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Aggression, Suicidality, and Emotion Profiles in Youth: Links to Early Life Adversity

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ABSTRACT

Suicidality and physical aggression are leading, related youth public health concerns. Yet, whether adolescents who harm themselves, others, or both differ emotionally and etiologically remains unclear. To address this, adolescents from a prospective population-based birth cohort reported their suicidality, physical aggression, depression/anxiety symptoms, anger, and callousness ($N = 1637$). Distinct latent harm-emotion profiles were identified, which were linked to perinatal and childhood experiences. A six-profile solution was retained: Low harm (79.5%), moderate suicidality (6.5%), high suicidality (2%), high aggression (2.5%), moderate aggression (8.5%), and high suicidality and aggression (dual harm; 1%). Elevated harm profiles were compared to the low-harm group. Moderate/high suicidality profiles showed slight elevations in physical aggression. All elevated harm profiles expressed higher negative emotionality. Dual harm and aggression groups reported higher callousness, while suicidality groups reported lower callousness. Aggression profiles were 75% male, suicidality profiles were 21% male, while the low and dual-harm profiles were more similarly mixed sex (47% vs. 63% male, respectively). Low-harm youth experienced more positive childhood parenting. The dual harm and high aggression groups had more deviant childhood best friends, while the dual harm and moderate aggression groups had lower early life household income. The moderate suicidality group had fathers with higher depressive symptoms during infancy and childhood. Thus, one in five youth showed relatively elevated suicidality and/or physical aggression; of which, 95% tended to have a primary target (themselves or others). Early life economic, parental, and peer support may be key for preventing suicidal and aggressive outcomes in adolescence.

Violence has two possible targets: the self or others. Suicide and homicide are among the top four leading causes of youth death in Canada (Statistics Canada 2021). These devastating outcomes are linked to one another; those that are more aggressive are also more likely to consider and attempt suicide (i.e., suicidality; Moore et al. 2022). The co-occurrence of self-harm (suicidality and/or nonsuicidal self-injury) and aggression—also known as dual harm—is linked to poorer outcomes, such lower education attainment, more trouble maintaining a long-term relationship, more lethal suicide attempts, and increased early all-cause mortality (Brokke et al. 2022; Harford et al. 2018; Steeg et al. 2019). Thus, researchers in the field have emphasized the need for creating profiles that help psychologically and etiologically distinguish individuals showing both self- and other-directed harm, as opposed to only one or none (see O'Donnell et al. 2015). The present paper focuses on forms of harm that, at their extremes, can have fatal consequences, that is, suicidality and physical aggression.

1 | The Development and Association of Suicidality and Aggression

Physical aggression typically peaks in early childhood, and about 10%–15% of children continue to maintain relatively high levels of aggression into adolescence (Brame et al. 2001; Côté et al. 2006). On the other hand, suicide attempts and deaths rise sharply after childhood, making adolescence the earliest time dual harm typically emerges (Centers for Disease Control and Prevention 2024; Voss et al. 2019). It is estimated that 3%–5% of adolescents engage in dual harm according to general population studies in the UK (Richmond-Rakerd et al. 2019; Steeg et al. 2023).

Aggression is generally considered an externalizing behavior, while suicidality is often considered a symptom of internalizing disorders (Torres-Rosado et al. 2023). The association between internalizing and externalizing symptoms is well-documented (e.g., $r = 0.24$; Askari et al. 2022). Similarly, researchers have reported a consistent, but small, association between aggression and suicidality in both adolescents and adults. Specifically, in a meta-analysis of 77 studies of those aged 16 years and older, aggression was associated with suicide ideation ($r = 0.24$), a history of attempts ($r = 0.21$), and lethality of suicide ($r = 0.10$; Moore et al. 2022). Furthermore, an earlier age at first suicide attempt is linked to higher aggression, suggesting this suicidality-aggression relation may be especially important to investigate in adolescents, rather than adults (Moore et al. 2022).

