

The Reciprocal Relationship Between Identity Diffusion and Adolescent Self-Injury: The Longitudinal Mediating Effect of Alienation

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Abstract

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Full Text

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Abstract

Adolescence represents a critical period for identity development, which is simultaneously accompanied by psychosocial developmental maladjustment issues (e.g., self-injury). This study employed the Random Intercept Cross-Lagged Panel Model (RI-CLPM) to examine the dynamic bidirectional relationship between adolescent identity confusion and nonsuicidal self-injury (NSSI), and to test the mediating role of alienation between them. Using the Identity Confusion Scale, Alienation Scale, and NSSI Behavior Scale, 1,258 middle school students were surveyed across three waves over a one-year period (designated as T1, T2, and T3). RI-CLPM results revealed that: (1) After separating between-person effects, at the within-person level, T1 NSSI significantly and positively predicted T2 identity confusion, while T2 identity confusion significantly and positively predicted T3 NSSI, and T2 NSSI also significantly and positively predicted T3 identity confusion, indicating a bidirectional relationship between adolescent identity confusion and NSSI; (2) At the within-person level, T2 alienation served as a longitudinal mediator in the relationship between T1 NSSI and T3 identity confusion. Grounded in Erikson's psychosocial development theory, this study connects identity—a key developmental task for adolescents—with NSSI on a temporal scale, offering important implications for the prevention and intervention of adolescent NSSI.

Keywords: identity confusion, nonsuicidal self-injury, alienation, random intercept cross-lagged panel model, adolescence

Classification Number: B844

1 Introduction

Nonsuicidal self-injury (NSSI), commonly referred to as “self-injury,” refers to the deliberate, direct, and socially unacceptable destruction of one's own body tissue without suicidal intent, including behaviors such as cutting, stabbing, biting, and burning (Nock, 2009). In the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5), NSSI is no longer classified as a symptom of borderline personality disorder but is instead listed as a distinct psychiatric condition (American Psychiatric Association, 2013). Meta-analytic studies conducted in Western countries indicate that 16.9% of adolescents have engaged in NSSI at least once in their lifetime (Gillies et al., 2018). A recent systematic review of NSSI in Chinese populations found that the lifetime prevalence of NSSI among Chinese middle school students was 25.3% for junior high and 32.8% for senior high students, which is higher than the 21.2% reported among university students (Qu et al., 2023). Globally, the incidence of NSSI among adolescents continues to show an upward trend (Zetterqvist et al., 2021). NSSI is not only associated with psychosocial dysfunction and psy-

chological symptoms in adolescents (Garisch & Wilson, 2015) but also serves as a stable predictor of future suicide risk (Ribeiro et al., 2016). Furthermore, adolescents who engage in NSSI to relieve stress may continue to experience negative consequences from these behaviors in adulthood (Daukantaitė et al., 2021). Therefore, adolescent NSSI warrants urgent attention from clinical and psychological practitioners.

1.1 The Relationship Between Identity Confusion and NSSI

Identity formation represents a key developmental task during adolescence (Erikson, 1968). Identity refers to an individual's stable and continuous awareness of various aspects of the self over time and across contexts, encompassing questions such as "Who am I?", "Who do I want to become in the future?", and "How do I fit into society?" (Schwartz et al., 2009). When individuals can integrate various aspects of their identity and form stable commitments through active exploration, identity achieves integration (Marcia, 2002). However, when individuals experience a dissociated state of self-awareness and are unable to autonomously determine their life direction and goals, they fall into identity confusion (Luyckx et al., 2013).

The initial onset and subsequent peak periods of NSSI coincide with the identity crisis stage of adolescence (Gandhi et al., 2017). From a developmental psychopathology perspective, Verschuere et al. (2020) proposed a cyclical model of identity and NSSI. This model suggests that perception of body image constitutes an important component of self-awareness, and identity confusion brings about diffuse feelings of emptiness and self-doubt (Gandhi et al., 2017). As a behavior directed toward the body, NSSI makes the "bodily self" central to adolescents' self-awareness, and physical alterations (i.e., NSSI) consequently lead to changes in identity (Verschuere et al., 2020). According to the boundaries model, NSSI can establish interpersonal boundaries between the self and others (Klonsky, 2007). Identity confusion leaves adolescents feeling lost, with blurred boundaries between self and others, making it difficult to confirm clear distinctions between themselves and others. NSSI can help adolescents establish a false sense of identity by defining the self (i.e., "I am a self-injurer") (Breen et al., 2013). Compared to their peers, adolescents with identity confusion are typically more vulnerable to NSSI risk. Numerous empirical studies in both clinical and community settings have found significant positive correlations between adolescent identity confusion and NSSI (e.g., Claes et al., 2014; Gandhi et al., 2016; Luyckx et al., 2015b). For instance, in a study of 532 Belgian high school students, Claes et al. (2014) found that identity confusion significantly and positively predicted NSSI even after controlling for age, gender, and depressive symptoms. In summary, adolescent identity confusion may be a potential risk factor for NSSI.

