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Original article

# Long-term stability of suicidal ideation among young adults residential care leavers: a prospective 10-year study

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ABSTRACT

*Background:* Juveniles in residential care systems have high rates of suicidal ideation (SI). This study aims to expand knowledge of the prevalence and stability of SI, as well its associated factors among young adult care leavers.

*Methods:* Swiss juveniles in residential care (N = 179; non-Swiss origin: 12,29%; N = 22) were followed up into young adulthood (34% female/66% males; $Age_{Baseline}$ (16.41, 2.86, 11–16); $Age_{Follow\text{-}Up}$ (26.64, 3.22, 20–38 years)). SI was assessed at baseline and 10-year follow-up. Statistics included descriptives, proportion of enduring cases (categorical mean-level stability), tetrachoric correlation (Rtet; categorical rank-order stability), $\chi^2$- and Kruskal-Wallis tests (to test differences between SI pathways), and multinomial logistic regression analyses (RRR; to investigate risk and protective factors for SI pathways).

*Results:* SI prevalence was 45.25% (baseline) and 31.84% (follow-up). Females showed higher rates. SI appeared moderately stable (43.2%) with higher estimates in females. Participants with remitted and persistent SI experienced more NSSI, internalizing/ externalizing symptoms, lower self-directedness, and lower quality of life than those without SI. Higher self-directedness, cooperativeness and quality of life predicted a lower likelihood of persistent SI.

*Conclusions:* Results suggest a higher risk and moderate stability of SI for young adult care leavers. Residential care practitioners should watch for risk factors, especially among females, and encourage self-directedness and cooperativeness.

**Glossary**

| | | |
|---|---|---|
| SI | Suicidal Ideation | the presence of thoughts about engaging in behavior aimed at ending one's life |
| OHC placements | Out-of-home care | Children and adolescents in residential or out-of-home care, generally placed there either by child welfare (civil law) or juvenile justice (criminal law) authorities |
| NSSI | Nonsuicidal Self-Injury | deliberate, self-directed damage of body tissue without suicidal intent and for purposes not socially or culturally sanctioned |

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| | | |
|---|---|---|
| CWS-placements | child welfare system-placements | Children and adolescents in out-of-home care be placed by child welfare (civil law) (e.g., foster care, group home) |

## 1. Introduction

Juveniles involved in residential care, out-of-home care (OHC), are more likely to experience suicidal ideation (SI) and engage in suicidal and nonsuicidal behaviors than their peers in the general population, putting them at higher risk of premature death (Batty et al., 2022; Evans et al., 2017; Göbbels-Koch, 2023a; Hassler et al., 2025; Katz et al., 2011; Lüdtke et al., 2018; Ruch et al., 2021). Nevertheless, little is known about the long-term stability and developmental pathways of SI among young adult care leavers, despite growing evidence that the elevated risk often persists beyond out-of-home care (Almquist et al., 2020; Ayer et al., 2024; Evans et al., 2017; Nock et al., 2013). The present study seeks to address this gap by examining the long-term stability of SI and its associated risk and protective factors, with the aim of informing prevention and intervention programs designed to reduce the risk of SI in this high-risk population.

SI, commonly defined as the presence of thoughts about engaging in behavior aimed at ending one's life (Posner et al., 2014), is relatively common among adolescents, with studies in the general population reporting prevalence rates of approximately 16% (Van Meter et al., 2023). Among juveniles in residential out-of-home care, however, SI is substantially more prevalent, with estimates ranging from 24% to 27% (Anderson et al., 2011; Ayer et al., 2024; Evans et al., 2017), highlighting the heightened vulnerability of this population. Moreover, evidence indicates that SI often persists into adulthood (Fergusson et al., 2005; Herba et al., 2007; Reinherz et al., 2006), suggesting that adolescent SI may constitute a stable and a robust predictor of suicide later in life (Odds Ratio = 10.70) (Fergusson et al., 2005; Herba et al., 2007; Reinherz et al., 2006).

Over the years, studies have been published on the pathways, age-based trends, and patterns of SI and the potential link to suicidal behavior. These studies have examined different populations (e.g., clinical, general, juvenile) over different time periods (e.g., from several months to years following baseline) (Goldston et al., 2016; Hassler et al., 2025; Liu et al., 2024; Nock et al., 2018; Prinstein et al., 2008; Zhu et al., 2019). Despite this, few studies have examined the longitudinal pathways of SI among juveniles after residential out-of-home care, including its associated factors. Ayer et al. (2024) and Hassler et al. (2025) have investigated age-based trends and found different SI patterns over time among juveniles in and following residential care. Ayer et al. (2024) identified eight trajectories of suicidal ideation (SI) among 7- to 12-year-olds across three waves: non-ideators (never reported SI), late ideators (SI only at wave 3), boomerang ideators (SI only at wave 2), delayed ideators (SI at waves 2 and 3), desisters (SI only at wave 1), boomerang non-ideators (SI at waves 1 and 3), late desisters (SI at waves 1 and 2), and persisters (SI at all waves). Anderson (2011) and Hassler et al. (2025) also found that also for the specific group of residential careleavers SI can persist into adulthood.