The association between suicidality and physical aggression may be comparable between differing forms of self- and other-directed harm. More specifically—in another meta-analysis ($N = 182{,}623$) including adolescents and early adults—researchers reported that the association between aggression and self-harm ($r = 0.20$) did not significantly differ depending on whether measures of self-harm included only suicidality ($r = 0.18$) versus suicidality and nonsuicidal self-injury/nonspecific self-harm ($r = 0.20$; Detullio et al. 2022). Whether nonphysical aggression was included in the measure of aggression also did not significantly change relations to suicidality. Although indirect, these results imply that the association between different forms of aggression and self-harm does not differ substantially.

Altogether, this small, consistent association between aggression and suicidality suggests that a modest proportion of people who harm tend to harm both themselves *and* others. This is further supported by population estimates of dual harm in youth (3%–5%; Richmond-Rakerd et al. 2019; Steeg et al. 2023). However, within the dual-harm literature, researchers have primarily used dichotomous categories to assess whether youth show self- and other-directed harm, for example, youth is aggressive and suicidal: yes or no. This has led to uncertainty regarding whether there is a predominant target of dual harmers (either themselves or others). Relatedly, for those classified as "sole harmers" (i.e., showing elevated harm towards either themselves OR others), do they display no harm towards the other target, or just less?

1.1 | Emotional Characteristics of Aggression and Suicidality

Conner et al. (2003) theorize that it is not just generalized aggression that is associated with suicide, but rather, specifically, reactive aggression. Reactive aggression is characterized by harm used to defend or retaliate against another (Conner et al. 2003; Hubbard et al. 2010). Children and adolescents showing reactive aggression tend to have more intense, dysregulated negative emotions and more social difficulties (Blair 2018; Card and Little 2006; Jambon et al. 2019). Reactive aggression contrasts with proactive aggression—defined as harm used to achieve a goal—which is associated with unemotionality and insensitivity to others' distress (i.e., callous-unemotional traits; Acland et al. 2024; Jambon et al. 2019; Peplak and Malti 2017; Romero-Martínez et al. 2022; Vaughan et al. 2024). Conner et al. (2003) hypothesize that the social and emotional challenges uniquely associated with reactive aggression confer a greater risk of suicide. Relatedly, others have discussed whether emotional difficulties underly the connection between aggression and suicidality (Boxer 2010; Hillbrand 2001; Kerr et al. 2007).

Emotions are strong motivators and inhibitors of harmful behavior (Malti et al. 2020). Emotional temperaments have been linked to long-term expressions of harmful thoughts and behaviors (Acland and Cavanagh 2023; Jambon et al. 2019; Lawson et al. 2022; Peplak and Malti 2017). Investigating the emotionality co-occurring with aggression (i.e., emotional vs. unemotional-callous aggressors) may help differentiate those more susceptible to suicidal thoughts and behaviors. This approach is consistent with the limited research on this topic showing that mood disorders (e.g., major depressive disorder) are prevalent amongst self-directed harmers (69%) and dual harmers (73%), while less so among other-directed harmers (32%), although still more prevalent compared to non-harmers (19%; Harford et al. 2018). Furthermore, Shafti et al. (2021)—in their cognitive-emotional model of dual harm—posit that the personality of individuals moderates how life stressors are behaviorally expressed. They hypothesize that a personality predisposing individuals to higher emotional distress makes them more susceptible to engaging in dual harm. Thus, youth

showing both aggression and suicidality may be typified by heightened emotional problems, whereas those showing only aggression may be more characteristic of callous-unemotional dispositions. However, whether this is the case is unknown as a recent review concluded that there is insufficient evidence on how the different profiles of aggression and suicidality co-occur with emotional dispositions (Shafti et al. 2023).

