‘Through the Gate’ Desistance-Based Social Work Intervention for Offenders Serving First or Second Prison Sentence in Hong Kong - Jockey Club Project ReBond: A Longitudinal Mixed-Methods Randomised Control Trial Preregistration

NCT:

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Description

Desistance refers to the process by which individuals cease criminal behaviour. Contemporary desistance scholarship conceptualises this not as a single event, but as a dynamic process characterised by a decreasing frequency and seriousness of offending over time. This process encompasses three interrelated dimensions: act desistance (the behavioural cessation of offending), identity desistance (the shift towards a pro-social identity), and relational desistance (the de-labelling of a criminal past across ecological systems). While a substantial body of randomised controlled trials (RCTs) has evaluated re-entry interventions, the majority focus on addressing discrete criminogenic needs or deficits. Few offer comprehensive services informed by the broader desistance literature or evaluate outcomes across all three desistance dimensions.

Addressing this gap in both practice and research, the Jockey Club Project ReBond (JCRB) is a two-year, desistance-informed social work intervention designed to accelerate act, identity, and relational desistance among individuals serving their first or second prison sentence in Hong Kong. The programme operates "through the gate," initiating within four correctional institutions and continuing after participants are released into the community.

The current study is a Mixed-Methods Randomised Controlled Trial (RCT) evaluating the effectiveness of Project ReBond. Participants will be randomly assigned to either the **intervention group** (receiving the full ReBond programme alongside treatment-as-usual) or a **TAU (treatment-as-usual) control group** (receiving only treatment-as-usual, which includes standard correctional and post-release care, with unrestricted access to existing community social services).

The study addresses two research questions:

1. Does Project ReBond lead to greater improvements in desistance-related motivation, as conceptualised by the Theory of Planned Behaviour, compared to the TAU control group?
2. Does Project ReBond lead to greater improvements in desistance outcomes (e.g., reduced re-offending, enhanced pro-social identity, and greater social integration) compared to the control group?

Quantitative outcomes will be assessed at baseline (pre-release), and at 1-2 months, 6-7 months, and 13-14 months post-release using a combination of self-constructed and validated self-report measures. Semi-structured interviews and focus groups will be carried out in the same timepoints for qualitative evaluation.

License

Research Questions Or Hypotheses

This study proposes directional hypotheses based on the three-dimensional construct of desistance (act, identity, and relational desistance) and the Theory of Planned Behaviour (TPB). The investigators define the frequency of self-reported reoffending behaviour as the primary outcome, while other desistance dimensions and motivational factors serve as secondary outcomes. Additionally, the intervention includes a pre-release phase featuring specific workshops (Art, Sports, and Tech) delivered in prisons by domain experts and social workers of an NGO for which targeted workshop outcomes will be measured. Finally, changes in well-being and thriving will be assessed as exploratory outcomes.

Overall, the investigators hypothesize that participants assigned to the intervention group (Project ReBond) will demonstrate significantly greater improvements across all outcomes compared to the control group. Specifically, the investigators expect positive intervention effects on desistance and TPB outcomes to become evident as participants transition back into the community (i.e., across the at 1-2 months, 6-7 months, and 13-14 months post-release assessment waves), while workshop-specific outcomes will be evident at the end of the workshop.

Primary Outcome

Compared to the control group, across post-release follow-ups, participants in the intervention group will demonstrate:

- **H1 (Act Desistance - Frequency):** A significantly lower frequency of self-reported reoffending behaviour.

Secondary Outcomes

Compared to the TAU control group, across post-release follow-ups, participants in the intervention group will demonstrate:

- **H2 (Act Desistance - Seriousness & Risk/Strengths):**
  - **H2a:** A significantly lower level of seriousness of self-reported reoffending.
  - **H2b:** Significantly higher levels of protective strengths related to desistance.
  - **H2c:** Significantly lower levels of dynamic risks related to desistance.
- **H3 (Identity Desistance):** Significantly higher levels of pro-social identity.
- **H4 (Relational Desistance):**
  - **H4a:** Significantly lower levels of reintegration needs.
  - **H4b:** Significantly lower levels of anticipated stigma from ex-offender identity.
  - **H4c:** Significantly higher levels of social support.
  - **H4d–g:** Significantly higher levels of social integration across the domains of education (H4d), housing (H4e), employment (H4f), and health (H4g).

Based on our conceptual model, compared to the TAU control group, participants in the intervention group will also demonstrate:

- **H5 (Desistance-Related Motivation):**
  - **H5a (Intention):** Significantly higher intention to desist from crime.
  - **H5b (Attitudes):** More positive attitudes toward desistance.
  - **H5c (Subjective Norms):** Stronger perceived subjective norms supporting desistance.
  - **H5d (Perceived Behavioural Control):** Higher self-efficacy regarding the maintenance of desistance.
  - **H5e (Emotions):** More positive emotional states.

Pre-Release Workshop Outcomes

In terms of workshop-specific outcomes, compared to the control group, participants in the intervention group will demonstrate at post-test:

- **H6 (Workshop Effects):**
  - **H6a (Art Workshop):** Significantly higher emotional competence.
  - **H6b (Sports Workshop):** Significantly higher resilience.
  - **H6c (Tech Workshop):** Significantly higher AI literacy.
  - **H6d (Tech Workshop):** Significantly higher problem-solving confidence.

Exploratory Outcomes

Compared to the TAU control group, across post-release follow-ups, participants in the intervention group will demonstrate:

- **H7:** Significantly higher levels of well-being.
- **H8:** Significantly higher levels of thriving.

Additional Blinding During Research Or Analysis

Due to the nature of delivering a social work intervention within correctional settings, it is not feasible to blind the social workers, correctional staff, or the core research team to group allocation, an open-label RCT will be conducted. All three parties require direct contact with participants to provide intervention services, maintain security, and conduct research activities. Furthermore, given the closed, communal nature of correctional

institutions, participants would inevitably discover their group assignments even if blinding were attempted; therefore, participants will also become unblinded.