Many psychosocial factors, particularly prevalent in residential out-of-home care, may increase the risk of SI. These include sociodemographic factors such as sex, age, number of residential care placements, and average residential care duration (Anderson, 2011; Boeninger et al., 2012; Evans et al., 2017; Hassler et al., 2025). Research indicates females have higher rates of SI prevalence and stability compared to males (Ayer et al., 2024; Boeninger et al., 2012; Evans et al., 2017; Göbbels-Koch, 2023a; Hassler et al., 2025; Nock et al., 2018; van Meter et al., 2023). Childhood adversity, individual adverse experiences (i.e., abuse, trauma), and contextual stressors (e.g., community violence, discrimination) (Brodsky and Stanley, 2008; Enns et al., 2006; Franklin et al., 2017), is also associated with an increased risk of SI. Studies indicate that traumatic experiences (Brodsky and Stanley, 2008; Enns et al., 2006; Franklin et al., 2017), and post-traumatic stress disorder (PTSD) (Angelakis et al., 2019; Berardelli et al., 2022; Franklin et al., 2017) are known risk factors for SI. Furthermore, additional recognized risk factors connected to SI are nonsuicidal self-injury (NSSI) (Joiner et al., 2012; Lüdtke et al., 2018; Ribeiro et al., 2016); co-occurring mental health disorders such as mood disorders, anxiety disorders, attention-deficit/hyperactivity disorder (ADHD), and post-traumatic stress disorder (PTSD) (Angelakis et al., 2019; Berardelli et al., 2022; Franklin et al., 2017) as well as traumatic experiences (Brodsky and Stanley, 2008; Enns et al., 2006; Franklin et al., 2017). Among individuals with persistent SI, additional associated factors include a history of physical abuse, feelings of hopelessness, out-of-home placement (Ayer et al., 2024; Nock et al., 2018; Reinherz et al., 2006), lower self-esteem, reduced perceived ability to cope with challenging situations, and a greater need for social support (Reinherz et al., 2006).

In addition to factors that increase the risk of SI, certain personality traits can be protective, reducing vulnerability and promoting resilience. Among these, self-directedness, cooperativeness, and self-transcendence have found to be particularly relevant (Conrad et al., 2009). Self-directedness refers to the ability to regulate and adapt one's behavior in accordance with individual goals and values (Cloninger et al., 1993). Closely linked to self-efficacy, or the belief in one's ability to positively influence situations and solve problems (Bandura and Cervone, 1983; Cloninger et al., 1993), it is characterized by responsibility, resourcefulness, and self-acceptance. Individuals with lower self-directedness often lack this sense of agency, which in turn, has found to be significantly associated with SI (Conrad et al., 2009; Lee et al., 2017). Cooperativeness refers to the ability to identify with and accept other people, demonstrating empathy, compassion, social acceptance, and willingness to help (Cloninger, 1993). Highly cooperative individuals tend to perceive themselves as part of a supportive community, motivated by compassion and reciprocal respect (Cloninger, 1993). Conversely, lower cooperativeness has found to be significantly associated with SI (Conrad et al., 2009; Lee et al., 2017). Self-transcendence involves perceiving oneself as part of a greater whole. In adolescents, elevated self-transcendence may sometimes reflect a search for meaning in response to distress, which can be associated with higher suicidality (Breton et al., 2015). Individuals with high self-transcendence show traits like spirituality, plainness, creativity, and humility (Cloninger et al., 1994, 1993). These traits may protect against SI in stressful situations. However, the combination of traits determines the outcome (Cloninger et al., 1993; Conrad et al., 2009), where a heightened sense of self-transcendence coupled with lower self-directedness has been linked to SI (Conrad et al., 2009; Lee et al., 2017).

### 1.1. *Aim of the current research*

To our knowledge, no study has examined the stability of SI among residential OHC care leavers from adolescence to young adulthood. This is essential for developing prevention and intervention programs aimed at reducing SI risk and related behaviors in this high-risk population (Anderson, 2011; Ayer et al., 2024; Horowitz et al., 2021; Fulginiti et al., 2018; Lussier et al., 2023; WHO, 2021). Therefore, the present study aimed to address this gap by examining in a sample of young adult OHC care leavers:

1) the prevalence of SI, including potential sex differences;
2) longitudinal pathways and stability into adulthood, including potential sex differences;
3) predictors of SI pathways, including sociodemographics, NSSI, co-varying mental health problems and traumatic experiences, as well

as potential protective factors, including self-directedness, cooperativeness, self-transcendence, and quality of life.

## 2. Methods

### 2.1. Procedures

Baseline-data was obtained from the longitudinal study "Swiss Study for Clarification and Goal-Attainment in Child Welfare and Juvenile-Justice Institutions" (German: Modellversuch Abklärung und Zielerreichung in stationären Massnahmen [MAZ.], Schmid et al., 2013). Follow-up data was obtained from the "Youth Welfare Trajectories: Learning from Experiences" (German: Jugendhilfeverläufe: Aus Erfahrung lernen [JAEL]), conducted during the period 2018 to 2022.

592 juveniles aged 6 to 26 years (mean age = 16.41 years, females 34,8%; 61) participated at baseline. The primary aim of the baseline MAZ. study was to describe the mental health of juveniles placed in residential out-of-home care institutions in Switzerland, either by penal law, by civil law, or voluntarily (i.e., without a judicial mandate). Residential care institutions accredited by the Swiss Federal Office of Justice were invited to participate, of which 64 (35% of all eligible institutions) agreed to take part, resulting in a representative sample of different institution types regarding size, schooling opportunities, treatment options, and the age range of residing youth (Jäggi et al., 2021; Schmid et al., 2022; Seker et al., 2022; Urben et al., 2022). Juveniles who had been living for at least one month in one of the included institutions, with sufficient language skills in German, French, or Italian as well as sufficient intelligence scores (i.e., IQ > 70) were eligible to participate. Prior to participation, juveniles, parents or legal guardians, and social workers were requested to provide informed consent. Participants then completed computer-based questionnaires as well as semi structured clinical interviews regarding mental health, psychosocial problems, and offending behavior. The MAZ. study procedure was reviewed and approved by the Ethics Committees on Research Involving Humans at the University of Basel and the University of Lausanne (Switzerland) and by the Institutional Review Board at the University of Ulm (Germany).

After approximately 10 years, participants were reassessed in the follow-up JAEL study, with the aim to investigate their psychosocial development and their transition from out-of-home care. Participants were contacted by postal mail, phone, email, and social media. The follow-up assessment consisted primarily of a set of online questionnaires, as well as qualitative and semi structured clinical interviews regarding the actual living situation, retrospective residential care experiences, mental health disorders and personality disorders, trauma, psychosocial problems, and offending behavior. The study procedure was reviewed and approved by the Ethics Committee Northwestern and Central Switzerland (EKNZ, Ref.: 2017–00718).

