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RESEARCH ARTICLE OPEN ACCESS

Sports-Based Interventions Fostering Positive Identity Formation in Prison: Insights From the Twinning Project

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ABSTRACT

For the formerly incarcerated, transitioning from criminal to law-abiding identities is particularly challenging, especially for those from highly stigmatised groups who are often excluded from mainstream social networks. The Twinning Project, an intervention pairing prisons with local sports clubs, provides people in prison with opportunities to form connections within a community that promotes healthy lifestyles and pro-social values while offering qualifications in coaching skills. This study conducted longitudinal surveys with 400 British inmates participating in the Twinning Project. The surveys focused on two pathways to social bonding: attachment and personal transformation. Both factors were linked to enhanced social bonding, as personal transformation predicted identity fusion, and attachment predicted identification over time. Our findings highlight the potential of community-based interventions in fostering positive social identities and reducing reoffending rates. This research offers insights into how structured programmes can facilitate personal change and social reintegration, ultimately contributing to safer communities.

The scientific literature that investigates the reasons behind recidivism has identified negative identities as a key factor (Farmer 2017; Liu and Bachman 2021; Paternoster and Bushway 2009). Consequently, one of the main challenges for efforts to reduce rates of reoffending is to help the formerly incarcerated abandon established identities in favour of more positive, law-abiding ones. The need to reduce recidivism is urgent, with 44% of people reoffending within 12 months of release from prison at a cost of over £18 billion a year in the UK and rates estimated at more than \$5 trillion in the USA (Prison Reform Trust 2022; Newton et al. 2019; Sipes 2022). Clear links have been established between criminal identities and criminal behaviours (Boduszek et al. 2012), while identities relating to positive social values are connected with more law-abiding behaviours among the formerly incarcerated (Newson, Peitz,

Gitsham, et al. 2024). This study considers how strong, positive social identities can be formed in prison. To explore this, we analysed the cognitive and social pathways to social bonding in an international sports-based prison using data from participants in the UK enrolled in a soccer (football) intervention.

Soccer fandom is famously tribalistic, motivating strong and long-lasting commitment to local clubs and national teams (Newson et al. 2016; Newson 2019; Wann and Branscombe 1990). Although there is a notoriously dark side to this form of group bonding—associated with intergroup violence and hooliganism—most soccer fans subscribe to law-abiding identities, stopping to help other rival fans and never engaging in violence (Newson et al. 2023). Fans also engage in self-policing behaviours, regulating one another's behaviours

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based on perceptions of legitimate group behaviour (Williams and Stott 2022). Similarly, identity-based interventions to improve soccer policing have demonstrable success in the UK and Sweden (Stott et al. 2019, 2020). Given these successes, could similar identity-based interventions be adapted to the criminal justice system, using soccer to encourage prosocial behaviour among offenders?

More broadly, sports coaching is associated with a healthy lifestyle, self-discipline, and other values favourable to law-abiding lifestyles and the cultivation of positive interpersonal skills (Barrio et al. 2021). Since launching in 2018, the Twinning Project has run interventions with over 70 professional soccer clubs and their local prisons and probation areas in the UK. It now runs on four continents with substantial success in the USA, where both soccer clubs and basketball clubs have been twinned with prisons. There are also soccer-prison pairings in South Africa, Australia, Italy, and Romania. Across continents, the intervention is designed to provide accredited qualifications (e.g., coaching, refereeing, and stewarding) to boost people in prisons' employability post-release and provide access to the wider sporting community and its considerable infrastructure. The project is aimed at people in prison within 24 months of release who have implicit minimum levels of fitness and literacy. Programs typically comprise 12 sessions with up to 16 participants attending a half-day session weekly, comprising interactive classroom work, physical activity, and opportunities for role-playing the new skills learned (e.g., coaching peers). In the UK, at the end of the program, participants are eligible for a coaching qualification accredited by the FA (the national governing Football Association). Though there are severe financial and logistical challenges for participants to make contact with prison interventions post-release, participants who complete the program are invited to an alumni group and can get in touch with their facilitating club's community club organisation and host, to help sustain both their identities and access to services. Further details about the Twinning Project can be found on its website (www.twinningproject.org).

Previously, participation in the Twinning Project has been associated with both behavioural and well-being improvements (Newson, Peitz, Cunliffe, et al. 2024; Peitz and Newson 2025); effects associated with social bonds to the project itself. Newson, Peitz, Cunliffe, et al. (2024) found that the number of adjudications, hearings for offences within the prison, was lower for Twinning Project participants in a two-month period after the program compared to a matched control group. Moreover, stronger identification with the Twinning Project was a key predictor of improved behaviour among intervention participants. Evaluating the program's impact on health and well-being, Peitz and Newson (2025) found that participants reported significantly increased levels of psychological need satisfaction, efficacy beliefs, and life satisfaction. These improvements were once more correlated with increases in social bonding, such that increased identification with the Twinning Project indirectly explained higher levels of well-being at the end of the program via increased psychological need satisfaction, indicating a social-cure mechanism by which access to a positive group identity provides psychological resources. Such findings aligned with evaluations of other physical activity prison intervention studies

(e.g., Kyprianides and Easterbrook 2020) and, more broadly, with cumulating evidence that sport-based interventions have significant positive effects on both criminal behaviour and well-being outcomes (Jugl et al. 2023).