1.2 | The Etiologies of Suicidality and Aggression

Aggression and suicidality are both associated with childhood adversity. Namely, they are linked to characteristics of pregnancy/birth (birth weight, drug exposure during pregnancy), parents (e.g., mental health, age, parenting style), family (e.g., number of siblings, socioeconomic status, divorce), child (e.g., sex), environment (e.g., adverse events), and peers (e.g., antisocial behaviors; Franklin et al. 2017; Nærde et al. 2024; Orri et al. 2019; Provençal et al. 2015; Tremblay et al. 2004; Vidal-Ribas et al. 2024). Early life adversity (e.g., abuse/neglect) may lead to chronic negative affect and/or limited prosocial emotions (i.e., callousness), culminating in harm (Byrd et al. 2018; Waller et al. 2015; Wolff and Baglivio 2017).

Although suicidality and aggression share many early life predictors, few researchers to-date have attempted to assess whether these diverse early life factors are only associated to both forms of harm due to their overlap. Furthermore, the co-occurrence of aggression and suicidality may be a severity marker for more extreme life adversity (Boxer 2010; Richmond-Rakerd et al. 2019). To understand whether these early life predictors are associated uniquely to one form of harm or the other and whether the co-occurrence of aggression and suicidality indicates more serious life adversity, additional research is needed.

1.3 | The Present Study

Our goal was to create a better understanding of how different patterns of emotions, physical aggression, and suicidality are represented among youth (i.e., emotion-harm profiles). Such profiles will provide insights into what types of harm tend to co-occur, with what severity—for example, whether high aggression co-occurs with high or only slightly elevated suicidality—and what emotional dispositions are characteristic of these differing harm patterns. We were additionally interested in characterizing how these distinct profiles may be associated with early life factors that have already been established as antecedents to aggression and suicidality. This will help disambiguate which factors are related to what outcome. We implemented a data-driven analytic approach (latent profile analysis), thus, the analyses were largely exploratory. Nevertheless, the following were our general expectations regarding how suicidality and aggression would be expressed and develop in youth based on the existing literature:

1. To create emotion-harm profiles, a latent profile analysis was implemented:
   a. Given the established small association between suicidality and aggression, we expected to identify groups of youth that showed only one form of harm (e.g., suicidality vs. aggression) and a smaller group of youth that showed both types of harm.
   b. As per the literature and theory on suicidality and reactive and proactive aggression, we expected to find an emotional aggression and a callous-unemotional aggression profile. The emotional aggression subgroup would be characterized by high negative emotionality, aggression, and elevated suicidality, while the callous-unemotional aggression profile would exhibit low negative emotionality, high aggression, high callousness, and low suicidality.
2. Given that past research suggests that suicidality and aggression share many early life antecedents, we did not have specific hypotheses for how early life factors would be related to profiles. We did have a general expectation that early life adversity would be most strongly associated to a dual-harm profile, as the co-occurrence of harm may indicate greater severity of life challenges.
3. Aggression and suicidality are known to have sex differences, such that males tend to exhibit more physical aggression and females tend to exhibit more suicidality in adolescence (Acland et al. 2025; Rhodes 2014). Thus, whether indicators between and within profiles differed by sex was additionally explored.

2 | Methods

2.1 | Participants

Data came from the Quebec Longitudinal Study of Child Development (QLSCD): a well-established, population-based, longitudinal birth cohort in Canada (conducted by Institut de la Statistique du Québec) that began in 1997/98 ($N = 2120$). Participants were recruited from the Quebec Birth Registry via a stratified procedure based on location and birth rate. Data collection is ongoing and has been collected every 1 or 2 years from birth into adulthood (for more information on recruitment and sampling see Orri et al. 2021; QLSCD Technical Documentation n.d.). In the present study, we used data from when participants were aged 5 months to 10 years for assessing perinatal and childhood factors and ages 15 and 17 years for understanding suicidality and physical aggression profiles in adolescents ($n = 1637$; 77% retention).