### 2.2. Subjects

Of the 511 MAZ. participants, 231 (45.2%) agreed to participate in the follow-up JAEL study. A detailed study flow-chart is provided in Figure S1 in the Supplementary. As the primary aim of this study was to investigate the prevalence and longitudinal trajectory of SI from adolescence to adulthood, only participants with complete data on the SI scale of the Massachusetts Youth Screening Instrument – second version (MAYSI-2; (Grisso et al., 2001) at both baseline and follow-up were included. This resulted in a final sample included 179 participants (34% female).

At baseline, participants were on average 16.41 years old (*SD* = 2.86; range: 11–26) and at follow-up 26.64 years old (*SD* = 3.22; range; 20–38) (Table 1). At follow-up, more than half of participants had a current mental disorder (56.05%), with the most common disorders being a personality disorder and substance abuse disorder (both 35.03%), followed by ADHD (16.56%). The most frequently diagnosed personality disorder were antisocial personality disorder (21.02%) and borderline personality disorders (10.19%; see Table S2 in the Supplementary Material). The average number of placements was 3.60 (2.97), and the average duration in residential care was 7.00 (5.38) years of residential care.

**Table 1**
Sample characteristics at baseline (t0) and follow-up (t2) (*N* = 179).

| | Baseline | Follow-up |
|---|---|---|
| | *M* (*SD*) | *M* (*SD*) |
| Age (years) | 16.41 (2.86) | 26.64 (3.22) |
| Number of placements in residential care | 0.85 (1.23) | 3.60 (2.97) |
| Average duration in residential care (years) | 1.29 (1.53) | 7.00 (5.38) |
| | *n* (%) | *n* (%) |
| Gender (female) | 61 (34.08) | 61 (34.08) |
| Current mental disorders[a] | | |
| Any current mental disorder | 100 (68.03) | 88 (56.05) |
| ADHD[b] | 18 (11.92) | 31 (19.75) |
| Anxiety disorder[b] | 36 (23.84) | 26 (16.56) |
| Conduct disorder[b, c] | 43 (28.48) | - |
| Mood disorder[b] | 23 (15.23) | 26 (16.56) |
| Personality disorder[b] | 39 (26.53) | 55 (35.03) |
| Psychotic disorder[b] | 2 (1.32) | 2 (1.27) |
| PTSD[b] | 7 (4.64) | 7 (4.46) |
| Substance-use disorder[b] | 24 (15.89) | 55 (35.03) |
| Current mental-health treatment[d] | 80 (55.56) | 44 (24.86) |

Note.
[a] Participants with multiple mental-health disorders are displayed more than once.
[b] Due to missing data, the sample size at baseline was *N* = 149.
[c] Only available at baseline.
[d] Due to missing data, the sample size at baseline was *N* = 144.

Sample attrition analyses revealed no significant differences in sociodemographic characteristics (i.e., age, sex, number of former placements, average duration in residential care) and adolescent mental disorders between the participants who took part in the follow-up study and those who did not. Excluded participants revealed no statistically significant differences from participants at baseline in age ($t(34) = 0.80$; $p = 0.427$), gender ($\chi^2(1) = 0.0072$; $p = 0.665$), number of placements in residential care ($t(40) = 1.76$; $p = 0.085$), average duration in residential care ($t(40) = 1.47$; $p = 0.167$), and any mental health disorder ($\chi^2(1) = 1.40$; $p = 0.527$).

### 2.3. Measurements

*Sociodemographic factors*, such as age, gender, number of placements, average duration in residential care (i.e., total time (in years) spent in residential care and juvenile-justice institutions), and current mental health treatment, were collected both at baseline and at follow-up. Information on social benefits was assessed only at follow-up.

*Suicidal Ideation* was assessed using the MAYSI-2 (Grisso et al., 2001) at both baseline and follow-up. The MAYSI-2 is a self-report screening questionnaire specifically developed to assist juvenile justice facilities in identifying juveniles with potential mental health problems and is used in the broader child welfare system (CWS) as well (Dölitzsch et al., 2017; Reilly et al., 2019). The MAYSI-2 consists of 52 items that assess symptoms during the last month and includes seven scales. All items are rated on a binary scale (no/yes). For each scale, a specific cutoff score exists in order to categorize individuals into three distinct groups: "clinically unsuspicious," "caution range" or "warning range." For the present study, the SI scale was of particular interest, as it presented the outcome variable for the main analyses. The SI scale consists of five items about whether in the past few months the participant had ever wanted to give up hope, felt like life was not worth living, felt like hurting or killing him/herself, or wished he or she were dead. The caution range was used to dichotomize participants into "No SI" versus "SI." The psychometric qualities of the MAYSI-2 indicated that its

reliability and validity are equally well supported in participants aged 18 and above (Colins et al., 2015). In our study, internal consistency using Cronbach's alpha was 0.85.

*Nonsuicidal self-injury,* (NSSI) during the last month, was assessed at baseline with one single item ("Did you feel the need or desire to hurt yourself?") of the MAYSI-2 (Grisso et al., 2001). Participants answered either with "no" (0) or "yes" (1).

*Internalizing and externalizing symptoms* were assessed using the self-report questionnaires of the Achenbach System of Empirically Based Assessment scales (ASEBA): the Youth Self-Report (YSR; 118 items) for adolescents aged 11–18 years (Achenbach, 2001), the Young Adult Self-Report (YASR; 124 items) for young adults aged 18–30 (Achenbach, 1997) and the Adult Self-Report (ASR; 120 items) for adults 30 years and older (Achenbach et al., 2005). Each item is rated on a three-point Likert scale (0=not true, 1=sometimes true, 2=very true). Summing scores of the eight subscales results in a total score, as well as two superordinate scores for internalizing and externalizing symptoms. For the present study, standardized z-scores of the internalizing and externalizing sum scores were used.