The importance of social bonds for the impact of the Twinning Project was further examined in interviews with participants serving community sentences (i.e., on probation) (Newson, Peitz, Gitsham, et al. 2024). Qualitative analyses revealed that the support of peers and coaches motivated participants to engage with the program and form more positive outlooks for their future. Moreover, a reflective account of a Twinning Project coach, detailing his experiences in the process of co-producing desistance efforts with participants, emphasised the shared nature of early desistance transitions and relationships between facilitators and participants (Kay et al. 2022). Nonetheless, the question still remains: *how* do people bond with new groups in prison? Here, we investigate two forms of social bonding (identification and identity fusion) and explore two well-established pathways to bonding in a sports-based prison intervention for the first time: (a) attachment and (b) feelings of personal transformation.

Fusion and identification were measured separately because previous research suggests that these two forms of group alignment stem from distinct psychological processes: fusion resulting from the perception of shared self-defining characteristics with other group members (e.g., transformative experiences of participation in the Twinning Project) and identification with the sharing of socially learned identity markers (e.g., wearing the same football kits bearing the Twinning Project logo). However, it is also very common for scores on fusion and identification to be highly correlated because the target for fusion may also be a group with which the subject identifies (i.e., both forms of group alignment may be present). It was important in this study to capture both fusion and identification because—even when highly correlated—they may have distinct behavioural outcomes. For example, fusion is associated with stronger forms of self-sacrificial behaviour for the group and may also be more persistent in the face of adversity—both of which could affect long-term resilience or resistance to the temptation to reoffend. The next section details precisely how these two forms of bonding and two proposed pathways to bonding are explained in the current literature.

1 | Forms of Social Bonding

To investigate the effects of the Twinning Project on positive long-term identity change, two forms of social bonding were analysed in conjunction: social identification and identity fusion. Social bonding has been well explained by Social Identity Theory (SIT), which explores how group affiliations in the form of identification with a group shape individual identity and behaviour, impacting both social behaviour and personal well-being (Tajfel and Turner 1979). Going a step further, identity fusion theory posits that the boundary between personal and group identities can become so porous that group-related actions feel deeply personal, often motivating extreme loyalty and self-sacrifice (Swann et al. 2009). On the other hand, identification involves alignment with group identity markers that have been acquired socially from others, implying a hydraulic relationship between

personal and group identities (making the one salient makes the other less salient). Although identification is, therefore, a depersonalising form of group alignment, it is often associated with prosocial behaviour (e.g., Tidwell 2005; Bruner et al. 2018).

By contrast, fusion is a form of group alignment in which personal and group identities are activated synergistically, and the boundary between one's personal and group identities becomes porous (Swann et al. 2009, 2012; Swann Jr. and Buhrmester 2015). Having become 'fused' in this way, any assault on the group is taken personally, and people become highly motivated to defend the group, even to the death (Whitehouse 2018). This type of extreme pro-group behaviour is often measured in the form of expressed willingness to fight and die for the group in hypothetical scenarios (Gómez et al. 2011; Newson et al. 2023; Swann et al. 2010), but has also been observed in military and paramilitary groups in which self-sacrificial behaviour associated with fusion is widespread (Sheikh et al. 2016; Whitehouse et al. 2014; Gómez et al. 2017). However, fusion is also associated with strong forms of peaceful pro-group action, such as willingness to assist those in need—as demonstrated in numerous studies involving charitable giving (Buhrmester et al. 2015, 2018). Indeed, fusion can help to reduce the risk of intergroup violence if the group's best interests are believed to be served by self-discipline or diplomacy (Newson et al. 2022).

Both theory and empirical evidence suggest that fusion and identification have different or even unique predictive values for intergroup outcomes (Gómez et al. 2020). For example, White et al. (2021) found that among Australian soccer fans, identification with one's club predicted prejudice toward an outgroup but not hostility, whereas fusion with one's club predicted hostility and not prejudice. Bortolini et al. (2018) found that among a large Brazilian sample, identification and fusion to various target groups were consistently correlated, but fusion was a better predictor of extreme pro-group behaviour attitudes than identification. This suggests that changes in identity fusion, rather than identification, could yield the most noticeable changes in behaviour and be most relevant for future applied research. However, in practice, to understand whether the antecedents of fusion and identification will be as distinguishable as they develop in the context of an intervention program, it is important to understand the potentially unique pathways to both forms of group alignment.

In the case of the Twinning Project, the aim was to see whether alignment with a law-abiding group and the values associated with soccer might have similarly positive effects on the behaviour of people in prison. In theory, both identification and fusion with the Twinning Project could result in more law-abiding attitudes and behaviours. Results from 676 people in prison indicated that behavioural improvements for people enrolled on the Twinning Project were associated with identification, rather than identity fusion, despite a wealth of evidence pointing to fusion being the driver for the strongest behavioural changes. Could it be that the Twinning Project did not sufficiently induce fusion to generate the potential for even bigger behavioural improvements? Or, in the prison setting, perhaps depersonalised bonding is a healthier strategy given the stressful and often unpredictable environment? Either way, understanding the pathways to these different forms of bonding in prison settings

is crucial to help interpret intervention results and contribute towards future designs.

