring both proactive and reactive criminal thinking—using instruments such as the PICTS—would allow for a more comprehensive assessment of cognitive change processes. In addition, integrating behavioral outcomes (e.g., re-arrest, revictimization, or partner-reported change) would permit tests of whether cognitive change mediates desistance (Walters, 2020).

From a practice perspective, the findings support several tentative implications. Routine assessment of criminal thinking at multiple time points may serve as a useful proximal indicator of program impact. The observed post-program stabilization suggests that booster or aftercare components may help extend gains achieved during treatment. Continued attention to facilitator training and program delivery consistency is also warranted, as is the implementation of strategies to improve partici-

pant retention, particularly among individuals facing structural barriers to sustained engagement (Link & Oser, 2018; Pike & Buttell, 2005).

Conclusion

This study provides longitudinal evidence that criminal thinking declines during BIP participation and remains stable thereafter, supporting the view that criminogenic cognitions—particularly proactive rationalizations—are modifiable through structured cognitive-behavioral intervention. These findings contribute to Neutralization Theory by demonstrating within-person change in cognitions that justify IPV and to Criminal Thinking Theory by showing that these changes are sustained, though not progressively deepening, following program completion.

From a policy and practice perspective, the results suggest that assessing cognitive change as a proximal outcome of BIPs—alongside, rather than in place of, recidivism metrics—is a promising direction for program evaluation, particularly given growing evidence linking reductions in criminal thinking to behavioral outcomes (Folk et al., 2018; Walters & Lowenkamp, 2016). The observed post-program stabilization further points to the potential value of extending services through booster sessions or integrated supports to consolidate cognitive gains.

Appendix: notes on random effects model estimation

The precise definitions of time-invariant variables is not critical for use with a fixed effects estimation, since each drops out with the differencing. Here we record several data transformations used to construct these variables, as they are relevant for estimation of the random effects model estimation.

The hierarchical categories that describe subjects' education level in Table 3 do not readily admit use in our linear model. Thus, we use an indicator for subjects' completion of some college or more.

The range of subjects' reports of previous incarcerations is quite wide, and we believe that those on the high side rely on subjects' memory to a very high degree. For example, some responded simply "a lot" or something similar. Moreover, while the variable is heavily skewed to the right, we do not believe that there is a critical distinction between 10, 20, or "a lot" of incarcerations. Therefore, we truncate this variable at 10 for estimation. We also interpret responses like "a lot" as "10".

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