Not only does identity confusion increase the risk of NSSI, but over time, NSSI may also lead to greater identity confusion (Claes et al., 2014). According to the identity-NSSI cyclical model, NSSI can provide adolescents with a sense of

self-awareness, but this self-awareness is partial, negative, and unstable, leading individuals to re-experience identity confusion (Verschuere et al., 2020). Moreover, compared to adolescents without a history of NSSI, those who have engaged in NSSI lack necessary agency and self-direction when facing various personal and environmental problems, becoming lost when exploring life paths and consequently experiencing delayed identity development (Schwartz et al., 2011). Cross-sectional evidence shows that adolescents with past NSSI experience have lower levels of identity integration, while those currently engaging in NSSI are more likely to experience identity confusion (Luyckx et al., 2015a). Only two longitudinal studies have examined the bidirectional link between identity confusion and NSSI: Gandhi et al. (2017) surveyed 380 Belgian high school students and found that baseline identity confusion significantly predicted NSSI one year later, while engaging in NSSI also increased the likelihood of adolescents developing identity confusion. However, Gandhi et al. (2019) showed that NSSI at an earlier time point could significantly and positively predict identity confusion at a later time point, but the reverse was not true.

The inconsistency between these two longitudinal studies and previous cross-sectional findings may be due to the confounding of within-person (contextual components of individual development) and between-person (trait-like components of individuals) effects (Gandhi et al., 2019).

1.2 The Mediating Role of Alienation

Although previous research has explored the relationship between identity confusion and NSSI, evidence regarding the internal mechanisms and processes linking the two remains scarce. Based on existing research, alienation may serve as a potential mediating variable in the dynamic relationship between identity confusion and NSSI, helping us fully understand how these two factors influence each other during adolescents' psychosocial development.

Alienation refers to the negative emotions—such as meaninglessness, feelings of oppression and constraint, self-estrangement, uncontrollability, and social isolation—that individuals experience when their normal relationships with people, society, nature, and themselves become distant or even dominated and controlled (Yang et al., 2002). Adolescence is a high-risk period for alienation, as teenagers' increased focus on their inner selves makes them susceptible to experiencing internal separation and separation between self and others (Calabrese & Poe, 1990). Identity confusion may be a precursor to alienation. Erikson's (1968, p. 167) psychosocial development theory posits that “the individual's contact with real others is a result and reflection of a clear self-definition.” This suggests that as adolescents' identity gradually develops, the quality of their interactions with significant others in their lives improves correspondingly. Individuals with identity confusion lack clear understanding of their roles and goals in interpersonal relationships (Erikson, 1950), cannot distinguish boundaries between self and others, and struggle to form reciprocal, empathetic intimate relationships, consequently experiencing feelings of alienation from their

surroundings and even society at large (Sandhu & Tung, 2004). Moreover, a range of issues associated with adolescent identity confusion (e.g., anxiety, depression, rule-breaking, aggression, emotional instability, and avoidant cognitive strategies) may interfere with interpersonal relationships, making interactions with others more difficult (Crocetti et al., 2013). Previous research has found that identity confusion leads to increased alienation in mother-child or peer relationships (Gandhi et al., 2016). In another study, Sandhu and Tung (2004) confirmed that identity confusion and identity moratorium were significantly positively correlated with adolescent alienation, while identity foreclosure and identity achievement were significantly negatively correlated with adolescent alienation.

The four-function model proposes that NSSI is maintained through four reinforcement processes: intrapersonal negative reinforcement, intrapersonal positive reinforcement, social positive reinforcement, and social negative reinforcement (Nock, 2009). On one hand, when individuals experience alienation and its associated negative emotions, they can escape from these unpleasant emotional experiences through self-injury (intrapersonal negative reinforcement). On the other hand, as individuals become increasingly distant from family or peers, they may use self-injury to gain attention or help from others (social positive reinforcement). According to this model, for adolescents experiencing alienation, NSSI represents a maladaptive coping strategy for regulating negative emotions and interpersonal communication (Gu, Yao et al., 2023). Research shows that interpersonal alienation is an important dimension for predicting NSSI (Bureau et al., 2010). In a longitudinal study of 245 American adolescents, Yates et al. (2008) found that alienation from parents positively predicted the future frequency of adolescent NSSI. In Chinese adolescent samples, alienation from parents or peers has also been found to significantly increase NSSI risk (Gu, Fang, & Yang, 2023; Gu, Yao et al., 2023). Thus, alienation may be a key predictor of NSSI.