However, to mitigate analytical bias, all data analysis will be conducted by an independent, blinded analyst. Prior to analysis, a designated researcher will strip the dataset of all personally identifying information and mask the group allocation variable (e.g., coding the conditions simply as 'Group A' and 'Group B'). The analyst will remain blinded to the true group identities until all primary statistical analyses have been completed and finalized.

Study Design

Overall Design

The current study employs a two-arm, parallel-group randomized controlled trial (RCT) utilizing a mixed design. The between-subjects factor is the treatment condition (Project ReBond Intervention plus TAU versus TAU Control), and the within-subjects factor is time, with repeated measures assessed across multiple time points over a 13-month tracking period.

Intervention Group (Project ReBond + TAU)

Participants allocated to the intervention group will receive the multifaceted Project ReBond services alongside standard care (TAU) for up to two years, beginning during their incarceration and continuing post-release. It should be noted that the 13-month research tracking period is shorter than the full two-year service duration; this truncated follow-up is necessary due to anticipated challenges in recruiting the predefined sample size before the project's overall deadline. The TAU is provided by the collaborating non-governmental organization (NGO), SideBySide. The Project ReBond intervention consists of the following specific components:

- **Pre-Release (During Incarceration):** Each participant will receive a 6-session pro-social habit workshop and career-life counselling as part of their pre-release preparation. Those requiring employment assistance will be provided with job interview opportunities prior to their release.
- **Post-Release:** Based on their personal interests and the recommendations of their caseworker, participants can choose to engage in the following services:
  i) Subsidies for professional grooming and image building;
  ii) Peer mentorship provided by successful desisters;
  iii) Financial literacy training and counselling;
  iv) Ongoing career-life counselling;
  v) Routine workshops designed to cultivate and maintain pro-social hobbies;
  vi) Subsidies for further education or occupational training;
  vii) Family-based counselling involving the participant and their significant other(s); and
  viii) Volunteering and community outreach, sharing opportunities.

TAU Control Group

Participants in the control group will receive standard care (TAU) while incarcerated and remain free to utilize any existing social services post-release. Specifically, control participants will be encouraged to engage with the standard services provided by SideBySide, whose standard care is informed by Risk-Need-Responsivity (RNR) principles.

Counterbalancing

Because this is a parallel-group design, treatment conditions are not counterbalanced. Furthermore, as the assessments are administered in a paper-and-pencil format, no counterbalancing of the questionnaire items or measures will be employed.

Randomization

Recruitment and Randomization Methods

Participant recruitment utilizes an open-label, double-consent Zelen design. Depending on the specific operational availability of each participating Correctional Institution (CI), one or more of the following three recruitment methods will be employed:

1. Passive Recruitment: Recruitment posters are displayed within the CI. Eligible Persons in Custody (PICs) can express their interest to their designated welfare officer.
2. Active Outreach: Correctional Services Department (CSD) staff extract a list of eligible PICs from their official database. They then individually approach every eligible PIC to introduce Project ReBond and register interested individuals.
3. Group Briefing: All eligible PICs are gathered for a face-to-face meeting with the project social worker(s) and researcher(s), who introduce the project and invite participation.

Across all three methods, PICs are informed that the study involves both an intervention and a control group. Upon expressing an initial intention to join, they agree to be randomized prior to final group assignment and formal consent.

Pre-Randomization Procedure

To comply with the Personal Data (Privacy) Ordinance, the CSD cannot provide the research team with any personal details (e.g., name, age, offense history) of interested PICs prior to consent. Instead, a CSD officer transfers a list of fully anonymized, unique identification numbers to the research team. Upon receipt, a designated researcher performs randomization on this anonymized list using a custom Python script.

This pre-randomization approach is necessary due to strict operational limitations within the local correctional culture. Because researchers are not always granted immediate access to collect formal written or verbal consent during the first two recruitment methods, randomization must occur prior to the formal consent process.

Post-Randomization Consent and Enrolment

Following randomization, potential participants will attend a briefing session separated by their allocated group. This ensures that every potential participant's right to informed consent is protected and minimizes any potential coercion that might arise from expressing initial interest. Motivational interviewing techniques are utilized in both groups to encourage enrolment. Participants are informed of their specific group assignment and are given the choice to formally consent or decline participation:

- Intervention Group: A caseworker provides a brief introduction to the Project ReBond intervention model, after which participants are invited to sign the consent form.
- Control Group (Treatment-as-Usual): A social worker from the collaborating NGO (SideBySide) provides a detailed briefing on the standard care services available. Participants are then invited to consent to participate in a research study aimed at understanding the general experiences of ex-offender rehabilitation.

Throughout this process, the number of individuals who refuse participation after group assignment will be carefully recorded to calculate and report accurate enrolment and attrition rates across both the intervention and control arms. Additionally, at each round of enrolment, each CI will complete a log sheet that details the number of potential participants who meet the inclusion criteria, those who are excluded based on the exclusion criteria; as well as the recruitment used and those who declined to participate hence never reached the pre-randomisation phase.

Engagement Rate and Attrition Tracking

Throughout this process, the number of individuals who refuse participation after group assignment will be carefully recorded to calculate and report accurate enrolment and attrition rates across both the intervention and control arms. Additionally, during each round of enrolment, each CI will complete a standardized log sheet. This log will detail:

i) The number of potential participants who meet the inclusion criteria;
ii) The number of individuals who are excluded based on predefined exclusion criteria;
iii) The specific recruitment methods utilized
iv) The number of individuals who accepted and declined to participate initially, including the reasons provided.

Ultimately, all these tracked data will be used to create a comprehensive CONSORT diagram, reporting engagement, enrolment, and dropout rates at every stage of the research.