2 | Transformative Experiences as a Pathway to Social Bonding

One of the most well-studied pathways to fusion is based on the sharing of personally transformative experiences with other members of the group (Gómez et al. 2020; Whitehouse 2018). The theory is that life-changing experiences shape our sense of the autobiographical self, and when such experiences are also shared with others, this causes our personal and group identities to become fused together (Whitehouse and Lanman 2014). Empirical studies suggest that this transformative process involves reflection on emotionally impactful life experiences (Jong et al. 2015; Muzzulini et al. 2021; Newson et al. 2016, 2021; Whitehouse et al. 2017).

Fusion-inducing experiences arise across diverse contexts. Some are broadly shared, such as the experiences of childbirth (Tasuji et al. 2020) or bereavement (Vázquez et al. 2019). Other experiences are group-specific, including events like national tragedies (Buhrmester et al. 2015; Jong et al. 2015) or intense sports defeats (Newson et al. 2023). Dysphoric experiences, in particular, are thought to be powerful catalysts for fusion because they engage adaptive responses linked to perceived group threats (Whitehouse et al. 2017). However, euphoric experiences, such as those involving transformative events—like winning a significant sports game or potentially the effects of psychoactive substances—can also lead to fusion (Newson et al. 2016, 2021).

Transformative experiences may also contribute to identification with a group if the identity in question is *social* rather than *personal*. In contrast, the basis for fusion is the sharing of *personally* transformative life experiences. In this study, three aspects of transformative experience were captured, focusing on the impact of participating in the Twinning Project on participants' sense of self. One item related to personally transformative experiences relevant to fusion (i.e., the extent to which the experience has changed one as a person), a second related to in-group identity transformations (i.e., the extent to which the experience has become part of one's identity), and a third was interpretable either way (i.e., the extent to which the experience has permanently changed one's life).

3 | Attachment as a Pathway to Social Bonding

A second focus was whether social bonding to the Twinning Project might arise from becoming attached to the coaches running the courses as positive role models. Attachment refers to the deep and enduring emotional bonds individuals form with significant others, initially emerging in infancy between a child and their primary caregiver (Bowlby 1969; Ainsworth 1989). This early attachment serves as a blueprint for future relationships, shaping expectations and interaction patterns throughout life (Fraley 2010). Adult attachment extends beyond primary bonds, incorporating secondary attachment figures, such as romantic partners, close friends, and mentors, who serve as sources of security and emotional regulation (Hazan and

Shaver 1987). Secondary attachment bonds play a crucial role in adult life, particularly in times of distress, as they provide emotional support and promote psychological resilience (Mikulincer and Shaver 2016).

These bonds are not solely determined by early experiences but are continuously shaped by new relational contexts, including therapeutic relationships, community support structures, and rehabilitative interventions (Fraley and Roisman 2019). The formation of secondary attachments occurs through repeated positive interactions that foster trust, reliability, and a sense of security (Sroufe 2005). This process is particularly relevant for individuals transitioning through major life changes, such as reintegration after incarceration, where structured programmes promoting social bonding can facilitate adaptive attachment behaviours.

Research suggests that healthy attachment is required to identify with groups (Crisp et al. 2009); likewise, sports team identification has been shown to be associated with attachment to a club (Prayag et al. 2020). However, there is mixed evidence on whether interpersonal relationships contribute to social identities or vice-versa (e.g., Leszczensky 2013). Attachment to those involved in the delivery of the Twinning Project could explain the willingness to follow their example in adopting healthier attitudes and lifestyles and reducing the risk of subsequent reoffending. Moreover, the attachment could also be associated with the fusion process since there is evidence that fusion creates a 'secure base' from which to explore the world, fostering positive attitudes to others in the absence of outgroup threat (Klein and Bastian 2023). This pathway is also posited to increase trust and willingness to interact with outgroup members, which could be particularly vital for prison populations, but is relatively under-explored (Klein et al. 2024). The attachment pathway would thus also be consistent with improvements in behaviour and more law-abiding attitudes.

As such, two pathways to social bonding were investigated: feelings of personal transformation and attachment. Although substantial work describes the transformative pathway to fusion, relatively little has been done to compare how transformation relates to identification. Similarly, there is no research yet that integrates processes of attachment with both fusion and identification. Here, the longitudinal relationships between two critical pathways to bonding (transformation and attachment), as well as two distinct forms of bonding (identification and fusion), were tested. Uniquely, these pathways to social bonding were investigated in an environment where participants are perhaps most in need of healthy pathways to secure positive social bonds: the prison system, where loneliness and lack of access to new social networks are pervasive (Nugent and Schinkel 2016; Schliehe et al. 2022).

4 | Present Research

A key question for this research was whether the Twinning Project fostered either transformation (Whitehouse 2018) or attachment (Klein and Bastian 2023), or both, and to what extent these psychological processes contributed to changes in social bonding (H1–H3). Crucially, it was also examined whether such

changes, if they occurred, were enduring (H2–H4). We further explored how the effects of transformation and attachment simultaneously predict social bonding. To investigate these issues, we tested how people fuse to a new social identity while in prison with a series of pre-registered hypotheses in a longitudinal study.