2.2 | Procedure

The QLSCD protocol was approved by the *Institut de la statistique du Québec* and the St-Justine Hospital Research Centre ethics committees in accordance with the Declaration of Helsinki, and informed assent and consent was acquired at each data collection. For infancy and childhood data collection waves, a computerized questionnaire was completed by a researcher who interviewed the person most knowledgeable about the child (mother in $> 97\%$ of cases) typically by phone. Mothers and fathers also completed self-report questionnaires. Youth completed self-report questionnaires at ages 10, 15, and 17 years.

2.3 | Measures

Multi-item measures were computed into factor scores using R package *stats* (R Core Team 2021) unless otherwise stated. As Cronbach's alpha (α) penalizes scales for the number of items, α was provided only for measures that had at least 10 items or if the alpha value was > 0.70 (acceptable threshold; Pallant 2020). If the measures did not meet these conditions, average inter-item correlation was reported; internal reliability was considered acceptable if $r = 0.15–0.50$ (Clark and Watson 1995). Revelle's omega total (ω_t) and loadings onto a unidimensional factor were also provided for all measures via R package *psych* and *stats* (McNeish 2018; Revelle 2023). Scale adjustments were considered if factor loadings were < 0.40 and removing an item improved internal consistency or retest reliability. See Table 1 for a list of measures, when they were assessed, and by which informant.

2.3.1 | Adolescent Measures

All adolescent measure items, scales, and reliability indices are provided in Appendix S1 and reasoning for adjustments to measures is detailed in Appendix S2. Youth completed the same measures at ages 15 and 17 years; items from the two adolescent timepoints were averaged together before factor score computation ensuring each timepoint was weighted equally.

Youth completed the Mental Health and Social Inadaptation Assessment for Adolescents (MIA; Côté et al. 2017). The MIA is a 113-item self-reported questionnaire aimed at measuring DSM-5 mental health symptoms over the last 12 months. MIA items pertaining to physical aggression, callousness, depression, anxiety, and anger were used to create subscales for each of those constructs.

For the anger measure, in addition to two items from the MIA scale, one item from a scale asking youth about their relationship with their teachers was used (adapted from the Student—Teacher Relationship Scale; Pianta and Steinberg 1992). Suicidality was self-reported by youth via three items related to suicidal thoughts and attempts. Suicidality, physical aggression, and callousness scores were averages of items (not factor scores), as this improved the measures' retest reliability (see Appendices S1 and S2 for details).

2.3.2 | Perinatal and Childhood Measures

Measures used to predict adolescent harm profiles were collected when children were 5 and 29 months, then 3 (perinatal and demographic measures) and 10 years (childhood measures). These ages were selected as these timepoints included both parents' reports (see Table 1 and Appendix S3 for scale details and alterations).

TABLE 1 | Perinatal, childhood, and adolescent factors measured.

Timepoints	Medical records	Mother-reported	Father-reported	Youth-reported
5 months	– Neonatal risk (prematurity, birth weight) – Sex at birth	– Mother's age – Intact family (yes/no) – Household income – Depressive symptoms – Pregnancy substance use (alcohol/cigarettes)	– Father's age – Depressive symptoms	
29 months		– Ethnic background (European: yes/no)	– Ethnic background (European: yes/no)	
3 years		– Number of siblings of participating child		
10 years		– Intact family (yes/no) – Household income – Depressive symptoms – Positive and harsh parenting practices – Child adverse life events (past year)	– Depressive symptoms – Positive and harsh parenting practices	– Prosocial and antisocial behaviors of best friend
15 and 17 years				– Physical aggression – Suicidality – Callousness – Anger – Depression – Anxiety

2.4 | Data Analysis

2.4.1 | Descriptive Statistics

Information on variable distributions and central tendencies were provided for study variables using *R* package *skimr* (Waring et al. 2022). Zero-order spearman correlations were performed using *corrplot* and *Hmisc* to assess associations between study variables (Harrell 2022; Wei and Simko 2021).