Level and Technique of Randomization

Randomization occurs at the individual level within each correctional institution, provided that there are at least 10 eligible PICs at a particular time. Recruitment and randomization take place in a rolling fashion, as there are only a small number of available cohorts at any given time. Because eligible participants are recruited in these small batches, the investigators utilize simple randomization with a forced allocation ratio rather than simple coin-flip randomization. The investigators aim for a 1:1 allocation ratio within each batch. In the event of an odd number of participants in a given batch, the allocation is forced so that the intervention group receives the extra participant (e.g., in a batch of 13, 7 are assigned to the intervention group and 6 to the control group).

Randomization Tool and Reproducibility

Allocation is determined using a Python script utilizing the `random()` package, which is based on the Mersenne Twister, a popular pseudorandom number generator commonly used in RCTs. To guarantee strict reproducibility, a seed is set using the exact year, month, date, hour, and minute (YYYYMMDDHHMM) the script is executed.

The `random.sample()` function is then used to randomly draw the exact number of required IDs for the intervention group, with the remaining IDs automatically assigned to the control group. Below is a reproducible example of the script used for a hypothetical batch of 13 participants:

```
import random

# 1. Set the seed using the exact date and time (e.g., March 13,
2026, at 12:04 PM)
random.seed(202603131204)
```

```
# 2. Define the batch of anonymized participant IDs
people =
["A_001", "A_002", "A_003", "A_004", "A_005", "A_006", "A_007", "A_0
08", "A_009", "A_010", "A_011", "A_012", "A_013"]

# 3. Calculate allocation (7 for intervention, 6 for control) and
sample
intervention = random.sample(people, 7)
control =
[person for person in people if person not in intervention]

# 4. Output the results
print("Intervention Group:", sorted(intervention))
print("Control Group:", sorted(control))
```

Integrity and Record-Keeping

To ensure the integrity of the RCT and prevent any possibility of selection bias, the execution of the code is witnessed by two other researchers. Immediately upon execution, the printed results in the terminal and the script itself are screen-captured and saved to the project's secure database for record-keeping.

Data Collection Procedures

Study Setting and Population

Data collection will be conducted in collaboration with CSD and the collaborating NGO, SideBySide. Participants will be recruited from four designated correctional institutions (CIs). These comprise three male institutions (one medium-security and two minimum-security) and one female institution (a mixed-security facility consisting of one minimum-security wing and two medium-security wings).

Eligibility Criteria

To ensure the sample aligns with the intervention's focus on community reintegration, participants must meet the following specific inclusion and exclusion criteria.

Inclusion Criteria:

- Hong Kong residents;
- Aged 18 years or above and capable of providing informed consent
- Serving a maximum of two sentences (including the current one) across any level or type of correctional facility
- The current sentence lasts between 3 and 12 months.

Exclusion Criteria:

- Physical conditions that preclude participation in at least 80% (six or seven sessions) of the Stage 1 in-prison workshops
- Psychological conditions (e.g. bipolar disorder or schizophrenia) that preclude participation in at least 80% (six or seven sessions) of the Stage 1 in-prison workshops
- Medical appointments that preclude participation in at least 80% (six or seven sessions) of the Stage 1 in-prison workshops

- Inadequate Cantonese or English proficiency that prevent the individual from providing informed consent and participating in the Stage 1 group workshops
- Cognitive impairments that prevent the individual from providing informed consent and participating in the Stage 1 group workshops
- A history or high risk of inflicting physical harm on other participants, clinicians, or CSD staff

Study Timeline and Assessments (Repeated Measures)

The intervention is structured around a five-stage service model, with data collection timepoints strategically mapped to these stages.

- Stage 1 (In-Prison Workshop): This stage consists of a seven-week workshop spanning about two months. The Baseline Assessment (T0) is conducted at Session 1. For the intervention group, the pre-test to evaluate workshop effectiveness will be conducted at the beginning of the Session 2. For the control group, the intake and pre-test measures are consolidated into a single session (T0). The Workshop Post-Test (T1) is administered at the end of Stage 1. Intervention participants complete T1 during their final workshop session, while control participants complete it approximately seven weeks after their baseline, subject to the operational and scheduling constraints of the CIs.
- Stage 2 (In-Prison Counselling): Participants enter Stage 2 for the remainder of their sentence, receiving one-on-one counselling sessions once every three months. Job interviews would be arranged based of needs of the participant. Notably, there is no formal assessment during Stage 2 due to the high variability in remaining sentence lengths, which makes standardizing the beginning and end of this stage impractical (e.g., a participant with less than three months remaining may receive only one session, whereas someone with over nine months may receive up to four sessions).
- Stage 3 (Immediately Post-Release): Upon release, participants enter a transitional period covering their first month (0 to 1 month) in the community. The first Post-Release Follow-Up (T2) is administered at the end of this stage, specifically between the first and second month following release.
- Stage 4 (Mid-Term Post-Release): This stage spans the second to the twelfth month post-release. The second Post-Release Follow-Up (T3) is conducted in the middle of this stage, between the sixth and seventh months.
- Stage 5 (Long-Term Post-Release): This stage encompasses the second year after release. The third and final Post-Release Follow-Up (T4) is administered at the beginning of this stage, between the thirteenth and fourteenth month post-release.

A one-month data collection window is utilized for each post-release follow-up timepoint. This extended window is necessary because questionnaires are administered in the presence of a caseworker or a researcher, and the wider timeframe accommodates the scheduling availability of both parties. Control group participants' follow-up data will be collected under the same scheduled

The limitation of the tracking period to 13 months post-release is necessitated by pragmatic constraints, primarily a strict three-year funding limitation for the overall project. Because the pool of eligible individuals is relatively small, the recruitment phase is expected to be prolonged, consuming a significant portion of the project's funded timeframe. Consequently, attempting data collection beyond 13 months would exceed the project's operational and financial capacity.