Hypotheses:

H1. *Feelings of being personally transformed by the Twinning Project (TP) will be associated with bonding to the Twinning Project immediately after the treatment.*

H2. *These effects will persist, such that personal transformation will also be associated with stronger bonding to the Twinning Project 8 weeks after the end of the programme.*

H3. *Feeling attached to a course leader will be associated with stronger bonding to the Twinning Project immediately after the treatment.*

H4. *These effects will persist, such that attachment will also be associated with stronger bonding to the Twinning Project 8 weeks after the end of the programme.*

5 | Method

A three-wave longitudinal design investigated pathways to social bonding in a sample of people in prison who took part in the Twinning Project. The first two surveys were administered by the coaches leading the intervention (at the first (T0) and last session of the program (T1)), and the third, which was identical in content to the second, was distributed by prison officers for participants to complete in their cells 2 months after the program ended (T2). Coaches and prison officers received specialised training in data collection, and all surveys were securely posted back to us by prison officers. The surveys were administered as part of a wider evaluation of the Twinning Project, alongside data collection of participants' prison behaviour (Newson, Peitz, Cunliffe, et al. 2024) and wellbeing (Peitz and Newson 2025).

5.1 | Sample

His Majesty's Prison and Probation Service (HMPPS) recruits participants for programs via advertising on prison wings and recommendations from PE officers; participants apply for the course, and soccer clubs and the prison work together to select candidates. The selection criteria for the Twinning Project prioritise people in prison within 24 months of release and with implicit minimum levels of literacy and fitness. Those with sexual offences and on low Incentives and Earned Privileges (HMPPS' behaviour monitoring system) levels are typically not allowed on the program. Over 70 prisons deliver Twinning Project programs, 19 of which were selected to represent all regions and categories of prisons in the UK and had to have completed at least one program prior to the research starting to ensure staff were experienced. A subsample was required to ensure that the prison service was not over-burdened with

helping the researchers to collect data. These 19 prisons were targeted to recruit participants for the longitudinal survey in a pre-determined research period between September 2021 and March 2023. All participants enrolled in identified cohorts were eligible to participate and were invited to complete the longitudinal surveys. Over 1000 people completed the Twinning Project during our research period, from which a subsample of $N=491$ individuals were recruited to take part in our longitudinal survey (oversampling to the originally estimated available sample size of $n=400$).

The data from 37 cases was removed prior to further analyses (12 cases were outside of the research period and not eligible, and 25 cases did not include confirmation of informed consent), leading to a final sample of $n=454$ longitudinal responses. Independent sample proportion tests showed that the group recruited for studies into social bonding experiences was highly similar to the remaining population who took part in the Twinning Project at that time in terms of demographics and criminal justice data (see SI).

The final sample consisted of $n=454$ T0 responses, $n=340$ T1 responses, and $n=247$ T2 responses. Each T1 response was linked to the respective prison behavioural data requested as part of Data S1. An analysis comparing cases who completed all three surveys against those with missing survey responses showed no significant differences regarding socio-demographic (age, ethnic background, education, employment history) or criminal history indicators (time spent in prison, time to release, Copas rate, i.e., criminal history) (p 's > 0.113). The final sample ($M_{\text{age}} = 30.30$, $SD = 7.18$) contained 85.5% men. Participants' ethnic backgrounds broadly reflected British prisons (60.8% White, 18.3% Black, 8.6% Asian, 11% mixed, 1.3% unknown), and there were a variety of educational backgrounds (30.5% without qualifications, 36.9% GCSE or similar, 19.8% college/apprenticeship, 12.6% university level, 7.7% unknown) and employment histories (never worked 18.9%, 34.2% part-time or casual, 46.9% regular employment, 4.6% unknown).

5.2 | Measures

Measures were administered three times (T0, T1, T2) using Likert scales ranging from 1 = strongly disagree to 5 = strongly agree, unless specified otherwise. For multi-item scales, mean scores were computed with higher values indicating higher levels of the respective measure. Internal scale reliability (Cronbach's α) scores are provided.

Social bonding with the Twinning Project was measured with two scales. First, identity fusion was assessed using an adapted version of the pictorial scale (Swann et al. 2009), where participants selected one of five pictures showing different degrees of overlap between two circles (one representing themselves and one representing 'The Twinning Project') ranging from A = no relationship between you and the other, to E = Total oneness with the other (see SI for more details). Given the normal distribution of the responses, the scale was treated as a continuous measure. Second, identification was assessed using Postmes et al.'s (2013) single-item identification scale ("I identify with the Twinning Project").

Transformation was assessed using a three-item scale, based on Muzzulini et al. (2021) and Newson et al. (2016): 'I feel that my experience of the Twinning Project has... (1) changed me as a person; (2) become part of my identity; (3) permanently changed my life'. Transformation was measured twice, at the end of the program (T1; $\alpha = 0.87$) and at the follow-up (T2, $\alpha = 0.89$).

Attachment to key relational figures in the Twinning Project was measured via two respect-based items: 'There is a coach or a staff member on the Twinning Project... (1) who I look up to; (2) who is a role model' (reflecting the oft-cited lack of role models within the criminal justice system); and two items adapted from Brunton-Smith and McCarthy's (2017) family attachment scale previously used with people in prison, using staff members instead of family ('There is a coach or a staff member on the Twinning Project... (3) who is a source of emotional support; (4) who I want to be involved in my life'). Attachment was measured after the program at T1 ($\alpha = 0.90$) and T2 ($\alpha = 0.88$).

In the first survey, participants were also asked about their age, educational background, employment history, ethnicity, and time left to serve.

Our pre-registered analytic plan also included exploratory measures of 'group definingness' and 'phenotypic matching', but the former demonstrated poor internal validity (α 's < 0.40), and the latter had too much overlap with the attachment items (r 's > 0.61) and were removed from subsequent analyses.