2.4.2 | Profile Analysis: Harm and Emotion Expression Patterns in Youth

To assess how patterns of suicidality, physical aggression, and emotional tendencies are expressed in adolescence, a latent profile analysis was conducted in *R* v4.1.2 via the package *tidyLPA* (Rosenberg et al. 2018). Solutions were compared based on the number of profiles (1–10) and model constraints. Model selection was based on sample-size adjusted BIC values, likelihood ratio bootstrap tests, entropy, and a preference for having all class sizes include ≥ 1% of the sample (see Spurk et al. 2020). Profile analyses are a data reduction technique, the goal of which is to group people in useful and reliable ways. Thus, theoretical considerations were also weighted, specifically the identification of a dual-harm group (see Appendix S4 for method details and R code).

Profiles were compared on their indicators (i.e., harm and emotions) using unpaired two-sample Wilcoxon rank sum tests (accommodates non-normally distributed data) via R package *ggpubr* (Kassambara 2023). Indicators of the profiles were also compared for potential sex differences between and within profiles using two-way ANOVAs for each indicator. If the sex differences varied by profile, unpaired two-sample Wilcoxon rank sum tests were performed comparing sex differences for each profile for that indicator. All *p* values were adjusted within each model for false discovery rate via *stats* (Benjamini and Hochberg 1995; R Core Team 2021). Profile plots were generated with the *ggplot2* package (Wickham 2016).

2.4.3 | Multinomial Regressions: Perinatal and Childhood Links to Profiles

Multinomial regression analyses were conducted to assess whether early life factors related to adolescent harm profiles via the *nnet* package (Venables and Ripley 2002). The low-harm profile was used as the reference for comparison. All predictors were scaled to be from 0 to 1 (with the exception of age) to aid in odds ratio (OR) interpretation, that is, the odds of being in a profile when comparing those with the lowest versus highest score on a predictor.

Multinomial analyses were conducted in several models. In Model 1a, perinatal factors were assessed, which included both mother and father reports to assess their independent contributions to profile membership. In Model 2a, significant perinatal predictors were included as controls and childhood factors were assessed. To avoid issues of multicollinearity, variables assessed both perinatally and in childhood were not included in the same models. In Models 1b and 2b, the same models were performed except that the mother and father reports were scaled to be between 0 and 1 (for equal weighting) and then averaged together. Linear models were tested to assess potential multicollinearity: predictor variables ranged in VIF values from 1.01 to 1.97. Model *p* values were adjusted for false discovery rate.

The most robust, consistent early predictors were included in a final trimmed model (Model 3). Lastly, elevated harm profiles were contrasted to one another to assess whether early factors were confidently associated with a particular profile: evaluated using OR plots (R package *OddsPlotty;* Hutson 2021). See Appendix S5 for additional methodological details and R code.

2.4.4 | Missing Data

The QLSCD follows participants across birth into early adulthood. Thus, we included variables at additional timepoints to improve the reliability of imputed missing data (see Appendix S6 for all added variables).

To maximize our sample and the quality of the estimated missing data, we imputed missing data for participants that had at least some data available at ages 13, 15, 17, and/or 20 years (final $n = 1637$; 77% retention; see Appendix S6 for further information and R code). Multiple imputations were performed via the *missForest* R package (Stekhoven and Bühlmann 2012).

Prevalence of missing data in the 1637 subset: 0% for medical records, ≤2% for mother and 7%–15% for father perinatal reports, 21%–34% for mother and 50% for father reports at 10 years, 12%–28% for youth reports at age 15 and 17 years. Of the perinatal factors, higher maternal depression, non-European maternal ethnicity, lower alcohol consumption during pregnancy, lower income, and assigned male at birth were associated with attrition by adolescence.

3 | Results

3.1 | Descriptive Statistics

Variables included in analyses are described in Table S1: means, standard deviations, score percentiles, and histograms are provided. Zero-order correlations are provided in Figure 1. All perinatal and childhood factors, except for whether families were intact at 5 months old, were significantly related to at least one of the adolescent profile indicators. Household income was strongly correlated from 5 months to 10 years ($r = 0.65$) suggesting high stability over time. Parental depression and family intactness had low (r = 0.18) and moderate (r = 0.42) stability over time, respectively.