Mixed-Methods Component

To supplement the quantitative RCT data, a qualitative component is embedded within the study design. Between T2 and T4, a purposive subsample of 30 individuals will be invited to participate in qualitative interviews to evaluate their desistance progress and gather feedback on the services received. This subsample will comprise 20 intervention participants, 5 control participants, and 5 significant others of intervention participants (whose corresponding primary participant also took part in the qualitative research). Recruitment for the intervention group and their significant others will be conducted through caseworkers, targeting participants who show interest. Recruitment for the control group will be conducted by a researcher who will randomly contact participants to invite them to participate.

Compensation Structure

Due to prison regulations, participants cannot receive compensation while serving their sentences. Therefore, compensation accrued during the in-prison phase (T0 and T1) will be distributed retroactively in the form of cash coupons once the participant is released.

- Intervention Group: Participants will receive HK$50 in cash coupons for each of the five quantitative survey timepoints, totalling HK$250.
- TAU Control Group: To buffer against the higher risk of attrition in the control group, a staircase compensation schedule is utilized for their quantitative surveys. Control participants accrue HK$50 for T0 and HK$50 for T1 (distributed post-release), followed by increasing rates for subsequent completions: HK$150 for T2, HK$300 for T3, and HK$500 for T4, resulting in a total possible compensation of HK$1,050 per control participant.
- Qualitative Subsample: Participants invited for qualitative interviews will receive HK$300 per interview across three timepoints, totalling a maximum of HK$900 in cash coupons.

Study Timeline

Data collection is scheduled to commence in April 2026 and conclude in September 2028.

Data Storage

All data collected during the study will be handled with strict confidentiality and securely stored. Hard copies of the paper-and-pencil questionnaires will be collected by the caseworkers at each assessment timepoint. Following collection, the caseworkers will scan these forms into a digital format, which will then be uploaded and stored on a secure, encrypted cloud server. To ensure participant privacy, all data will be fully anonymized. The original physical copies of the questionnaires will be securely stored in a locked filing cabinet located in the researchers' office. In accordance with standard academic data retention policies, the anonymized data will be retained for a minimum of five years, calculated from the date of first academic publication or the conclusion of data collection, whichever occurs later.

Sample Size

The primary unit of analysis for this study is the individual participant. The sample size is planned to be equal across both the intervention and control conditions, utilizing a 1:1 allocation ratio.

Sample size estimation was conducted using G*Power (Version 3.1.9.6). Due to a lack of existing literature on desistance-based interventions to inform precise effect size expectations in this specific context, a moderate effect size of Cohen's *d*= 0.5 was assumed for the primary outcome measure (frequency of self-reported re-offending, operationalized as agreement with the statement, 'I have committed fewer crimes than before'). Setting the significance level at $\alpha = 0.05$, power at 0.85, and a group allocation ratio of 1:1, the initial estimated sample size for a two-tailed test was determined to be 73 participants per group.

To account for anticipated attrition over the 13-month tracking period, a dropout rate of 30%, an average attrition rate in the population based on a meta-analysis by Olver et al. (2011) and a drop-in rate of 0% were factored into the final calculation. A 0% drop-in rate was established because crossover from the control group to the intervention group is operationally impossible within the correctional setting. Following the recommendations of Wittes (2002), the initial sample size was multiplied by an inflation factor of 2.04 to maintain sufficient statistical power under these attrition assumptions. This resulted in an adjusted estimate of 148.92 participants per group.

Finally, to align with the specific operational targets required by the funding body, the Hong Kong Jockey Club Charities Trust, this estimate was rounded up. The final planned sample size is 150 participants per group, yielding a total target sample size of 300 participants across the two conditions.

Starting And Stopping Rules

Two feasibility pilot groups were conducted to examine the feasibility of conducting the pre-release workshop. Since the pilot groups are not randomised, any data collected will not be used in the final analysis.

Participant recruitment and subsequent data collection will commence on a rolling basis whenever the Correctional Services Department (CSD) identifies a cohort of at least 10 eligible Persons in Custody (PICs). This starting threshold is established to ensure that, upon batch randomization, the cohort can be reasonably divided into the two study arms, thereby guaranteeing that the Stage 1 in-prison intervention workshop meets its minimum operational requirement of five participants per group.

The recruitment phase will formally terminate as soon as the target sample size of 150 participants per group (300 participants in total) is successfully enrolled. Data collection will conclude once this final enrolled cohort completes their 13-month post-release tracking period (T4) and the final T4 qualitative interview has been conducted.

Manipulated Variables

The sole manipulated variable in this study is the treatment condition. Participants are allocated to one of the two following treatment arms via simple randomization prior to providing informed consent (utilizing a Zelen design).

Measured Variables

Act Desistance Variables

Self-Reported Re-offending

To capture the two-dimensional nature of act desistance—specifically the frequency and severity of reoffending (Rocque, 2021), this construct is measured using two self-constructed items: "I have committed fewer crimes than before" and "The crimes I commit now are less serious, so if I get caught, the punishment should be lighter." Both items are rated on a 6-point scale ranging from 0 (*Not committing any crime*) to 5 (*Committing more/more serious crimes than before*). Higher scores indicate worse reoffending outcomes.

Post-Release Living Inventory for Ex-Prisoners (PROLI-ex)

The PROLI-ex measures post-release daily routines and behaviors linked to health and desistance outcomes, which predict self-reported reoffending (Liu et al., 2023). Upon request, the original authors provided an unpublished, localized short Chinese version of the scale. This 17-item scale comprises four subscales: institutional routine, active living, online leisure, and support seeking ($\alpha = 0.71, 0.69, 0.81, 0.69$). Participants indicate how regularly they performed specific routines over the past two weeks on an 11-point Likert scale ranging from 0 (*Not regular at all*) to 10 (*Very regular*). Scores are calculated by averaging the items within each subscale, as well as averaging all items for a total score.

Continuance Intention

To measure engagement with the ReBond project, participants will complete a self-constructed 4-item measure of continuance intention. Items are rated on a 7-point Likert scale ranging from 1 (*Strongly disagree*) to 7 (*Strongly agree*). Higher scores indicate a stronger intention to continue. The internal consistency of this measure will be calculated and reported in the final analysis.