The identity-NSSI cyclical model suggests that after engaging in NSSI, individuals obtain a self-injurer identity, but this identity violates universal social values and therefore cannot be recognized in general interpersonal contexts (Erikson, 1968). After experiencing disapproval and distancing from others, individuals develop increased alienation, and the self-injurer identity gradually loses meaning when detached from interpersonal contexts, thereby pushing identity back toward confusion (Verschueren et al., 2020). Therefore, alienation may play an important role in the potential process through which NSSI influences identity confusion. According to interpersonal models of developmental psychopathology, individual development is constrained by both individual characteristics and environmental features, which exist in a dynamic and continuous pattern of mutual exchange (Rudolph et al., 2016). This model assumes that individuals are not passive recipients of experiences but also influence their social environment through specific attitudes and behaviors, which may further increase their interpersonal stress (Hammen, 1991). Consequently, individuals who engage in NSSI face more tense interpersonal environments, from which

alienation emerges. Although NSSI has interpersonal communication functions (social positive reinforcement) in the short term (Nock, 2009), in the long run, NSSI behaviors may elicit negative reactions from others (You et al., 2012). Research indicates that NSSI, as a stigmatized behavior, can adversely affect individuals' interpersonal relationships (Piccirillo et al., 2020). You et al. (2012) also found that NSSI may trigger interpersonal problems, as individuals' NSSI behaviors are not accepted by their surroundings, leading to isolation, avoidance, and rejection from others. Adolescents who engage in NSSI have difficulty with emotional communication with others and show greater emotional reactivity and negative attributions to unpleasant interpersonal interactions (Miller et al., 2018). Therefore, engaging in NSSI may be an antecedent for the emergence and development of alienation. In a 6-year longitudinal study of 866 American 7th and 8th graders, De Luca et al. (2022) used RI-CLPM and found that at the within-person level, adolescent NSSI significantly predicted future increases in loneliness and deterioration in peer relationship quality.

Identity formation is inseparable from social context, as individuals discover themselves and develop their identity through continuous interaction with significant others (Crocetti et al., 2018). According to social learning theory (Bandura & Walters, 1977), bidirectional construction occurs during individuals' interactions with others. Through interactions with peers who share common values and interests, adolescents gain more opportunities for observation and learning, and their identity develops positively (Brody, 1998). When experiencing alienation, adolescents may miss opportunities for meaningful interactions with others, thereby losing the social comparison and support needed for identity development (Crocetti et al., 2018). The lack of exploration and commitment triggered by alienation are key factors in persistent identity confusion. In a 5-year longitudinal survey of 497 Dutch families, Crocetti et al. (2017) found that poor family relationship quality led to adolescent identity confusion. Additionally, empirical research has supported the bidirectional association between adolescent loneliness experiences and identity in educational and interpersonal domains (Kaniūšonytė et al., 2019). Based on the aforementioned theoretical and empirical evidence, the bidirectional link between identity confusion and NSSI may be mediated by alienation. However, few studies have examined this potential mediating role using multi-wave longitudinal data.

Furthermore, the association between identity confusion and NSSI may differ by gender. According to gender role theory, different gender role expectations lead men to typically have stronger emotional regulation efficacy and calmer emotion regulation styles than women (Nolen-Hoeksema, 2012). Sexual selection evolutionary theory posits that adolescent girls are more sensitive to the interpersonal aspects of their social environment than boys, and they are more likely to ruminate on negative experiences (Martel, 2013). Moreover, compared to men, women experience greater impairment from identity distress (Gandhi et al., 2015). This suggests that girls may be more likely than boys to use maladaptive methods such as NSSI to cope with negative emotions and interpersonal alienation triggered by identity confusion (Li et al., 2022; Verschueren

et al., 2020). Therefore, further research is needed to examine gender differences in the mechanisms underlying the relationship between identity confusion and NSSI.