*Traumatic experiences* were assessed using the Essener Trauma-Inventory for Children and Adolescents (ETI-CA; Tagay, Düllmann, Hermans, and Senf, 2007) for participants younger than 18 years, and the Essener Trauma-Inventory (ETI; Tagay, Stoelk, Möllering, Erim, and Senf, 2004) for participants 18 years and older. Both the ETI-CA and ETI are self-report questionnaires including 58 items, with items 1–14 assessing traumatic events and items 15–58 evaluating the presence of post-traumatic stress disorder (PTSD) symptoms. For the present study, a dimensional trauma score was built by summing items 1–14, reflecting the total number of reported traumatic experiences for each participant, regardless of whether the events were directly experienced, witnessed, or both.

*Self-directedness, self-transcendence, and cooperativeness* were assessed at baseline using the Junior Temperament and Character Inventory 12–18 - Revised (JTCI 12–18 R; Goth and Schmeck, 2009). The JTCI 12–18 R is built upon Cloninger's psychobiological model of personality (Cloninger, 1999; Cloninger et al., 1993), and comprises 103 items, including four temperament scales (i.e., novelty seeking, harm avoidance, reward dependence, and persistence) and three character scales (i.e., self-directedness, self-transcendence, and cooperativeness). For the present study, standardized z-scores of the three character scale scores were used. The questionnaire has shown good psychometric properties in a German normative and clinical sample (Goth and Schmeck, 2009).

*Quality Of Life* was assessed at baseline, using the WHO-5 Wellbeing Index, a five-question survey of subjective well-being. The scale can be used regardless of underlying illness (or lack of illness) and across many settings. It has been used in suicidology studies to measure well-being (life satisfaction) in contrast to psychological pain and suicidal thoughts. Research using the WHO-5 shows those with SI scores lower than those without (Awata et al., 2007; Topp et al., 2015).

**Risk factors.** *Mental disorders* were assessed at follow-up using the Structured Clinical Interview for DSM-5 Disorders - Clinician Version (SCID-5-CV; First et al., 2016), a semi-structured clinical interview based on DSM-5 diagnoses in adults (>18). The SCID-5-CV covers the most common diagnoses in clinical settings (depressive and bipolar disorders, schizophrenia spectrum and other psychotic disorders, substance-use disorders, anxiety disorders, obsessive-compulsive disorder, PTSD, ADHD, and adjustment disorder), as well as 17 additional DSM-5 diagnoses. It is highly reliable, with a Cohen's κ ranging from 0.70 to 0.75.

*Personality disorders* were assessed at follow-up using the Structured Clinical Interview for DSM-IV-TR Axis II Personality Disorders (PD; SCID-II; First et al., 1997), a semi-structured clinical interview designed to yield personality disorders diagnoses. The SCID-II is a semi structured interview designed to yield personality disorder diagnoses (i.e., paranoid, schizoid, schizotypal, histrionic, borderline, antisocial, narcissistic, avoidant, dependent, obsessive-compulsive, depressive, and passive-aggressive PDs) and consists of 134 items, which are rated on a 3-point Likert scale (1 = absent, 2 = subthreshold, and 3 = threshold).

*Potentially traumatic events (PTEs)* were assessed at follow-up using the Life Events Checklist – revised version (LEC-R; Weathers Let al., 2013). The LEC-R is a 19-item self-report measure designed to screen for 18 PTEs, like natural disasters or physical assault, as well as a 19th item for any other very stressful event. Participants were asked whether they had experienced, witnessed, or learned about each of the 19 events. The answers were rated on a 4-point scale (Gurri et al., 2024). A total score was then calculated based on total sum of PTEs endorsements of "directly experienced" for each participant.

### 2.4. Statistical analysis

First, descriptive analyses were calculated for sociodemographic variables, mental disorders, and SI. Second, categorical mean-level stability of SI was analyzed by the proportion of enduring cases from baseline to follow-up, that is, the number of participants reporting SI at both assessments divided by the total number of participants with SI at baseline. Categorical rank-order stability was calculated using tetrachoric correlations ($r_{tet}$), measuring the relationship between binary baseline and follow-up scores with the assumption of bivariate normality (Pearson, 1900). Similar to Pearson's r, a value between 0.1 and 0.3 is considered First, descriptive analyses were calculated for sociodemographic variables, mental disorders, and SI. Second, categorical mean-level stability of SI was analyzed by the proportion of enduring cases from baseline to follow-up. Categorical rank-order stability was measured using tetrachoric correlations, assuming bivariate normality. Similar to Pearson's r, a value between 0.1 and 0.3 is considered low, 0.3 to 0.5 moderate, and 0.5 to 0.8 high. Third, SI pathways were derived from cutoff scores on the MAYSI-2 SI scale at baseline and follow-up (no SI at T0 and T1: "No SI"; SI at T0 & no SI at T1: "Remitted SI"; No I at T0 & SI at T1: "New onset SI"; SI at both T0 and T1: "Persistent SI"). Then, the differences between the SI pathways at follow-up in sociodemographic characteristics, PTEs, and social benefits were analyzed using chi-square tests for categorical variables and Kruskal–Wallis tests for continuous variables, as the assumptions for Analysis of Variance were not met. When differences were significant ($p < 0.05$), post-hoc comparisons were conducted with the Dunn test for continuous variables and the chi-square test for categorical variables. To account for the increased risk of Type I error due to many comparisons, p-values were adjusted using the false-discovery rate (FDR) correction.

Fourth, multinominal logistic regression analyses were conducted to examine baseline factors potentially predicting SI pathways. In total, eight separate models were estimated. Four of these examined prospective risk factors, and four examined prospective protective factors. Each model was adjusted for age and gender. Separate multinomial models were estimated for each factor to avoid effects of multicollinearity and unstable confidence intervals due to highly correlated predictors. A correlation matrix of these predictors is in the supplement (S3). All statistical analyses were conducted using RStudio [Version 4.4.1 (R Core Team, 2024)]. Significance was set to $p < 0.05$ for all analyses. Analyses were conducted on all participants with complete data on the outcome variable (SI pathways). Imputed data (0.6%) for predictor variables were from the mice package in R, with 100 imputed datasets (van Buuren and Groothuis-Oudshoorn, 2011).