Identity Desistance Variables

Identification with Desistance

Pro-social identity, conceptualized as identity desistance (e.g. Giordano, 2016; Giordano et al., 2002),, is measured using the 5-item Identification with Desistance scale, which assesses an individual's subjective law-abiding identity (Cheung et al., 2018). Participants rate their responses on a 5-point Likert scale ranging from 1 (*Rarely*) to 5 (*Always*). The final score is calculated by summing the items, with higher scores indicating a stronger pro-social identity. The reported internal consistency for this scale is $\alpha = 0.62$.

Relational Desistance Variables

Reintegration Needs

Relational desistance is operationalized as the level of concern regarding various reentry barriers across several domains: basic needs, work and career, health and well-being, digital literacy, and interpersonal relationships. Adapted from the Barriers to Reentry Success Inventory (Liptak, n.d.) and integrated with clinical insights, this scale asks participants to rate their concerns on a 4-point Likert scale ranging from 1 (*No Concern*) to 4 (*Great Concern*), with an additional "Not Applicable" (N/A) option. Scores are calculated by summing the items for each subscale and for the total score, with higher scores indicating a higher need for reintegration support. Internal consistency will be calculated and reported after data collection.

Stigma Consciousness Questionnaire (SCQ)

Stigma consciousness refers to the anticipated stigma an individual expects to experience (Pinel, 1999). A modified 10-item Stigma Consciousness Questionnaire is used, with the subject adapted to "ex-offenders." Participants rate items on a 7-point Likert scale ranging from 1 (*Strongly disagree*) to 7 (*Strongly agree*). Higher scores indicate higher anticipated stigma. Internal consistency will be calculated and reported after data collection.

Multidimensional Scale of Perceived Social Support (MSPSS)

The MSPSS measures an individual's perception of social support across three sources: significant others, family, and friends (Zimet et al., 1988). This 12-item questionnaire utilizes a 7-point Likert scale ranging from 1 (*Strongly disagree*) to 7 (*Strongly agree*), with higher scores indicating higher perceived social support. Previous research indicates good to excellent reliability for the subscales: significant other ($\alpha = 0.91$), family ($\alpha = 0.87$), and friends ($\alpha = 0.85$).

Social Integration Indicators (Education, Housing, Employment, Health)

To capture objective markers of social integration, the following self-constructed items are utilized:

- **Education:** Participants indicate whether they have received any education or training post-release (Yes/No). If responded "Yes," they specify the type.
- **Housing:** Participants indicate whether they have a stable shelter for the next 12 months (Yes/No), followed by categorical questions regarding ownership and housing type.
- **Employment:** Participants indicate their current employment status (Yes/No), where unpaid labor (e.g., caregiving) is classified as work. Data regarding occupation type and income level are also collected.
- **Health:** Participants indicate whether they have been diagnosed with any new health conditions post-release (Yes/No). Subjective health is assessed using a single item: "On a scale from 0 to 10 (0 = *worst*, 10 = *best*), how would you rate your own health over the past month?"

Theory of Planned Behaviour Variables

Agency for Desistance (ADQ)

The ADQ assesses offenders' intentions to change and their perceived ability to stay crime-free (Lloyd & Serin, 2012). The original 10-item scale has acceptable internal consistency ($\alpha = 0.77$). Following communication with the original authors, 6 additional items were added to more accurately measure the construct. The internal consistency of the final 16-item scale will be calculated and reported in the final analysis.

Factors of Motivation for Desistance (FoM-D)

The FoM-D assesses motivational factors (attitude, perceived social norm, self-efficacy, and positive affect) expected to predict the ADQ. The first three constructs are measured using a modified scale developed by Cheung et al. (2018). Participants rate their responses on a 5-point Likert scale ranging from 1 (*Rarely*) to 5 (*Always*), some items with an added "Not Applicable" option. Scores are summed, with higher scores indicating stronger motivation. Reported internal consistencies for these subscales are $\alpha = 0.62$, $\alpha = 0.65$, and $\alpha = 0.61$. An option 'Not Applicable' is added so some questions where it asks the frequency of an experience. Since an option that is close to 'never' is not provided in the original scale. A 'Not Applicable' is added to those options with instructions to allow respondents to answer that the particular question does not apply to them.

Positive Affect

Measured using the Positive Feelings subscale of the Comprehensive Inventory of Thriving (CIT) (Su et al., 2014). This is a 3-item subscale rated on a 5-point Likert scale from 1 (*Strongly disagree*) to 5 (*Strongly agree*). Scores are summed. While the full CIT has shown strong reliability ($\alpha = 0.77$ to 0.96), internal consistency for this specific subscale alone is not previously available and will be calculated.

Workshop Outcomes Variables

Profile of Emotional Competence (PEC) for Art Workshop

The PEC measures individual differences in the identification, understanding, expression, regulation, and use of emotions (Brasseur et al., 2013). To align with workshop objectives, only three subscales are used: 'Identification of own emotions,' 'Understanding of own emotions,' and 'Expression of own emotions.' Items are rated on a 5-point Likert scale ranging from 1 (*Does not describe me at all*) to 5 (*Describes me very well*). The full 50-item scale has excellent internal consistency ($\alpha = 0.93$); the reliability of the specific subscales used will be calculated.

Brief Resilience Scale (BRS) for Sports Workshop

The BRS measures the ability to bounce back or recover from stress (Fung, 2020). This 6-item scale utilizes a 5-point Likert scale ranging from 1 (*Strongly disagree*) to 5 (*Strongly agree*). Previous research demonstrates good to excellent reliability across samples ($\alpha = 0.80$ to 0.91).