5.3 | Statistical Analysis

Analyses were conducted using R (v.4.3.2) and RStudio (v.2023.12.0).

5.4 | Pre-Registration

The pre-registration can be found at https://osf.io/pfv6a/?view_only=a559bdfb01a94f1dafb6c847705d284f.1

6 | Results

6.1 | Paths to Social Bonding at the End of the Programme (H1 and H3)

Initial bivariate correlation analyses showed that both levels of personal transformation and attachment to a coach were associated with both identity fusion and identification at the end of the programme (full descriptive statistics and bivariate correlations are available in Table S1).

Linear regression models were estimated to test whether both levels of personal transformation and attachment to a coach at T1 would predict identity fusion and identification at the end of the programme (T1), while controlling for the respective baseline (T0) levels of social bonding. In line with Hypotheses H1 and H3, both transformation and attachment were significant

TABLE 1 | Linear regression models predicting social bonding at the end of the programme (T1) based on transformation and attachment at T1, controlling for baseline (T0) social bonding (M1) and demographic characteristics (M2).

	Identity fusion T1 (M1)			Identity fusion T1 (M2)		
	<i>b</i>	<i>t</i>	<i>p</i>	<i>b</i>	<i>t</i>	<i>p</i>
Transformation T1	0.16	2.18	0.030	0.14	1.97	0.049
Attachment T1	0.19	2.63	0.009	0.19	2.74	0.007
Identity fusion T0	0.16	3.02	0.003	0.15	2.84	0.005
Age				-0.03	-0.48	0.631
Gender				-0.11	-2.01	0.046
Model summary	$R^2=0.13, F(3, 308)=16.53, p<0.001$			$R^2=0.14, F(3, 305)=11.04, p<0.001$		

	Identification T2 (M1)			Identification T2 (M2)		
	<i>b</i>	<i>t</i>	<i>p</i>	<i>b</i>	<i>t</i>	<i>p</i>
Transformation T1	0.27	3.90	<0.001	0.27	3.92	<0.001
Attachment T1	0.25	3.66	<0.001	0.25	3.69	<0.001
Identification T0	0.09	1.78	0.076	0.08	1.69	0.093
Age				0.10	1.89	0.059
Gender				-0.09	-1.80	0.072
Model Summary	$R^2=0.25, F(3, 290)=32.97, p<0.001$			$R^2=0.26, F(5, 278)=21.51, p<0.001$		

Note: Gender 1 = Male, 2 = Female.

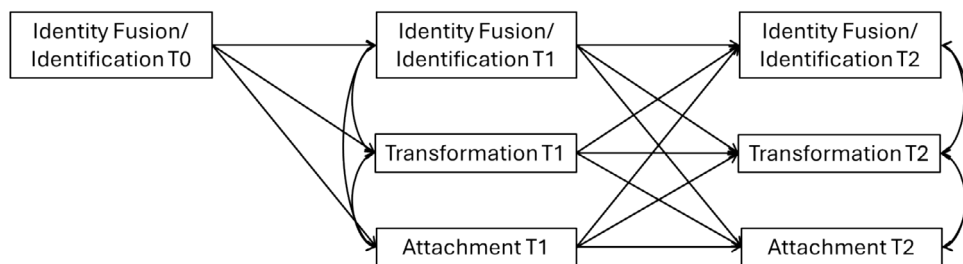


FIGURE 1 | Presentation of the Cross-Lagged Panel Models Estimated to Test H2 and H4. Control variables and related paths, as well as covariate paths between T0 and T2 variables omitted for visual clarity. Models were tested separately with Identity Fusion and Identification variables.

predictors of identification and identity fusion when the programme ended (see Table 1, Model 1). The effects were robust after entering age and gender as control variables (Model 2).

6.2 | Paths to Social Bonding 8 Weeks After the Programme (H2 and H4)

To test whether transformation and attachment had lasting effects on social bonding, structural equation models with a cross-lagged panel design were estimated using the lavaan package (v 0.6–19).

The model examined the relationships between social bonding indicators at T0, T1, and T2, and personal transformation and attachment at T1 and T2, including autoregressive, cross-lagged, and correlational paths to account for stability and reciprocal influences among variables (see Figure 1). Control variables (where included) were allowed to covary, as were the residuals of baseline bonding indicators and T2 outcome variables. Models were saturated (df=0).

Table 2 shows the estimates of the models containing identity fusion. Model 1, without control variables, showed that transformation T1 had a stronger cross-lagged effect on fusion T2 than attachment did, but neither reached the threshold of statistical significance ($p=0.059$). Instead, there was a significant cross-lagged effect of transformation T1 on attachment T2, as well as an effect of baseline fusion (T0) on feelings of transformation at T1, but no effect on attachment at T1. When including the control variables age and gender (Model 2), the cross-lagged effect of transformation T1 on fusion at T2 was statistically significant ($p=0.025$) and the strongest predictor overall, whereas there were no effects of fusion on transformation or attachment. This finding supports hypothesis H3. The effect of baseline fusion on transformation at T1 remained significant, as did the effect of transformation at T1 on attachment T2. The model also showed that female gender was associated with lower levels of fusion at T1, and older age was linked to higher levels of fusion at T2.

The models predicting identification at 8 weeks after the end of the programme (Table 3) showed a different results pattern. Here

TABLE 2 | Autoregressive crosslagged three-panel models with transformation, attachment and fusion (Model 1) and including demographic characteristics (Model 2).