## 3. Results

### 3.1. Prevalence of SI

At baseline, 81 (45.25%) participants reported SI, of which 42 participants were females (68.85% of the female sample) and 39 men (33.05% of the male sample). A total of 57 (31.84%) participants reported SI at follow-up, of which 26 were females (42.62% of the female sample) and 31 were men (26.27% of the male sample) (see Table 2). SI

**Table 2**
Prevalence rates and mean-level stability of suicidal ideation from baseline to follow-up ($N = 179$).

| Suicidal Ideation (SI) | Baseline | Follow-up | Never | Remitted | New Onset | Persistent | Mean-level stability[c] | Rank-order stability |
|---|---|---|---|---|---|---|---|---|
| | *n* (%) | *n* (%) | *n* (%) | *n* (%) | *n* (%) | *n* (%) | % | $r_{tet}$ |
| Total sample | 81 (45.25) | 57 (31.84) | 76 (42.46) | 46 (25.7) | 22 (12.29) | 35 (19.55) | 35/81 = 43.21 | 0.35 |
| Female sample[a] | 42 (68.85) | 26 (42.62) | 14 (22.95) | 21 (34.43) | 5 (8.2) | 21 (34.43) | 21/42 = 50.00 | 0.37 |
| Male sample[b] | 39 (33.05) | 31 (26.27) | 62 (52.54) | 25 (21.19) | 17 (14.41) | 14 (11.86) | 14/39 = 35.90 | 0.26 |

Note.
[a] N = 61.
[b] N = 118.
[c] Proportion of enduring SI cases from baseline to follow-up; $r_{tet}$ = Tetrachoric correlation coefficient.

prevalence rates were significantly more prevalent in female participants than in male participants, both at baseline, $\chi^2(1) = 19.38$; $p = 0.001$, and at follow-up, $\chi^2(1) = 4.23$; $p = 0.040$.

### 3.2. Stability of SI

**Mean-level stability.** Of the 81 participants who reported SI at baseline, 35 still reported SI at follow-up, resulting in a mean-level stability of 43.2% (see Table 2). Overall, 46 (56.8%) participants improved from baseline to follow-up by no longer reporting SI at follow-up (i.e., Remitted SI), while 22 (22.4%) participants with No SI at baseline reported SI at follow-up (i.e., New onset SI). Seventy-six (42.46%) participants neither reported SI at baseline nor at follow-up (No SI). Regarding sex differences, female participants had significantly higher mean-level stability estimates than male participants, $\chi^2(1) = 11.618$; $p = 0.001$.

**Rank-order stability.** The tetrachoric correlation coefficient ($r_{tet}$) from baseline to follow-up was 0.45, indicating overall a moderate rank-order stability. Correlations were somewhat higher in females ($r_{tet} = 0.37$) than in males ($r_{tet} = 0.26$), although this difference was not statistically significant, Fisher's z = 0.76, $p = 0.448$.

### 3.3. Group differences at follow-up

The Kruskal–Wallis test revealed significant differences in SI pathways for PTEs (KW $\chi^2 = 9.19$; $p = 0.027$), with post-hoc pairwise comparisons revealing that participants in the Persistent SI group reported higher levels of PTEs than those in the No SI, the Remitted SI, and the New onset SI group. Chi-Square tests further revealed significant group differences for gender, $\chi^2(1) = 22.77$; $p < 0.001$, with post-hoc analyses indicating that females were overrepresented in the Remitted and Persistent SI group compared to men. Furthermore, significant differences were observed for receipt of disability insurance benefits, $\chi^2(3) = 18.62$; $p < 0.001$. However, after adjusting for multiple comparisons using the False Discovery Rate method, pairwise chi-square comparisons were no longer significant (see Table 3).

### 3.4. Predictors of SI pathways

Findings regarding the multinominal regression analyses are displayed in Fig. 1 as well as in the Supplement Table S4.

**Remitted SI vs. No SI.** Participants with remitted SI were significantly more likely to have engaged in NSSI at baseline compared to those with no SI (RRR = 20.52, 95% CI [6.01–70.00], p < 0.001). They also exhibited significantly higher internalizing (RRR = 4.06, 95% CI [2.20–7.50], p < 0.001) and externalizing symptoms (RRR = 2.40, 95% CI [1.53–3.78], p < 0.001), but were not more likely to report higher levels of traumatic events (RRR = 1.35, 95% CI [0.91–2.01], p = 0.14). Finally, high self-directedness (RRR = 0.51, 95% CI [0.32–0.80], p = 0.004) and a high quality of life (RRR = 0.39, 95% CI [0.24–0.65], p < 0.001) were associated with a significantly lower likelihood of remitted SI compared to no SI, whereas self-transcendence and cooperativeness