1.3 The Current Study

Both Gandhi et al. (2017) and Gandhi et al. (2019) used traditional Cross-Lagged Panel Models (CLPM) to explore the bidirectional association between identity confusion and NSSI. However, this approach has difficulty distinguishing whether the longitudinal relationship between identity confusion and NSSI stems from true effects between variables or from individual differences between subjects (Gandhi et al., 2019; Verschueren et al., 2020). The Random Intercept Cross-Lagged Panel Model (RI-CLPM) proposed by Hamaker et al. (2015) addresses this limitation of CLPM. RI-CLPM can decompose longitudinal relationships between variables into between-person effects (correlations between stable trait-like components) and within-person effects (relationships between time-varying state components). Between-person effects focus on explaining between-subject differences in outcome variables using between-subject differences in predictor variables, whereas within-person effects focus on explaining within-subject variation in outcome variables using within-subject variation in predictor variables (relative to individual baseline levels) (Yuan et al., 2021). Many researchers argue that RI-CLPM should be prioritized over CLPM when estimating cross-lagged effects, especially when stable trait factors are present (Curran & Hancock, 2021).

Moreover, previous research on the relationship between identity confusion and NSSI has primarily focused on Western countries that emphasize individualism. Individualistic cultures stress personal interests and goals, and adolescents establish identity by exploring their inner authentic needs and seeking their uniqueness (Becker et al., 2012). In contrast, China is a typical collectivist culture where Chinese adolescents achieve identity by adhering to social norms and establishing connections with others. In Chinese culture, which emphasizes interpersonal relationships and interdependence more strongly, the link between lack of self-consistency (identity confusion) and adverse psychological outcomes is weaker (Church et al., 2008).

Therefore, this study used RI-CLPM to deeply examine the dynamic, reciprocal relationship between identity confusion and NSSI among Chinese adolescents at the within-person level by separating out between-person effects, and to investigate the potential mediating role of alienation in their longitudinal association, aiming to obtain more accurate results. Based on the aforementioned theories and literature, this study proposed two hypotheses: (1) At the within-person level, there exists a bidirectional relationship between identity confusion and NSSI; (2) Alienation mediates the dynamic reciprocal association between identity confusion and NSSI. Building on this, this study further employed multi-group comparison methods to test for gender differences in the bidirectional relationships among identity confusion, alienation, and NSSI.

2 Method

2.1 Participants

Using cluster sampling, middle school students from multiple schools in Henan, Hubei, Zhejiang, and Jiangsu provinces were selected as participants and surveyed three times over a one-year period. The first assessment was conducted in October 2021 (T1), with subsequent follow-up assessments every six months (designated as T2 and T3). The first assessment included 1,386 participants. Due to student transfers, absences, and other reasons, 128 participants failed to complete all three assessments, with 50 missing at T2 and 78 missing at T3, resulting in an attrition rate of 9.2%. A total of 1,258 participants were included in the final analysis.

Among all valid participants, 628 were male (49.9%) and 630 were female (50.1%); 990 were from rural areas (78.7%) and 268 were from urban areas (21.3%); 247 were only children (19.6%) and 1,011 were non-only children (80.4%). At the first assessment, participants' ages ranged from 12 to 18 years, with a mean age of 13.81 years ($SD = 1.42$). The sample included 568 first-year middle school students (45.1%), 411 second-year middle school students (32.7%), 39 first-year high school students (3.1%), and 240 second-year high school students (19.1%).

2.2 Measures

2.2.1 NSSI Behavior Scale The NSSI Behavior Scale developed by You et al. (2013) was used, which is suitable for measuring NSSI among Chinese adolescents. The scale includes 7 items assessing adolescents' self-injurious behaviors such as cutting, burning, biting, and punching. Participants were asked to report the frequency of these behaviors in the past six months using a 6-point scale: 1 = 0 times, 2 = 1 time, 3 = 2 times, 4 = 3 times, 5 = 4 times, 6 = 5 times or more. The mean score of the scale was calculated, with higher scores indicating more severe self-injurious behavior. The scale has demonstrated good psychometric properties in previous research (Gu et al., 2022). In this study, Cronbach's α coefficients for the three assessments were 0.82, 0.85, and 0.89, respectively.

2.2.2 Identity Confusion Scale The Erikson Psychosocial Inventory developed by Rosenthal et al. (1981) was used, which includes 6 subscales (identity, trust, autonomy, intimacy, etc.) with a total of 72 items. This study utilized the identity confusion subscale from the identity section, which was translated and revised by Gu et al. (2020). The subscale includes 6 items (e.g., "I often change my view of myself"). A 5-point Likert scale was used, with 1 representing "strongly disagree" and 5 representing "strongly agree." Higher scores indicate higher levels of identity confusion. The scale has shown good reliability and validity in previous studies (Zhong et al., 2024). In this study, Cronbach's α coefficients for the three assessments were 0.71, 0.76, and 0.78, respectively.