	Model 1						Model 2											
	Identity fusion T1		Transformation T1		Attachment T1		Identity fusion T1		Transformation T1		Attachment T1							
	<i>b</i>	<i>z</i>	<i>p</i>	<i>b</i>	<i>z</i>	<i>p</i>	<i>b</i>	<i>z</i>	<i>p</i>	<i>b</i>	<i>z</i>	<i>p</i>						
Identity fusion T0	0.25	3.52	<0.001	0.18	2.56	0.010	0.04	0.60	0.552	0.22	3.35	0.001	0.17	2.37	0.018	0.04	0.55	0.586
Age										-0.05	-0.92	0.360	-0.04	-0.61	0.542	-0.02	-0.25	0.803
Gender										-0.18	-2.02	0.044	-0.10	-1.17	0.243	-0.03	-0.31	0.755
	Identity fusion T2		Transformation T2		Attachment T2		Identity fusion T2		Transformation T2		Attachment T2							
	<i>b</i>	<i>z</i>	<i>p</i>	<i>b</i>	<i>z</i>	<i>p</i>	<i>b</i>	<i>z</i>	<i>p</i>	<i>b</i>	<i>z</i>	<i>p</i>						
Identity fusion T1	0.18	2.46	0.014	0.04	0.64	0.523	0.07	1.07	0.287	0.16	2.55	0.011	0.02	0.30	0.766	0.08	1.47	0.141
Transformation T1	0.18	1.89	0.059	0.51	6.33	<0.001	0.19	2.22	0.026	0.17	2.24	0.025	0.50	7.24	<0.001	0.20	2.46	0.014
Attachment T1	0.05	0.56	0.576	0.09	1.19	0.235	0.34	4.12	>0.001	0.06	0.91	0.363	0.11	1.34	0.180	0.34	4.89	>0.001
Age										0.13	2.20	0.028	0.00	-0.25	0.803	0.04	0.67	0.502
Gender										-0.16	-1.83	0.068	-0.12	-1.82	0.069	0.03	0.45	0.650

Note: Gender 1 = Male, 2 = Female. Model 2: Identification T0: Age *b* = -0.03, *z* = -0.34, *p* = 0.737, Gender *b* = -0.12, *z* = -1.04, *p* = 0.298.

the cross-lagged effects of attachment T1 and transformation on identification T2 were similar in size but missed the threshold of statistical significance (attachment $p = 0.067$, Model 1). Baseline identification (T0), similarly to fusion, significantly predicted only transformation but not attachment at T1. Running the model with control variables (Model 2), the cross-lagged effect of attachment T1 on identification T2 was statistically significant ($p = 0.016$), providing support for hypothesis H4. The effect of transformation T1 was not ($p = 0.054$) significant. This time, female gender correlated with significantly lower levels of identification both at the end of the programme and at the follow-up 8 weeks later.

Together, these findings seem to suggest that transformation is the more consistent path to identity fusion, whereas the paths considered holistically operate relatively evenly for identification, though only the cross-lagged path of attachment reached the threshold of statistical significance. Crucially, there were no cross-lagged effects of social bonding on either attachment or transformation, lending some support to the overall theorised paths to bonding, rather than vice-versa.

7 | Discussion

As indicated in our introduction, there were several *prima facie* reasons to hypothesize that participation in the Twinning project would foster bonding among participants through feelings of personal transformation and attachment to those delivering the courses. Based on previous research surrounding the transformative pathway to fusion (Jong et al. 2015; Newson et al. 2016; Whitehouse 2021), the working hypothesis was that participation in the Twinning Project could have a transformative effect on inmates, leading to bonding with law-abiding group identities associated with positive lifestyles and values. In line with the secure base hypothesis (Klein and Bastian 2023; Klein et al. 2024), it was also considered that the soccer professionals working with people in prison to develop new skills could become a focus for feelings of attachment and, as such, act as role models and catalysts for improved attitudes and behaviours.

Both transformativeness and attachment did indeed have positive effects on participants in the Twinning Project; but in different ways and with different trajectories over time. The results supported our original hypotheses (H1) that participants who experienced their participation in the Project as personally transformative became more fused and identified more strongly at the end of the programme, and that transformation had a lasting impact on fusion (H3). This finding was in line with previous research demonstrating the role of transformative shared experiences in driving fusion (Jong et al. 2015; Newson et al. 2016, 2021). Attachment to the coaches was also associated with fusion at the end of the programme (H2) but only the transformative pathway appeared to have a lasting effect. Similarly, both transformation and attachment were associated with stronger identification at the end of the programme (H1 and H2), and while both paths were similarly strong in predicting identification at the follow-up, only attachment was statistically significant.

The observed effects of transformation and attachment within the Twinning Project align closely with established

criminological theories of desistance from crime. Desistance is often conceptualised as a process involving both primary desistance—the cessation of offending—and secondary desistance, which entails a deeper identity shift (Maruna 2001). The transformative impact observed in this study, wherein participants who experienced personal transformation became more strongly fused with a new, prosocial identity, parallels Maruna's (2001) redemption narratives, in which individuals reconstruct their pasts to create a coherent, prosocial self-narrative. This aligns with research emphasising the importance of cognitive shifts in fostering long-term desistance (Giordano et al. 2002). Our findings on the transformative impact of the Twinning Project align with these developments. Participants who experienced personal transformation through the program's shared activities and values exhibited a shift toward prosocial identities, mirroring the transformation narratives identified in recent desistance literature. This suggests that structured interventions fostering personal growth and identity reconstruction can be pivotal in supporting desistance, reinforcing the importance of facilitating environments where individuals can develop and internalise new, positive self-concepts.