A.I. Literacy (AIL) for Tech Workshop

The AIL is a combined 12-item measure of subscales from ChatGPT literacy and AI self-efficacy scale. It sources 8 items from the intrinsic motivation and behavioral commitment subscale of the AILQ (Ng et al., 2024, a = 0.88) and 4 items from the creative application subscale of the ChatGPT literacy scale (Lee & Park, 2024 ; a = 0.79). Both scales use a 5-point Likert format ranging from 1 (*Strongly disagree*) to 5 (*Strongly agree*).

Problem Solving Inventory (PSI) for Tech Workshop

The PSI measures problem-solving confidence, approach-avoidance style, and personal control (Heppner & Petersen, 1982). To align with workshop objectives, only the problem-solving confidence subscale is used. Items are rated on a 6-point Likert scale ranging from 1 (*Strongly disagree*) to 6 (*Strongly agree*). The full inventory has excellent reliability ($\alpha = 0.90$), and the selected subscale is also highly reliable ($\alpha = 0.85$).

Exploratory Variables

Well-Being

General well-being is assessed using a 6-item scale recommended by VanderWeele et al. (2020) as an optimal short measure. Items are rated on a 10-point Likert scale ranging from 1 (*Not at all*) to 10 (*Completely*). Internal consistency will be calculated and reported in the final analysis.

Comprehensive Inventory of Thriving (CIT)

The CIT measures a broad range of psychological well-being constructs, representing a holistic view of positive functioning (Su et al., 2014). This 54-item scale covers 18

domains, including support, learning, mastery experience, and autonomy. Participants rate items on a 5-point Likert scale ranging from 1 (*Strongly disagree*) to 5 (*Strongly agree*). Across five distinct samples in previous research, the CIT demonstrated acceptable to excellent internal consistency ($\alpha = 0.77$ - 0.96).

Covariates and Demographic Variables

To ensure group equivalence and control for potential confounding factors, the following variables will be collected:

- **Demographics:** Gender, age/date of birth, educational level, marital status, number of children, length of residence in Hong Kong, preferred language, and contact information.
- **Criminal History & Incarceration:** Last offense, length of sentence, remand period, discharge date, and previous convictions.
- **Socioeconomic Status:** Last occupation, previous occupations, and district of last residence (including housing type and ownership status).
- **Health & Risk Factors:** Drug addiction history, Triad association (gang affiliation), and reported disabilities or chronic illnesses.
- **Other Services Engagement:** Social welfare/services received pre- and post-release.
- **Inventory of Offenders' Risk, Needs and Strengths (IORNS):** A 130-item scale adopted as an intake assessment to measure static/dynamic needs and protective strengths (Miller, 2018). Subscales demonstrate strong reliability (Overall Risk Index: $\alpha = 0.88$; Dynamic Risks Index: $\alpha = 0.90$; Protective Strength Index: $\alpha = 0.85$).
- **Exit Interview:** A brief interview designed to capture reasons for withdrawing from the service or research, accounting for the Risk-Need-Responsivity (RNR) principle where low-need individuals may drop out after successfully desisting.
- **Recruitment and Screening Log:** Completed by CSD staff during recruitment cycles to record eligible participants, refusals, recruitment methods, and final randomized numbers.
- **Post-Release Criminal Behaviour Checklist:** Completed by a caseworker to record whether a participant has been arrested, convicted, or incarcerated post-release.

Data Collection Timeline

The timing of data collection is shown in the table below.

Data Collection Time points				
Before randomisation	T0 Intake Assessment	T0 Workshop Pre-Test	T1 Workshop Pre-Test	T2, 3, 4 Follow-up (~1, 6, 13 month post release)
1. Recruitment and Screening Log	1. Intake Interview • Demographics • Criminal History & Incarceration • Socioeconomic Status • Health & Risk Factors 2. Inventory of Offenders' Risk, Needs and Strengths 3. Identification with Desistance 4. Reintegration Needs 5. Agency for Desistance 6. Factors of Motivation for Desistance 7. Well-Being	1. Art workshop • Profile of Emotional Competence 2. Sports workshop • Brief Resilience Scale 3. Tech workshop • A.I. Literacy • Problem Solving Inventory	1. Art workshop • Profile of Emotional Competence 2. Sports workshop • Brief Resilience Scale 3. Tech workshop • A.I. Literacy • Problem Solving Inventory 4. Continuance Intention	1. Self-Reported Re-offending 2. Post-Release Living Inventory for Ex-Prisoners 3. Identification with Desistance 4. Reintegration Needs 5. Stigma Consciousness Questionnaire 6. Multidimensional Scale of Perceived Social Support 7. Social Integration Indicators 8. Agency for Desistance 9. Factors of Motivation for Desistance 10. Continuance Intention 11. Post-Release Criminal Behaviour Checklist 12. Other Services Engagement 13. Well-Being 14. Comprehensive Inventory of Thriving 15. Exit Interview (if applicable

Indices

Act Desistance (Composite Score)

The scores from the two items measuring self-reported re-offending will be summed and averaged to create a single composite score indicating overall act desistance.

Reintegration Needs

For items where participants select the "Not Applicable" (N/A) option, the response will be recoded to a value of 1 (*No Concern*). This transformation is utilized because if a specific reentry barrier or domain does not apply to an individual, it inherently causes them no concern.

Factors of Motivation for Desistance (FoM-D)

For items where participants select the "Not Applicable" (N/A) option, the response will be recoded to the highest motivational score (i.e., a score of 4 for standard items, or a score of 1 if the item is reverse-scored).

Inventory of Offenders' Risk, Needs and Strengths (IORNS) - Overall Risk Index (ORI)

The total score of the IORNS will be calculated and referenced against the standardized norm table (stratified by age and sex) to derive the Overall Risk Index (ORI). The continuous ORI will then be transformed into a 4-level categorical variable based on the following percentile rankings:

- **Low:** ≤ 33rd percentile
- **Average:** 34th to 74th percentile
- **High:** 75th to 89th percentile
- **Very High:** ≥ 90th percentile

Analysis Plan

Statistical Models

The goal of the main analysis is to determine whether the intervention group has a more positive outcome compared to the control group. All analyses will be conducted in R (R Core Team, 2025). The outcome variable across all models is the log-transformed self-reported frequency of re-offending at follow-up timepoints (`logFreqReO_followup`). All models adjust for the log-transformed baseline self-reported re-offending frequency (`logFreqReO_T2`), baseline Overall Risk Index (`ORI_baseline`, categorical), and age group (AgeGroup, categorical). Missing data will be handled using `na.action = "na.exclude"`, retaining participants with partial data. The same tests, whenever available, will be performed on other outcome variables.