**Table 3**
Group differences between suicidal ideation pathways at follow-up ($N = 179$).

| | Total sample (N = 179) | 1 Never (N = 76) | 2 Remitted (N = 46) | 3 New Onset (N = 22) | 4 Persistent (N = 35) | Test statistics | p-value | Pairwise contrasts |
|---|---|---|---|---|---|---|---|---|
| | *M (SD)* | *M (SD)* | *M (SD)* | *M (SD)* | *M (SD)* | KW $\chi^2$ | *p*-value | |
| Age (years) at follow-up | 26.64 (3.22) | 26.72 (3.65) | 26.88 (2.27) | 26.41 (2.90) | 26.29 (3.71) | 2.42 | 0.489 | - |
| Age (years) at first placement | 14.88 (3.68) | 14.78 (4.11) | 15.34 (2.89) | 14.88 (3.60) | 14.51 (3.90) | 1.67 | 0.643 | - |
| Number of placements in residential care | 3.60 (2.97) | 3.24 (2.76) | 4.13 (3.64) | 2.909 (1.78) | 4.147 (3.21) | 5.29 | 0.151 | - |
| Average duration in residential care (years) | 7.00 (5.38) | 6.63 (5.18) | 6.56 (4.71) | 7.38 (6.46) | 8.18 (6.14) | 2.49 | 0.476 | - |
| Potentially traumatic events | 2.58 (2.56) | 2.24 (2.32) | 2.33 (2.17) | 2.36 (2.53) | 3.80 (3.23) | 9.19 | **0.0269*** | 4 > 1,2,3 |
| | *n* (%) | *n* (%) | *n* (%) | *n* (%) | *n* (%) | $\chi^2$ | *p*-value | |
| Gender (female) | 61 (34.08) | 14 (7.8) | 31 (11.7) | 5 (2.8) | 21 (11.7) | 22.77 | **< 0.001***** | 2,4 > 1,3 |
| Current mental-health treatment[a] | 44 (24.86) | 13 (7.3) | 10 (5.6) | 9 (5.1) | 12 (6.8) | 7.53 | 0.057 | - |
| Current social welfare[a] | 49 (27.68) | 14 (7.9) | 15 (8.5) | 10 (5.6) | 10 (5.6) | 7.12 | 0.068 | - |
| Current unemployment insurance[a] | 11 (6.21) | 5 (2.8) | 3 (1.7) | 2 (1.1) | 1 (0.6) | 0.97 | 0.758 | - |
| Current Disability insurance[a] | 27 (15.25) | 6 (3.4) | 4 (2.3) | 4 (2.3) | 13 (7.3) | 18.62 | **< 0.001***** | [†] |

Note.
[a] Due to missing data, the sample size was N = 177.
[†] After adjusting for multiple comparisons using the False Discovery Rate method, pairwise chi-squared tests comparisons revealed to be unsignificant.

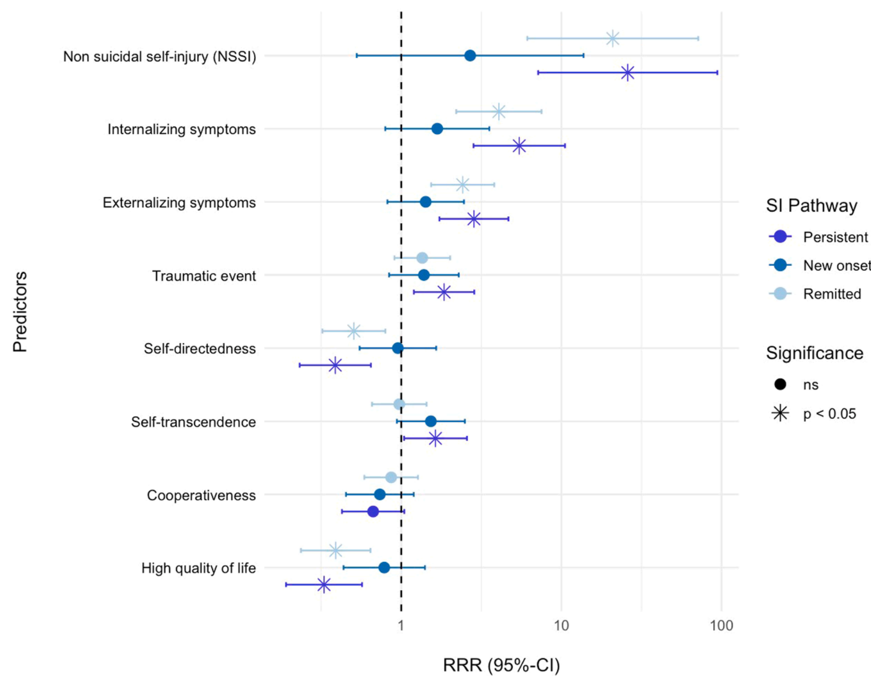


**Fig. 1.** Prospective risk and protective factors predicting SI pathways in multinominal logistic regression models.

showed no significant effects.

**New onset SI vs. No SI.** Compared to the No SI group, none of the examined baseline factors were significantly associated with new onset SI.

**Persistent SI vs. No SI.** Participants with persistent SI were significantly more likely to have engaged in NSSI at baseline compared to those with no SI (RRR = 25.22; 95% CI [6.98–91.14]; $p < 0.001$). They also exhibited significantly higher internalizing (RRR = 5.43; 95% CI [2.81–10.47]; $p < 0.001$) and externalizing symptoms (RRR = 2.81; 95% CI [1.71–4.61]; $p < 0.001$), and were nearly twice as likely to report higher levels of traumatic events (RRR = 1.87; 95% CI [1.21–2.89]; $p = 0.005$). Protective factors such as higher self-directedness (RRR = 0.35, 95% CI [0.21–0.59], $p < 0.001$), cooperativeness (RRR = 0.63, 95% CI [0.40–0.99], $p = 0.046$) and quality of life (RRR = 0.34, 95% CI [0.19–0.58], $p < 0.001$) were associated with significantly lower likelihood of persistent SI, whereas higher self-transcendence actually appeared to increase the likelihood of persistent SI (RRR = 1.79, 95% CI [1.13–2.85], $p = 0.013$) compared to no SI.

**Persistent SI vs. Remitted SI.** Compared to the remitted SI group, participants with persistent SI were nearly two times more likely to report higher levels of self-transcendence (RRR = 1.88, 95% CI [1.15-3.07], $p = 0.012$), while the other baseline factors remained non-significant.