3.2 | Latent Profile Analysis

Fit indices (adjusted BIC and entropy) demonstrated that the model that specified variances and covariances as equal was the

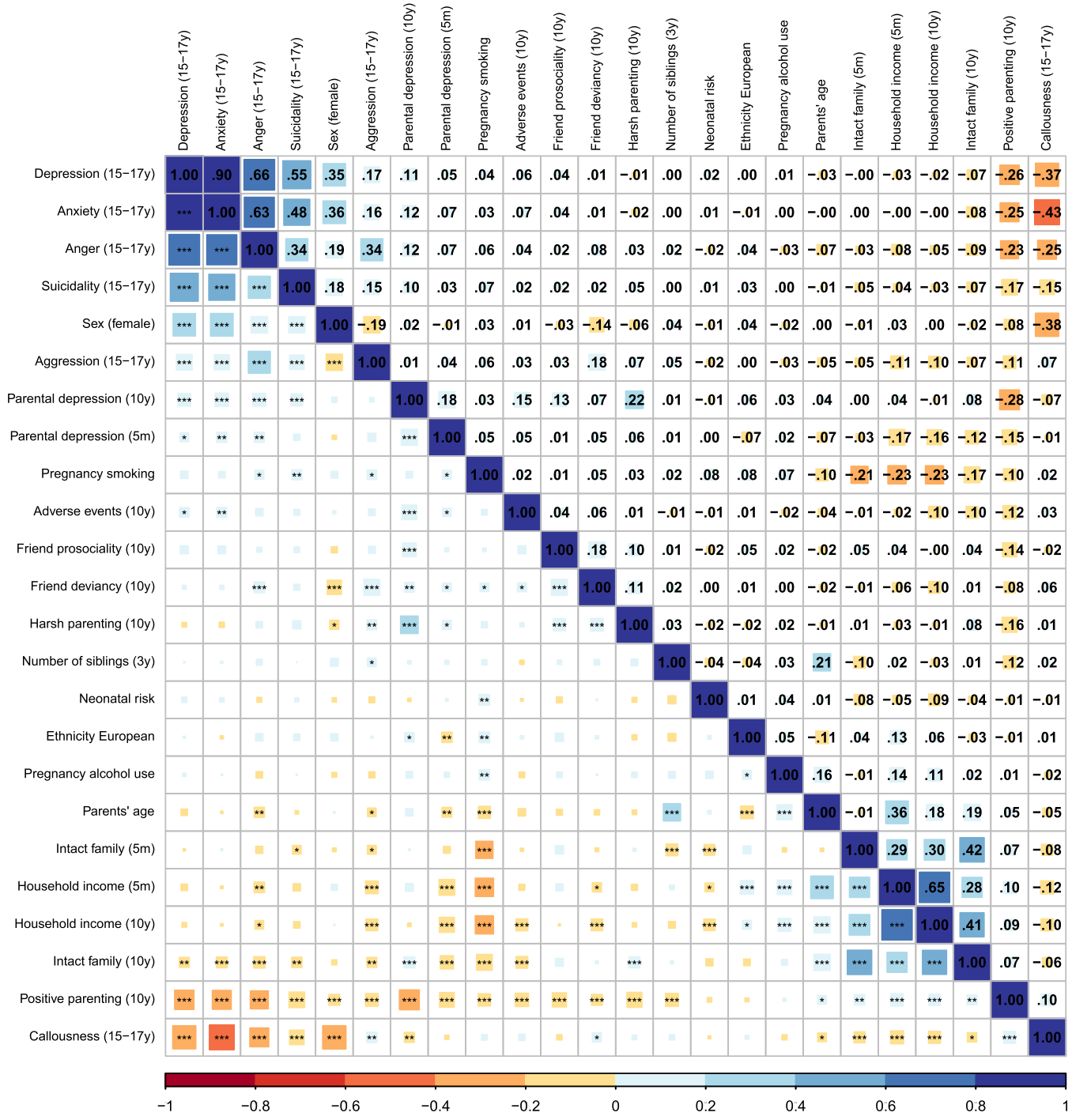

FIGURE 1 | Zero-order Spearman correlations for study variables after imputation ($n = 1637$). Data were compiled from the final master file of the Québec Longitudinal Study of Child Development (1998–2018), ©Gouvernement du Québec, Institut de la statistique du Québec. *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$. [Color figure can be viewed at wileyonlinelibrary.com]

best fit across the profiles tested. In the retained model, likelihood ratio bootstrap tests suggest that adding a profile all the way up to 10 profiles explained significant additional variance ($ps < 0.001$). However, profiles above seven had decreased entropy and/or contained warnings of concern. Profiles 5 and above identified what appears to be a distinctive dual-harm group. Profiles 5 and 7–10 had a minimum group that contained less than 1% of the sample (rounded to one decimal place). Thus, the six-profile solution met all selection criteria (see Figure 2): minimum profile size = 1.0% ($n = 16$); bootstrap likelihood ratio test value = 376, $p < 0.001$; Entropy = 0.98. This six-profile solution was stable across other starting seed values and a higher number of starts, suggesting that identified profiles were not due to a local solution. Profiles were also similar regardless of whether emotion variables were included. However, the dual-harm group was slightly larger (1% vs. 0.6%) and had higher aggression when emotion variables were considered (see Appendix S4). Details regarding output warnings in R, profile selection, and additional sensitivity tests are provided in Appendices S4 and S6.