1. Primary Analysis

The primary analysis is an evaluable Intention-to-Treat (ITT) analysis including all randomized participants who completed the T2 questionnaire and are thus able to provide baseline data for the primary outcome. The ITT employs a linear mixed-effects model to evaluate whether the treatment effect on re-offending varies across follow-up timepoints, while accounting for individual differences in both baseline levels and trajectories over time. The model will be implemented using the `lmerTest` package (Kuznetsova et al., 2017) with the following specification:

```
lmerTest(logFreqReO_followup ~ logFreqReO_T2 + Arm * as.factor(Time) +
as.factor(ORI_baseline) + as.factor(AgeGroup) + (1 + Time |
Participant.id), data = analysisdataset, na.action = "na.exclude")
```

- **Dependent Variable:**
  - `logFreqReO_followup`: Log-transformed frequency of re-offending at each follow-up timepoint.
- **Independent Variables:**
  - *Baseline Measure:* `logFreqReO_T2` (Log-transformed re-offending frequency at T2), included as a covariate to adjust for pre-existing differences in re-offending between participants at early post-release.
  - *Treatment and Time Effects:* `Arm * as.factor(Time)` (An interaction term between treatment arm allocation and the categorical time variable). This expands into (a) the main effect of treatment arm, (b) the main effect of time, and (c) arm-by-time interaction terms for each follow-up time point. This allows the model to estimate whether the treatment effect differs across time points rather than assuming it is constant over the course of the follow-up.
  - *Baseline Covariates:* `as.factor(ORI_baseline)` (Categorical variable capturing the Overall Risk Index at baseline) and `as.factor(AgeGroup)` (Categorical variable indicating the participant's age group).
- **Random Effects:**
  - `(1 + Time | Participant.id)`: A random intercept and a random slope for time, nested within participants. This accounts for individual-level variability in both baseline re-offending levels and the rate of change in re-offending over time, which is appropriate given the expectation of heterogeneous individual treatment responses.

Model Interpretation: The inclusion of `Arm * as.factor(Time)` allows the model to test whether the treatment effect emerges, grows, or diminishes across the course of the study. The main effect of Arm captures the average difference between arms pooled across timepoints, while the arm-by-time interaction terms identify specific timepoints at which the treatment and control arms meaningfully diverge. Baseline re-offending is treated solely as an adjustment covariate in this model, without any assumed differential relationship across arms.

2. Sensitivity Analysis

The sensitivity analysis extends the primary model by introducing an interaction between baseline re-offending frequency and treatment arm. This tests whether participants' pre-treatment re-offending level acts as a moderator of the treatment trajectory—that is, whether the pattern of treatment effects over time differs systematically depending on how frequently participants were re-offending at baseline. The model will be implemented as follows:

```
lmerTest(logFreqReO_followup ~ logFreqReO_T2 * Arm + Arm
*as.factor(Time) + as.factor(ORI_baseline) + as.factor(AgeGroup) + (1 +
Time | Participant.id), data = analysisdataset, na.action =
"na.exclude")
```

- **Dependent Variable:** `logFreqReO_followup`
- **Independent Variables:**
  - *Interaction and Component Terms:* `logFreqReO_T2 * Arm` expands into (a) the main effect of baseline re-offending frequency, which adjusts for pre-existing differences between participants, and (b) a baseline-by-arm

interaction term. The interaction tests whether participants' pre-treatment re-offending level moderates the treatment effect—that is, whether the treatment is more or less effective for participants who, in early post-release, have higher or lower levels of re-offending.
    - *Baseline Covariates:* `as.factor(ORI_baseline)` and `as.factor(AgeGroup).`
- **Random Effects:** `(1 + Time | Participant.id)`

Model Interpretation: This model serves as a sensitivity check on the assumption, implicit in the primary analysis, that baseline re-offending severity does not differentially shape treatment trajectories across arms.

3. Local Average Treatment Effect (LATE) Analysis

The local average treatment effect analysis estimates the treatment effect without consideration of time. This analysis addresses the heterogeneity of the nature of intervention provided at each service stage. Given that the target of inference is an overall average treatment effect rather than a time-varying one, a simplified model structure will be used:

```
lmerTest(logFreqReO_followup ~ logFreqReO_T2 + Arm +
as.factor(ORI_baseline) + as.factor(AgeGroup) + (1 | Participant.id),
data = analysisdataset, na.action = "na.exclude")
```

- **Dependent Variable:** `logFreqReO_followup`
- **Independent Variables:**
    - *Baseline Measure:* `logFreqReO_T2`
    - *Treatment Effect:* `Arm` (A single indicator of treatment arm allocation: 1 = intervention, 0 = control), estimating the average treatment effect pooled across all follow-up timepoints.
    - *Baseline Covariates:* `as.factor(ORI_baseline)` and `as.factor(AgeGroup).`
- **Random Effects:**
    - `(1 | Participant.id)`: A random intercept only, accounting for individual-level baseline differences without estimating participant-specific trajectories.

Model Interpretation: The LATE estimate is expected to be larger in magnitude than the intent-to-treat estimate from the primary analysis. A substantially larger LATE would suggest that the primary analysis provides a conservative estimate of the benefit of the intervention, which was diluted by the effects of time.