## 4. Discussion

The present study examined the prevalence, stability, and longitudinal trajectories of SI into adulthood among young adult OHC care leavers, as well as associated gender differences and predictors. Overall, the findings indicate that SI is both highly prevalent and moderately stable from adolescence into adulthood in this population. Females appearing to be at greater risk in terms of both prevalence and persistence, which is consistent with patterns observed in non-OHC samples. Importantly, the results underscore the combined influence of individual psychopathology and environmental adversity in shaping SI trajectories: NSSI, internalizing and externalizing symptoms, and traumatic experiences increased the likelihood of both remitted and persistent SI, suggesting that these factors may reflect enduring vulnerability rather than transient risk. Conversely, higher self-directedness and a better perceived quality of life were as protective factors, suggesting a potential role for adaptive self-regulation and subjective well-being in mitigating long-term risk. For persistent SI specifically, higher cooperativeness was associated with reduced risk, while greater self-transcendence was associated with increased risk. This points to a more nuanced interplay of risk and resilience in shaping long-term SI trajectories. Together, these findings extend prior research to the understudied population of OHC care leavers and emphasize the importance of addressing both risk and resilience processes when considering the long-term developmental pathways of SI. Five main findings require further discussion.

First, we found that SI was highly prevalent among young adult OHC care leavers, with females appearing to be at a particularly high risk. These findings extend prior research on the high prevalence and moderate stability of SI among young adult care leavers to a former OHC population with a longer follow-up (Ayer et al., 2024; Evans et al., 2017; Hassler et al., 2025; Nock et al., 2018) and are consistent with evidence suggesting females report higher rates of SI than males (Ayer et al., 2024; Boeninger et al., 2012; Göbbels-Koch, 2023a; van Meter et al., 2023; In-Albon et al., 2026). This elevated risk may be partly explained by females‘ greater burden of mental health problems, including personality disorders and adjustment problems, and by cumulative history of childhood adversities and continued exposure to challenging circumstances in females after leaving care compared to their peers in the general population (Atkinson and Hyde, 2019; Paulsen et al., 2023; Seker et al., 2022; Stein, 2008). These factors may increase their risk of SI (Göbbels-Koch, 2023a, 2023b) and suicidal behaviors (Hjern et al., 2025). Personality disorders were assessed at follow-up, but the present study did not differentiate between subtypes, such as borderline personality disorder, which has been strongly linked to SI and NSSI. This was not feasible due to limited subgroup sizes. Therefore, and the findings therefore cannot speak to subtype-specific difference (see S2).

Second, we found that SI showed moderate stability from adolescence into young adulthood, with a substantial subgroup reporting persistent SI over time. Nearly one-fifth of participants continued to report SI from adolescence into young adulthood. Persistent SI was more likely among those with prior PTEs and NSSI during care. These findings align with previous research on longitudinal evidence in adult care

leavers. Additionally, our findings highlight the persistent SI vulnerability of OHC female care leavers. Although a meta-analysis did not identify gender as a significant moderator (Lim et al., 2019) this may be due to the inclusion of heterogeneous populations. However, evidence from care-experienced samples, however, indicates higher rates of suicidal behaviors among females (Corneau and Lanctôt, 2004). Specifically with SI increases during adolescence in females but decreases in males over time (Hassler et al., 2025). This suggests that gender-specific trajectories may be particularly salient within OHC populations.

Third, we found that co-occurring mental health problems, traumatic experiences, and non-suicidal self-injury were associated with an increased likelihood of unfavorable SI pathways. The study population showed a high prevalence of mental disorders at both baseline and follow-up. At follow-up, 56.5% of participants met the diagnostic criteria for a mental disorder, including personality disorders (35.0%) and substance use disorders (35.1%). Nearly one in four participants received mental health treatment (24.9%). Prior research has demonstrated relations between SI and NSSI (Lüdtke et al., 2018; Prinstein et al., 2008) and PTEs (Bunting et al., 2023; Howarth et al., 2020), particularly in the presence of anxiety disorders (Klonsky and Olino, 2008; O'Neil et al., 2012), mood disorders (Franklin et al., 2017; Prinstein et al., 2008), and personality disorders (Nock et al., 2013; Verona and Javdani, 2011).Surprisingly, ADHD diagnoses were more prevalent at follow-up. Although this may reflect underdiagnosis in adolescence or increased recognition in adulthood (Abdelnour et al., 2022; Elefante and Perugi, 2025; Greer, 2025), other explanations—such as changes in diagnostic practices or help-seeking—cannot be ruled out, underscoring the importance of considering developmental diagnostic patterns.

Fourth, we found that baseline NSSI injury was a key predictor of SI at follow-up, while outcomes remained heterogeneous. Baseline NSSI was associated with an increased likelihood of SI at follow-up, consistent with theories suggesting that repetitive NSSI may increase capability for suicide (Bryan et al., 2015; Joiner, 2005; Nock and Prinstein, 2005; Prinstein et al., 2008). At the same time, Remitted SI among individuals with a history of NSSI indicated heterogeneity in outcomes. This may reflect variation in the functions of NSSI, such as emotion regulation versus contributing to hopelessness (Brausch and Muehlenkamp, 2018; Hamza et al., 2012; Klonsky, 2007; Kraus et al., 2020), as well as differences in contextual or protective factors (Hamza et al., 2012). Although less influential than self-criticism, social factors may also contribute to NSSI, particularly in subcultures where it is perceived as acceptable or used to express distress or strength through norm violation (Hooley and Franklin, 2018; Nock, 2008). Interpretation is limited by the dichotomous assessment of NSSI and future research should incorporate more detailed measures, particularly because frequency and severity are associated with increased suicidal risk (Lloyd-Richardson et al., 2007; Nock et al., 2006; Wester et al., 2016).

Fifth, we found that personality-related and psychosocial factors, including self-directedness, cooperativeness, and quality of life, were associated with a reduced likelihood of unfavorable SI trajectories. Building on Cloninger's model, (Cloninger, 1993; 2002), which conceptualizes character dimensions as integrative emotional drives, the present study examined these traits in a sample of OHC care leavers over an extended timeframe. In line with prior research, individuals with SI demonstrated lower self-directedness and higher self-transcendence (Conrad, 2009). Lower self-directedness may reflect a reduced capacity for goal-oriented behavior and adaptive self-regulation, supporting the notion that SI is linked to maladapative emotion regulation. In contrast, the role of self-transcendence appears more complex. While it has been associated with openness to experiences beyond the self, and broader existential perspectives (Cloninger, 2002), higher levels in individuals with SI may also reflect sensitivity to external influences or a diminished sense oft personal control (Cloninger, 2002; Conrad, 2009).