Attachment was also a significant predictor, but its impact over time was limited to identification and not fusion. In the context of desistance, attachment refers to the emotional bonds individuals form with significant others, which can play a crucial role in the cessation of criminal behaviour (Bowlby 1969). Strong attachments to prosocial figures, such as family members, mentors, or community members, provide emotional support and a sense of security, which can deter individuals from engaging in criminal activities in adult life (Mikulincer and Shaver 2016; Ansbro 2022). Attachment to role models, while beneficial in reinforcing social bonds, may be more akin to traditional social control theories (Hirschi 1969). As such, a perceived close relationship with a trusted member of a group might offer access to a group identity, but it does not sustain a sense of merging a sense of self and group. This supports work on identity desistance, indicating that internalising a new self-concept is a key driver of sustained behavioural change (Paternoster and Bushway 2009); identity fusion is precisely about incorporating aspects of group identity within one's personal identity irrevocably, suggesting alignment between criminogenic and psychological theories.

This theoretical grounding is illustrated further by empirical insights drawn from qualitative research with women in prison enrolled on the Twinning Project. Here, the programme's transformative potential was found once again, particularly in fostering positive self-perception and prosocial identity shifts. Women developed a more positive self-concept and intentions to help others, aligning with the concept of generative motivation found in desistance research (Maruna 2001; McNeill 2016). These overlapping themes suggest that identity transformation through sport-based interventions may be universally relevant across genders, albeit with different mechanisms and challenges. Equally, the women's research suggests that attachment to mentors or coaches in prison interventions may be gender-specific, potentially requiring additional emotional and practical support mechanisms for women due to extensive trauma backgrounds in prison.

Our findings provide empirical support for the role of identity transformation in desistance processes and suggest that

TABLE 3 | Autoregressive crosslagged three-panel models with transformation, attachment and identification (Model 1) and including demographic characteristics (Model 2).

	Model 1						Model 2											
	Identification T1		Transformation T1		Attachment T1		Identification T1		Transformation T1		Attachment T1							
	<i>b</i>	<i>z</i>	<i>b</i>	<i>z</i>	<i>b</i>	<i>z</i>	<i>b</i>	<i>z</i>	<i>b</i>	<i>z</i>	<i>b</i>	<i>z</i>						
Identification T0	0.18	2.56	0.011	0.15	2.12	0.034	0.04	0.55	0.582	0.17	2.89	0.004	0.14	2.25	0.024	0.03	0.48	0.631
Age							0.08	1.17	0.242	-0.06	-0.90	0.369	-0.01	-0.12	0.907			
Gender							-0.20	-2.22	0.027	-0.13	-1.60	0.111	-0.08	-0.82	0.410			
	Identification T2		Transformation T2		Attachment T2		Identification T2		Transformation T2		Attachment T2							
	<i>b</i>	<i>z</i>	<i>b</i>	<i>z</i>	<i>b</i>	<i>z</i>	<i>b</i>	<i>z</i>	<i>b</i>	<i>z</i>	<i>b</i>	<i>z</i>						
Identification T1	0.24	2.91	0.004	0.02	0.33	0.744	0.10	1.26	0.209	0.18	2.67	0.008	0.01	0.08	0.936	0.11	1.74	0.083
Transformation T1	0.15	1.57	0.116	0.52	6.15	<0.001	0.08	0.94	0.346	0.13	1.93	0.054	0.51	7.71	<0.001	0.09	1.14	0.254
Attachment T1	0.17	1.83	0.067	0.08	0.92	0.356	0.40	4.62	<0.001	0.19	2.40	0.016	0.09	1.17	0.243	0.40	5.88	<0.001
Age							0.05	0.92	0.356	0.05	0.92	0.356	-0.01	-0.18	0.855	0.02	0.38	0.704
Gender							-0.26	-3.43	0.001	-0.12	-1.93	0.053	0.05	0.68	0.499			

Note: Gender 1 = Male, 2 = Female. Model 2: Identification T0; Age *b* = 0.03, *z* = 0.38, *p* = 0.703, Gender *b* = -0.09, *z* = -0.74, *p* = 0.457.

interventions promoting profound personal change may be more effective in fostering long-term reintegration than those solely focused on identifying with a societally positive group. In a related study, changes in identification with the Twinning Project, but not fusion, were associated with significant behavioural improvements among prisoners (Newson, Peitz, Cunliffe, et al. 2024). In the long run, transformation might be more important than attachment to role models for identity fusion, even though the latter may seem to be more intuitively plausible as an agent for change and is certainly more widely utilised in prison interventions (Fonagy and Levinson 2004). Nonetheless, our results indicate that both transformative and attachment pathways played significant roles in fostering social cohesion.