4. Joint Model Analysis (Informative Dropout Sensitivity Analysis)

To assess whether the primary analysis results are biased by informative dropout—that is, whether the reasons participants withdraw from the study are related to their re-offending trajectories—a joint model will be fitted using the `JMbayes2` package (Rizopoulos et al., 2026). The joint model simultaneously estimates a longitudinal submodel for re-offending and a survival submodel for time to dropout, linking them through an association parameter (α) that quantifies the degree to which the longitudinal outcome process predicts the hazard of dropout.

```
# Longitudinal Submodel
```

```
lmeFit <- lme(logFreqReO_followup ~ Time * Arm + logFreqReO_T2 +
as.factor(ORI_baseline) + as.factor(AgeGroup),random = ~ Time |
Participant.id, data = analysisdataset)

#Dropout Submodel
coxFit <- coxph(Surv(Time, dropout) ~ Arm + as.factor(ORI_baseline) +
logFreqReO_T2, data = wideanalysisdataset, x = TRUE)

#Joint Model
joinFit <- jm(lmeFit, coxFit, time_var = "Time", functional_forms = ~
slope(logFreqReO_followup))

summary(joinFit)
```

- **Longitudinal Submodel:** Estimates the trajectory of log-transformed re-offending as a function of time, treatment arm, their interaction, and baseline covariates, with a random intercept and slope for each participant. This mirrors the structure of the primary analysis.
- **Survival Submodel:** A Cox proportional hazards model estimating the risk of dropout as a function of treatment arm, baseline Overall Risk Index, and baseline re-offending frequency.
- **Association Structure:** The `slope()` functional form instructs the model to link the rate of change in re-offending at any given moment to the instantaneous hazard of dropout. This is preferable to linking dropout to the current value alone, as it captures whether the direction and pace of a participant's trajectory—rather than simply their current level—is predictive of withdrawal.

Model Interpretation: The key output from `summary(joinFit)` is the posterior estimate for the association parameter α. If α is close to zero with a credible interval spanning zero, this indicates that dropout is non-informative and that the primary analysis results are unlikely to be biased by differential attrition. A significant negative α would suggest that participants who were improving (showing a declining re-offending trajectory) were more likely to drop out, which may suggest that early desisters require fewer services due to their low needs and implies that the primary analysis underestimates the true treatment benefit. A significant positive α would indicate the opposite, with poor responders disproportionately withdrawing and causing the primary analysis to overestimate the treatment effect.

Transformations

Primary Outcome Transformation (Logarithmic Transformation)

Assuming a right-skewed distribution for the primary outcome data, that most participants are expected to report zero or few instances of re-offending as a natural process of desistance, any self-reported frequency of re-offending data will undergo a logarithmic transformation. This log transformation will be applied to linearize the variable's relationship with other predictors in the statistical models and avoid issues related to skewed distributions.

Coding Schemes and Recoding

1. **Arm:** Coded as 0 (Control Group) and 1 (Intervention Group).
2. **Time:** Coded as 0 to 5 (representing baseline through T4 follow-up).

3. **Overall Risk Index (ORI):** The IORNS raw score will first be converted to a norm percentile and then categorized into one of four levels:
    - Low ($\leq$ 33rd percentile)
    - Average (34th–74th percentile)
    - High (75th–89th percentile)
    - Very High ($\geq$ 90th percentile)
4. **Age Group:** Age will be classified into 7 ordinal groups (1 to 7):
    - 1: 18–30
    - 2: 31–40
    - 3: 41–50
    - 4: 51–60
    - 5: 61–70
    - 6: 71–80
    - 7: 81–90
5. **Dropout:** Coded as 0 (Comply/Retained) and 1 (Dropout).

Inference Criteria

Primary, Sensitivity, and LATE Models

For these analyses, statistical inference will be based on *p*-values derived from the `lmerTest` package. The threshold for statistical significance will be set at $\alpha = 0.05$. All tests will be two-tailed.

Bayesian Joint Model

The criterion for evidence of informative dropout will be a 95% credible interval excluding zero and a posterior probability $P < 0.05$. Convergence of the MCMC sampler will be assessed using the Gelman-Rubin statistic ($\hat{R} < 1.1$) prior to interpreting the results.

Data Inclusion And Exclusion

If a participant is found to be violating the eligibility criteria after randomisation, their data will be excluded from the analysis; however, they will still be given the choice to accept the assigned services provided by their respective arm.

In all analyses, cases will be excluded based solely on the eligibility criteria mentioned above. Outliers will not be removed and will be retained in the dataset.

Missing Data

The linear mixed-effects models and Bayesian joint models will use all available data. Missing data will be handled via maximum likelihood estimation (or Bayesian equivalent) inherent to these models, effectively retaining participants with partial data across the timepoints without requiring explicit imputation.

Other Planned Analysis

Since some secondary outcomes are binary (i.e., yes or no), for which the `lmerTest` package is not appropriate, the `lme4` package (Bates et al., 2015) will be used instead. For example, one of the secondary outcomes is employment, a binary outcome indicating whether the participant is currently employed (including unpaid work) or not. To

test whether the intervention group showed higher rates of employment across follow-up timepoints, `glmer()` is used with the following specification:

```
#The binary logit model
glmerFit <- glmer(Employment_followup ~ Arm * as.factor(Time) +
as.factor(ORI_baseline) + as.factor(AgeGroup) + (1 |
Participant.id), data = analysisdataset, family = binomial(link =
"logit"), na.action = na.exclude)

summary(glmerFit)
```

- **Dependent Variable:**
  - `Employment_followup`: A binary outcome indicating employment status at each follow-up timepoint (e.g., 1 = employed, 0 = not employed).
- **Independent Variables:**
  - *Treatment and Time Effects:* `Arm * as.factor(Time)`
  - *Baseline Covariates:* `as.factor(ORI_baseline)` and `as.factor(AgeGroup).`
- **Random Effects:**
  - `(1 | Participant.id)`

Model interpretation: An odds ratio greater than 1 indicates higher odds of the outcome occurring in the intervention arm relative to the control arm, and an odds ratio less than 1 indicates lower odds.

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