### 4.1. Limitations

This study has several limitations that may affect how the interpretations of the findings. First, SI was assessed using a self-report screening questionnaire designed to evaluate mental health problems more broadly, rather than specifically targeting SI. While the MAYSI-2 SI Scale has been found to have good internal consistency, adequate test-retest reliability (Grisso et al., 2001) and good specificity (Archer et al., 2004), future studies may benefit from using a more comprehensive suicide risk assessment, including external evaluations as well, to provide a more nuanced understanding of this construct in vulnerable populations.

Second, the ability to analyze more nuanced individual patterns of change was limited by the relatively small number of data points collected over time. Research on the dynamics of SI indicates that SI can fluctuate substantially over shorter periods, with changes occurring even within hours (Kleiman et al., 2017). More frequent measure of SI over a longer period of observation, for example using Ecological Momentary Assessment (EMA) (Sedano-Capdevila et al., 2021), might provide a more nuanced patterns of change in SI.

Third, the current study did not incorporate mediation or moderation analyses, and it was not feasible to develop a comprehensive multivariate model encompassing all predictors. Instead, separate models were created to avoid multicollinearity and unstable parameter estimates. Consequently, potential interactions between risk and protective factors could not be examined. Additionally, more detailed social determinants of health were not assessed. Future research should incorporate these factors to better understand the mechanisms underlying SI among care leavers.

Fourth, the presence of NSSI at baseline was a robust predictor of SI at follow-up. However, the magnitude and dynamics of this relationship remain uncertain because individual changes in NSSI behavior over time were not captured. As NSSI frequency and type have been shown to be associated with suicidal behavior (Wester et al., 2016), and a greater number or severity of NSSI has been indicated to correspond to a higher likelihood of SI (Nock et al., 2006; Lloyd-Richardson et al., 2007), a more detailed measure of NSSI at multiple time points might provide a more nuanced understanding of the patterns of change in SI and its relation with NSSI over time.

Fifth, factors and events occurring between the baseline and follow-up assessment are unknown. For example, participants may have received treatments that influenced the presence or absence of SI.

Sixth, the present study assessed only biological sex (not gender identity). Research shows that people with gender identities experience higher rates of suicidal thoughts, suicide attempts, and NSSI compared to the general population (Surace et al., 2021). In future studies, including a broader measure of gender may be beneficial.

Nevertheless, this study examined a high-risk sample of young adult care leavers over a 10-year follow-up period. The findings emphasize the heterogeneity of SI patterns, as well as the evolving risk factors over time. These insights have significant implications for clinicians' risk assessment, the refinement of predictive tools, and the creation and evaluation of targeted interventions.

### 4.2. Implications

This study highlights the need for sustained attention to SI among young adult care leavers, a group characterized by elevated and persistent vulnerability. In particular, individuals with a history of potentially traumatic experiences, NSSI, and mental health problems, as well as female care leavers may benefit from early identification and continuous monitoring. Given that NSSI has been identified as a significant key indicator of subsequent suicide or suicidal thoughts (Lüdtke et al., 2018), its assessment should be systematically integrated into screening and intervention efforts.

Interventions may benefit from not only targeting symptom

reduction but also strengthening protective factors, such as self-directedness, cooperativeness, and social connectedness, and perceived quality of life. Incorporating social-emotional learning and SI awareness into OHC care trajectories may further support the development of competence, and resilience, and social connectedness (Shahram et al., 2021; Sharma, 2025). Tailored and developmentally informed interventions, including those specifically targeting SI (Kothgassner et al., 2020; van Ballegooijen et al., 2025) appear particularly relevant for this population with complex needs. However, also indirect psychotherapy improves SI and self-injurious behavior across different mental disorders (In-Albon et al., 2026; van Ballegooijen et al., 2025). Future longitudinal research should employ targeted suicide risk assessment tools, include repeated and validated measures of NSSI, and systematically examine both risk and protective factors to better capture their dynamic interplay over time.

### *4.3. Conclusion*

In conclusion, SI among young adult care leavers is both highly prevalent and moderately stable from adolescence into adulthood with females showing increased vulnerability in terms of both presence and persistence. Persistent SI is associated with a combination of individual psychopathology and environmental adversity, including NSSI, mental health symptoms, and traumatic experiences, whereas higher self-directedness, cooperativeness, and better quality of life appear to function as protective factors. These findings underscore the importance of considering both risk and resilience processes as well as their interaction, in understanding long-term SI trajectories in this population.

## Clinical trials registry

N.A.

## Consent: patient/participant statement

Written informed consent for participation in the study was obtained from children and adolescents and their legal representatives at baseline (MAZ. study) and from young adults at follow-up (JAEL study). We only recontacted participants who provided written consent at baseline to be recontacted in case of a follow-up study.

## Data availability statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

## Ethics approval statement

The MAZ. study procedure was reviewed and approved by the Ethics Committees on Research Involving Humans at the University of Basel and the University of Lausanne (Switzerland) and by the Institutional Review Board at the University of Ulm (Germany). The JAEL study procedure was reviewed and approved by the Ethics Committee Northwestern and Central Switzerland (EKNZ, Ref.: 2017–00718).

## Pre-registration statement

N.A.

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## CRediT authorship contribution statement

**Daphne Weedage:** Conceptualization, Writing – original draft, Writing – review & editing. **Delfine d'Huart:** Conceptualization, Writing – original draft, Formal analysis, Writing – review & editing. **David Bürgin:** Methodology, Writing – review & editing. **Süheyla Seker:** Writing – review & editing. **Tina In-Albon:** Writing – review & editing. **Robert Vermeiren:** Writing – review & editing. **Cyril Boonmann:** Conceptualization, Writing – original draft, Writing – review & editing. **Marc Schmid:** Writing – review & editing.

## Declaration of competing interest

The authors report there are no competing interests to declare.

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## Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.psychres.2026.117261.

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