The Twinning Project's core impacts—building prosocial identities through structured mentorship and sports-based engagement—offer a framework that has potential to be adapted across diverse cultural and legal contexts. In countries with rehabilitative justice models, such as Norway or Germany, integration with existing reintegration programs could emphasise skill-building and employment pathways. Conversely, in jurisdictions with more punitive approaches, adaptation may require policy advocacy to align with existing correctional strategies and will need to appeal to the general public who may feel that such interventions are not 'fair', particularly under times of austerity (Garland et al. 2013; Ouellette et al. 2017). In these contexts, a relational security framing that emphasises the improvements to public safety associated with such interventions may be useful (Kikas et al. 2021). Cultural factors, including attitudes toward rehabilitation, the role of community organisations, and the availability of sports infrastructure, will also shape implementation around the world. Future research should explore how local legal systems, societal norms, and institutional support impact the scalability of the Twinning Project beyond the UK.

8 | Limitations

This study suffers from several limitations. First, participants were self-selecting (both by applying to participate, indicating a willingness and ability to commit to self-improvement) and via club and/or prison selection of participants. This means that our results are unlikely to reflect the entire prison population. Additionally, this study was not able to access a control group. However, in a related study using a control group to examine Twinning Project behaviours, there were significant behavioural improvements for the treatment condition (Newson, Peitz, Cunliffe, et al. 2024). Furthermore, caution is warranted when generalising the results to wider populations, as the prison population has a unique existence that is both isolating and lacking in personal space—factors that could well alter results, in addition to personal backgrounds that are likely to bring noise to the results (such as unhealthy attachment styles, substance misuse or lack of education).

There are also limitations in the study design. First, although widely used, the pictorial measure of identity fusion is considered slightly less reliable than the verbal measure (Gómez et al. 2011). This measure was selected for speed in use and with respect to lower literacy levels among the prison population. Second, the measure of transformation did not allow the disentangling of

potential unique pathways to identity fusion and social identification. This is particularly relevant considering the potential relationship of transformation with self-verification (Gómez et al. 2024). Moreover, while qualitative studies in probation settings (Newson, Peitz, Gitsham, et al. 2024) and with women (Peitz et al. 2025) have contributed valuable insights by triangulating evidence across diverse populations, a mixed-methods approach within a single cohort could provide a more integrated perspective. Future research on the Twinning Project should consider a gender-responsive approach, addressing barriers to engagement and the role masculinity plays in identity formation here, as well as exploring the role of attachment in differently gendered environments.

Future research should aim to enhance methodological rigour through co-designed research approaches that empower participants rather than relying on extractive methods. Participatory methodologies that incorporate creative or arts-based methods could offer deeper insights into the lived experiences of transformation, self-concept change, attachment, and desistance from crime (Haarmans et al. 2021) in a way that feels non-exploitative and is led by participants' self-inquiry rather than following the researchers' agenda. Additionally, employing longer-term longitudinal mixed-methods designs combining in-depth qualitative interviews with validated psychometric measures, though challenging in prison settings, would allow for a richer exploration of how transformation evolves over time. Such approaches would help clarify whether transformation leads directly to long-term identity shifts or whether it requires ongoing reinforcement through structured social bonds.

9 | Conclusion

Further research is urgently needed to explore more deeply the question of whether transformative experiences and attachment have distinct and reliable impacts on positive changes in identity. It is possible that the process of transformation is itself more potent for sustaining personal and group identity fusion than the process of attachment, whereas attachment to trusted group members as a reference figure facilitates group identification. Previous evidence showed that identification with the Twinning Project increased more strongly and was more sustainable than fusion (Newson, Peitz, Cunliffe, et al. 2024). Participants in the Twinning Project may become attached to coaches quite rapidly during the delivery of a course; this type of change may be stimulus-driven. By contrast, being personally transformed by the experience of participation in the Twinning Project is likely to be a much slower and longer-term process. Previous research on the so-called 'shared-experiences pathway' (Whitehouse 2018, 2021) suggests that this transformative process involves reflection on long-lasting episodic memories for especially impactful life-changing events or moments of insight, and especially the activity of reflecting on such experiences subsequently (Jong et al. 2015). This reflective journey may take months or years to unfold, rather than a stimulus-triggered reaction associated with short-term relationships. We encourage future interventions to include post-program community engagement, such as peer-led groups or shared spaces for reflective sessions, with which research could explore post-program engagement as a mediating factor. Resolving these questions is important to harness the

power of social bonding in prison interventions and to address the spiralling problem of recidivism afflicting already overburdened penal systems in the UK and other countries.

Ethics Statement

Ethical approval was obtained from the University of Oxford (SAME_C1A_19_016). Data is available on request and cannot be made publicly available in relation to data sharing agreements made with Her Majesty's Prison and Probation Service due to the prison population that was sampled for the research.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are openly available at OSF at: https://osf.io/pfv6a/?view_only=a559bdfb01a94f1dafb6c847705d284f.

Endnotes

¹The manuscript deviates from the pre-registration to include paths to both social identification and identity fusion, whereas the original analysis plan addressed identity fusion only. This modification is based on findings from related studies into the Twinning Project, which identified social identification as highly relevant for behavioural (Newson, Peitz, Cunliffe, et al. 2024) and well-being outcomes (Peitz and Newson 2025). The results section now focuses on the models where paths to social bonding are tested simultaneously, and contains comprehensive cross-lagged panel models (CPLMs) that incorporate all available datapoints and allow for covariation between variables (see model specification in the results section). All outputs of pre-registered analyses are presented in the Supporting Information (see Tables S12–S19).

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Supporting Information

Additional supporting information can be found online in the Supporting Information section.