2.2.3 Alienation Scale The Adolescent Student Alienation Scale developed by Yang et al. (2002) was used, which includes three subscales: interpersonal, social, and environmental alienation. The interpersonal alienation subscale was selected for this study, comprising 15 items across three dimensions: uncontrollability, loneliness, and alienation from family members. A 7-point Likert scale was used, ranging from 1 “completely uncharacteristic of me” to 7 “completely characteristic of me.” The mean score of the subscale was calculated, with higher scores indicating higher levels of alienation. This questionnaire aligns with the developmental characteristics of Chinese adolescents and has been widely used in domestic and international research (Gu, Yao et al., 2023). In this study, Cronbach’s α coefficients for the three assessments were 0.89, 0.92, and 0.92, respectively.

2.3 Procedure

This study was approved by the Ethics Committee of Hunan Normal University (Approval No.: 2023472). After obtaining informed consent from schools, participants, and their parents, three group assessments were conducted at the class level. Questionnaires were completed during designated self-study periods and collected on-site. The content and procedures were essentially consistent across the three assessments. At least one examiner was present in each class, all of whom were graduate students in psychology who had received standardized training, were familiar with the assessment procedures, and were responsible for reading instructions, explaining the purpose and significance of the assessment, emphasizing confidentiality, the absence of right or wrong answers, and independent completion, as well as addressing questions and monitoring the assessment process. Participants required approximately 10 minutes to complete all questionnaires.

2.4 Data Analysis

First, SPSS 26.0 was used for descriptive statistics and correlation analysis. Kline (2016) suggests that if the absolute value of the skewness coefficient exceeds 3 and the absolute value of the kurtosis coefficient exceeds 10, the variable follows a skewed distribution; otherwise, it follows or approximately follows a normal distribution. In this study, except for NSSI at the three time points (skewness coefficients = 3.16, 4.07, and 4.20; kurtosis coefficients = 11.79, 20.50, and 20.69), all other variables were normally distributed. Therefore, Pearson correlations were used for correlations between identity confusion and alienation across time points, while Spearman rank correlations were used for other variable correlations. Additionally, following previous research practices (Gu, Yao et al., 2023), NSSI behaviors at the three time points were log-transformed before model testing. The transformed NSSI variables (skewness coefficients = 2.02, 2.56, and 2.84; kurtosis coefficients = 3.63, 6.68, and 7.99) approximately followed a normal distribution. To minimize the impact of data distribution on the results, nonparametric percentile bootstrap methods were also used to test

the significance of parameter estimates.

Second, confirmatory factor analysis was used to assess longitudinal measurement invariance of each scale across the three time points. Little's MCAR test showed $\chi^2 = 115.9$, $df = 168$, $p = 0.999$, indicating that missing data in this study were completely random (Little & Rubin, 2014). Mplus's default full information maximum likelihood estimation was used to handle missing data. Then, Mplus 8.3 was used to construct RI-CLPM to deeply examine the interaction patterns between identity confusion and NSSI and the mediating role of alienation in their relationship by separating between-person and within-person effects. RI-CLPM introduces a latent variable for random intercepts in the cross-lagged model, typically fixing the effects of this latent variable on all observed indicators to 1 (Hamaker et al., 2015). The variance of the random intercept factor is estimated to represent stable traits that do not change over time (between-person variation). When using RI-CLPM, researchers typically focus on the reciprocal predictive relationships between two or more variables at the within-person level.

Finally, multi-group structural equation modeling was used to test whether the relationships among identity confusion, alienation, and NSSI differed across genders. Following Mulder and Hamaker's (2021) recommendations, a model with freely estimated path coefficients (M1) and a model with path coefficients constrained to be equal across groups (M2) were constructed. If M1's fit indices were significantly better than M2's, it would indicate that path coefficients could not be constrained to equality across groups, meaning differences existed between groups. Conversely, it would indicate no differences between groups.

2.5 Common Method Bias Test

To reduce common method bias from self-reporting, procedural controls such as including lie detection items and varying instructions were implemented. Additionally, Harman's single-factor test was used for statistical examination. Exploratory factor analysis revealed that five, five, and four factors with eigenvalues greater than 1 were extracted at the three time points, respectively. The first factor explained 8.4%, 9.7%, and 10.0% of the variance, respectively, all below the 40% critical threshold (Zhou & Long, 2004). Therefore, this study did not suffer from serious common method bias.

3 Results

3.1 Descriptive Statistics

Descriptive statistics and correlation matrices for identity confusion, alienation, and NSSI are presented in Table 1. Results showed that identity confusion, alienation, and NSSI were all significantly positively correlated with each other at the three time points (r ranging from 0.14 to 0.68, $p < 0.001$), meeting the prerequisite assumptions for cross-lagged analysis.

3.2 Measurement Invariance Tests

This study tested four models of measurement invariance across time points: configural invariance, weak invariance (equal factor loadings), strong invariance (equal item intercepts), and strict invariance (equal item error variances and covariances). Following Chen's (2007) recommendations, if the difference in fit indices between models is smaller than the specified critical values (change in CFI < 0.01, change in RMSEA < 0.015), the specific invariance test is considered passed. As shown in Table 2, alienation essentially met strict invariance, while identity confusion and NSSI met strong invariance but not strict invariance. Bentler (2006) argued that strict invariance is not a necessary step for measurement invariance, and many researchers have omitted this step in measurement invariance testing (e.g., Shi et al., 2023).

3.3 Bidirectional Relationship Between Identity Confusion and NSSI

Figure 1 [Figure 1: see original paper] presents the RI-CLPM results for identity confusion and NSSI, which showed good fit to the data: $\chi^2 = 7.15$, $df = 1$, CFI = 0.998, TLI = 0.965, RMSEA = 0.070. At the between-person level, identity confusion and NSSI showed a significant positive correlation ($r = 0.36$, $p < 0.001$). At the within-person level, all autoregressive path coefficients were significant except for T1 identity confusion predicting T2 identity confusion. For cross-lagged effects, T1 NSSI positively predicted T2 identity confusion ($\beta = 0.16$, $p = 0.010$), T2 identity confusion positively predicted T3 NSSI ($\beta = 0.11$, $p = 0.027$), and T2 NSSI positively predicted T3 identity confusion ($\beta = 0.18$, $p = 0.005$), indicating reciprocal predictive relationships between identity confusion and NSSI at the within-person level.

3.4 Mediating Effect of Alienation

Figure 2 [Figure 2: see original paper] presents the RI-CLPM results for identity confusion, alienation, and NSSI, which showed good model fit: $\chi^2 = 12.07$, $df = 3$, CFI = 0.998, TLI = 0.982, RMSEA = 0.049. At the between-person level, identity confusion, alienation, and NSSI were all significantly positively correlated with each other. At the within-person level, after separating random intercepts to control for between-subject stability, prior alienation (T_n) significantly predicted subsequent alienation (T_{n+1}), and prior NSSI significantly predicted subsequent NSSI, but prior identity confusion did not significantly predict subsequent identity confusion. T1 alienation positively predicted T2 identity confusion ($\beta = 0.20$, $p = 0.001$), T1 NSSI positively predicted T2 alienation ($\beta = 0.13$, $p = 0.042$), T2 alienation further positively predicted T3 identity confusion ($\beta = 0.21$, $p = 0.001$), and T2 NSSI significantly predicted T3 identity confusion ($\beta = 0.14$, $p = 0.021$) and T3 alienation ($\beta = 0.13$, $p = 0.039$). Nonparametric percentile bootstrap results (5,000 resamples) showed that the indirect effect of T2 alienation between T1 NSSI and T3 identity confusion was significant (indirect effect = 0.027, 95% CI = 0.001–0.065), indicating

that alienation served as a longitudinal mediator in the effect of NSSI on identity confusion.

3.5 Gender Differences in the Relationships Among Identity Confusion, Alienation, and NSSI

Multi-group structural equation modeling was used to test whether the relationships among identity confusion, alienation, and NSSI differed between male and female adolescents. Results showed that the model with constrained path coefficients ($M2: \chi^2 = 57.57, df = 24, CFI = 0.994, TLI = 0.983, RMSEA = 0.047$) had better fit indices than the model with freely estimated path coefficients ($M1: \chi^2 = 26.72, df = 6, CFI = 0.996, TLI = 0.958, RMSEA = 0.074$). Thus, the relationships among identity confusion, alienation, and NSSI did not differ significantly between genders.

4 Discussion

Based on three-wave longitudinal survey data and RI-CLPM analysis, this study examined the direct and indirect reciprocal relationships between identity confusion and NSSI in Chinese adolescents. By exploring the mechanisms linking identity confusion and NSSI, this study also extended previous Western research and provided methodological innovations. Results indicated that at the within-person level, adolescent identity confusion and NSSI were reciprocally associated, and alienation mediated the relationship between NSSI and identity confusion.

4.1 The Relationship Between Identity Confusion and NSSI

RI-CLPM results showed that at the between-person level, the random intercepts of identity confusion and NSSI were significantly positively correlated, indicating a significant between-subject relationship between the “traits” of the two constructs. Adolescents with higher levels of identity confusion reported higher NSSI, and adolescents with more severe NSSI also exhibited higher identity confusion. After separating out stable components that do not change over time, identity confusion and NSSI still influenced each other at the within-person level: T1 NSSI significantly and positively predicted T2 identity confusion, which in turn significantly and positively predicted T3 NSSI, and T2 NSSI also significantly and positively predicted T3 identity confusion. First, adolescent identity confusion is a risk factor for NSSI. From the perspective of the boundaries model, adolescents with identity confusion have no clear boundaries between self and others, and their different identities in daily social life often conflict with each other (Boccagno & Hooley, 2020). Therefore, engaging in NSSI can help such adolescents counteract self-loss and reduce confusion arising from identity ambiguity (Breen et al., 2013).

Identity can also serve as an outcome of NSSI, consistent with findings from studies conducted with Belgian adolescents that increased NSSI risk leads to

deepened identity confusion (Gandhi et al., 2017). The Chinese Confucian principle states that “the body, hair, and skin are received from one’s parents,” representing the most fundamental form of filial piety that emphasizes cherishing bodily integrity and respecting one’s life rather than engaging in meaningless mutilation and worthless sacrifice (Hwang, 1999). The process of engaging in NSSI may represent a failure to fulfill the role of “child” in the family, and this influence may extend from the family to broader national and social domains. NSSI can, to some extent, affect the normal development of individuals’ socialization, leading to confusion in adolescents’ social roles. Adolescence is crucial for self-awareness development, as individuals during this period excessively focus on peer evaluations (Zhou et al., 2020). As a behavior not accepted by the social environment, NSSI can also cause shame, leading adolescents to conform to others’ viewpoints and opinions in social situations and refrain from expressing their own thoughts or ideas, gradually losing their sense of independence (Brown et al., 2009).

Additionally, the results showed that T1 identity confusion could not predict T2 NSSI. This finding suggests that from early to middle adolescence, the risk of identity confusion intensifying after engaging in NSSI is greater than the risk of NSSI behavior emerging after identity confusion increases. When identity confusion arises, adolescents may adopt other maladaptive problem behaviors (e.g., eating disorders, aggressive behavior, compulsive buying) to cope with inner emptiness (Morsünbül, 2015; Reeves et al., 2012; Verschueren et al., 2020).

4.2 The Mediating Role of Alienation

This study found that at the within-person level, adolescent alienation and NSSI maintained some stability across the three time points, but identity confusion did not. This means that for a given adolescent, current changes in identity confusion cannot predict future changes in identity confusion. This result confirms Becht et al.’s (2016) view that identity confusion is volatile and uncertain during adolescence.

Furthermore, at the within-person level, T2 alienation mediated the relationship between T1 NSSI and T3 identity confusion; that is, NSSI indirectly increased adolescent identity confusion by elevating alienation. This finding is consistent with previous research showing that over time, NSSI leads to increased interpersonal stress among adolescents, which in turn triggers alienation from their surroundings, society, and nature (Burke et al., 2015; Ewing et al., 2019). This result supports the interpersonal model of developmental psychopathology (Rudolph et al., 2016). While adolescents’ living environments constrain their social development, their own behaviors and characteristics also shape their unique living conditions. Adolescents who engage in NSSI are often viewed as “different”—seen as vulnerable and strange by their peers and subjected to more discrimination or prejudice (De Luca et al., 2022). A recent review found that NSSI exposure is typically associated with peer loss, and due to lack of understanding and social support, the risk of engaging in NSSI further increases

(Simone & Hamza, 2020). Even when NSSI is not disclosed, adolescents may experience loneliness because they cannot share their experiences with others (Gandhi et al., 2018).

Increased alienation exacerbates the severity of identity confusion, a finding that supports social learning theory (Bandura & Walters, 1977). Identity development is both a dynamic exchange process between person and environment and a sociopsychological structure that creates what is important to self and others and reflects social influence through imitation, identification, and active self-construction (Adams & Marshall, 1996). Therefore, through communication and interaction with others, adolescents' identity develops positively. Conversely, adolescents experiencing alienation, who lack opportunities for observation and learning during socialization, are more likely to develop identity confusion.

Contrary to our hypothesis, this study found that T1 identity confusion could not influence T3 NSSI through T2 alienation. This result may be related to the distinct "relational" nature of identity in Chinese cultural contexts (Cheng & Berman, 2012). While individuals in Western societies establish identity through self-discovery and self-expression, individuals in Eastern cultures strive to establish harmonious interdependent relationships with family members and social groups as a way to achieve identity (Cheng & Berman, 2012). The ultimate goal of Chinese adolescent development is the "relational self" rather than the "autonomous self" (Lam, 1997). Therefore, if adolescents gradually alienate themselves from family or peers when experiencing identity confusion, this seems to run counter to the goal of achieving a "relational self." Chinese adolescents' identity confusion does not easily lead to interpersonal problems; instead, they are more likely to strive to maintain interpersonal and social harmony (Suh, 2002), alleviating confusion through normal interactions with others.

This study also found that the association patterns among identity confusion, alienation, and NSSI were consistent between male and female adolescents; that is, the mediating role of alienation between NSSI and identity confusion did not differ by gender. This may be because the "relational self" represents a universal goal for adolescent identity development in Chinese culture (Lam, 1997). Future research should use RI-CLPM to test whether this gender pattern can be replicated in other Eastern and Western cultures.

4.3 Limitations and Implications

This study has several limitations. First, data were collected through adolescent self-reports, which may be influenced by social desirability and recall bias. Future research should collect information from multiple sources (e.g., parents, teachers, and peers). Misunderstanding of NSSI definitions by participants may also lead to inaccurate assessments. Researchers have developed and tested various experimental methods to study NSSI behaviors with improved internal validity, such as measuring implicit identification with NSSI behaviors (Ammer-

man et al., 2018). Future research in this area could integrate multiple research methods.

Second, this study's three-wave longitudinal design only provided preliminary verification of the identity-NSSI cyclical model. Future research should employ short-term intensive longitudinal designs to provide more robust empirical evidence for the identity-NSSI cyclical model. Additionally, the bidirectional relationship between identity confusion and NSSI may not apply to all adolescents. Future research could consider adding moderating variables such as age (Klimstra & Denissen, 2017) and friendship quality (Zhong et al., 2024) to RI-CLPM for more nuanced analysis of their within-person level relationships.

Third, although this study examined the relationship between identity confusion and NSSI based on the boundaries model, it did not directly measure the interpersonal boundary function of NSSI. Therefore, future research could use ecological momentary assessment to ask adolescents with NSSI history to report their feelings before and after self-injury. Finally, this study's participants were primarily in early and middle adolescence. As education duration increases and the age of independent living is delayed, adolescence is extending (Côté & Levine, 2015). The transition from late adolescence to emerging adulthood, involving the shift from school to work, may represent a second turning point for identity development (Hatano et al., 2022). Future research should examine the interconnections and underlying mechanisms between identity confusion and NSSI within a broader temporal framework.

The theoretical implications of this study are twofold. First, the RI-CLPM results emphasize the importance of considering both within-person and between-person effects when studying direct or indirect bidirectional links between adolescent identity confusion and NSSI. By extracting stable trait factors to separate between-subject differences, RI-CLPM provides more accurate estimates of the dynamic interplay between adolescent identity confusion and NSSI. Second, this study found a unidirectional mediating pattern of alienation between NSSI and identity confusion that was consistent across genders. This suggests that identity in Chinese culture has a "relational" quality, and identity confusion among Chinese adolescents does not necessarily lead to maladaptive outcomes, providing some evidence for cross-cultural comparisons.

This study also offers practical implications for the prevention and intervention of adolescent psychological problems. First, schools should organize more activities or courses related to personal development, providing adolescents with adequate time and opportunities for self-exploration to help them achieve greater continuity and integrity in their identities. Second, enhancing social support and improving social skills are often effective approaches. For example, Positive Psychology Interventions (PPIs) are considered effective intervention measures. PPIs focus primarily on enhancing psychological functioning and are viewed as a supplementary approach to mental health interventions. By encouraging individuals to identify positive emotions, express gratitude, practice kindness, and identify and utilize their strengths, PPIs have been proven ef-

fective in reducing alienation and improving personal and social relationships (Lim et al., 2020). Finally, Intensive Contextual Treatment (ICT) is a short-term, family-collaborative therapy that effectively reduces NSSI frequency, internalizing symptoms, stress levels, emotion regulation difficulties, and school maladjustment among adolescents (Wijana et al., 2018). School- and family-based collaborative ICT could serve as a future intervention approach for NSSI, improving various aspects of adolescents' lives and fostering a virtuous cycle between NSSI and identity.

5 Conclusion

- (1) After separating between-person effects, at the within-person level, T1 NSSI significantly and positively predicted T2 identity confusion, while T2 identity confusion significantly and positively predicted T3 NSSI, and T2 NSSI also significantly and positively predicted T3 identity confusion. A bidirectional relationship exists between adolescent identity confusion and NSSI.
- (2) After separating between-person effects, at the within-person level, T2 alienation served as a longitudinal mediator in the relationship between T1 NSSI and T3 identity confusion.

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