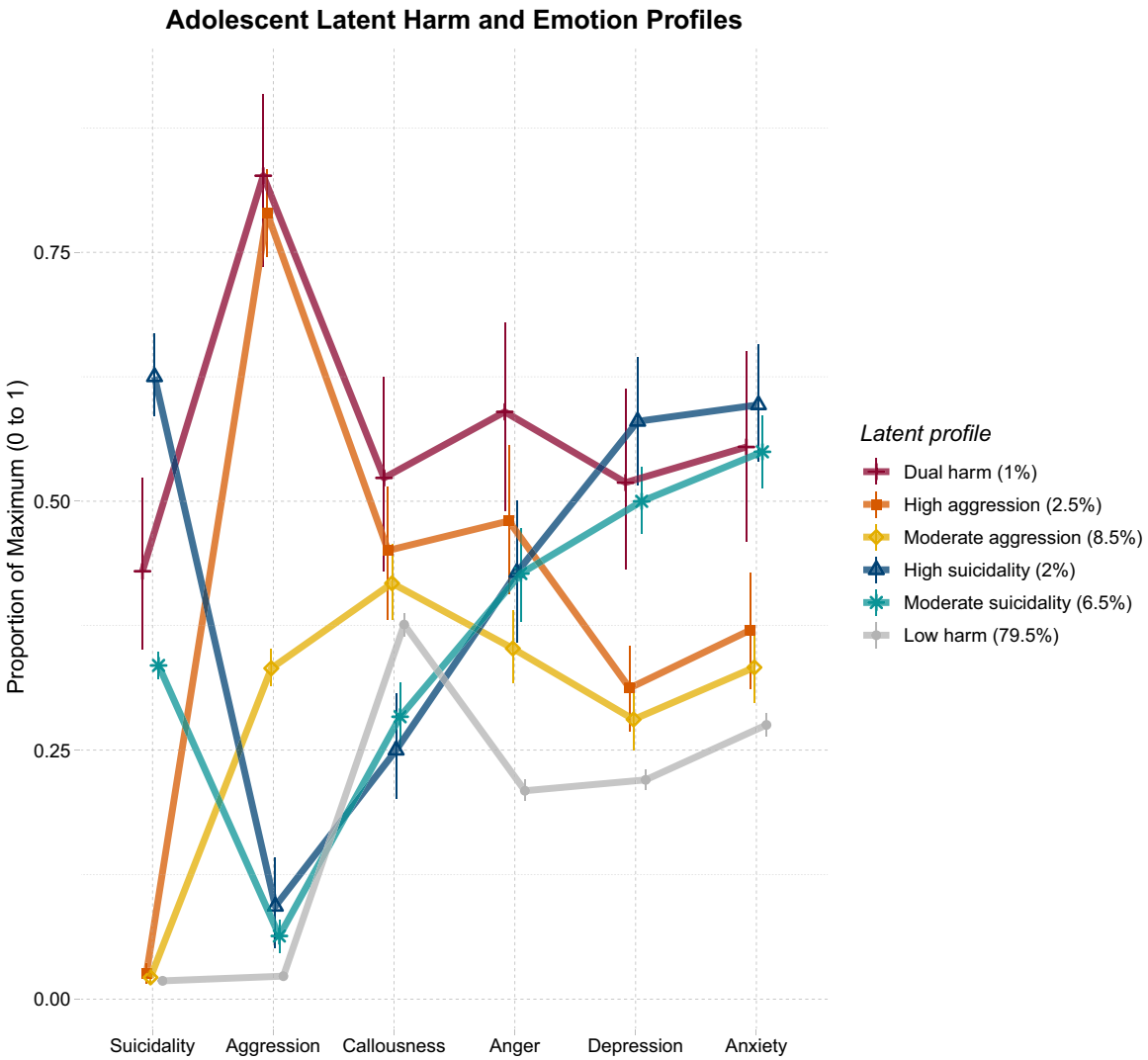

FIGURE 2 | Six-profile solution with equal variances and covariances specified ($n = 1637$). Error bars indicate 95% bootstrapped confidence intervals. Point estimates were specified to dodge to reduce overlap. Percentages were rounded to closest 0.5. Data were compiled from the final master file of the Québec Longitudinal Study of Child Development (1998–2018), ©Gouvernement du Québec, Institut de la statistique du Québec. [Color figure can be viewed at wileyonlinelibrary.com]

The profiles identified suggest that youth express either low harm (limited suicidality and aggression; $n = 1302$, 79.5%), moderate suicidality ($n = 108$, 6.6%), high suicidality ($n = 33$, 2%), moderate aggression ($n = 135$, 8.3%), high aggression ($n = 43$, 2.6%), or dual harm (high in both suicidality and aggression; $n = 16$, 1%). Profiles appear to differentiate between forms and levels of harm more so than emotional symptoms; this is apparent from the sharp range cut-offs for suicidality and aggression within each profile, but not for emotional indicators (see Figure 3). Dual harm and high aggression profiles had elevated aggression compared to all other profiles (see Figure S1 for all pairwise comparisons). Suicidality profiles had higher physical aggression than the low-harm group. The low harm and aggression profiles had lower suicidality compared to dual harm and suicidality profiles. Notably, no one in the dual-harm group exhibited a score of zero for any of the emotional indicators (callousness, anger, depressive/anxiety symptoms). Furthermore, no one in the high or moderate suicidality groups exhibited scores of zero for depression and anxiety symptoms. The low-harm group reported lower anger, depression, and anxiety compared to all other groups. The dual-harm group had the highest level of anger, although whether they were higher than the high-aggression group was uncertain. The dual harm and suicidality profiles reported higher anxiety and depression compared to the aggression profiles. The dual harm and aggression profiles all expressed higher callousness compared to the low harm and suicidality profiles. Interestingly, the low-harm group reported higher callousness compared to suicidality profiles. Together, this suggests that profiles represented distinct levels of harm and associated emotions.

3.3 | Sex Differences Within and Between Harm Profiles

Across profiles, males tended to exhibit higher aggression and callousness, while females reported higher suicidality, anger, depression, and anxiety (see Appendix S7 for full details and R

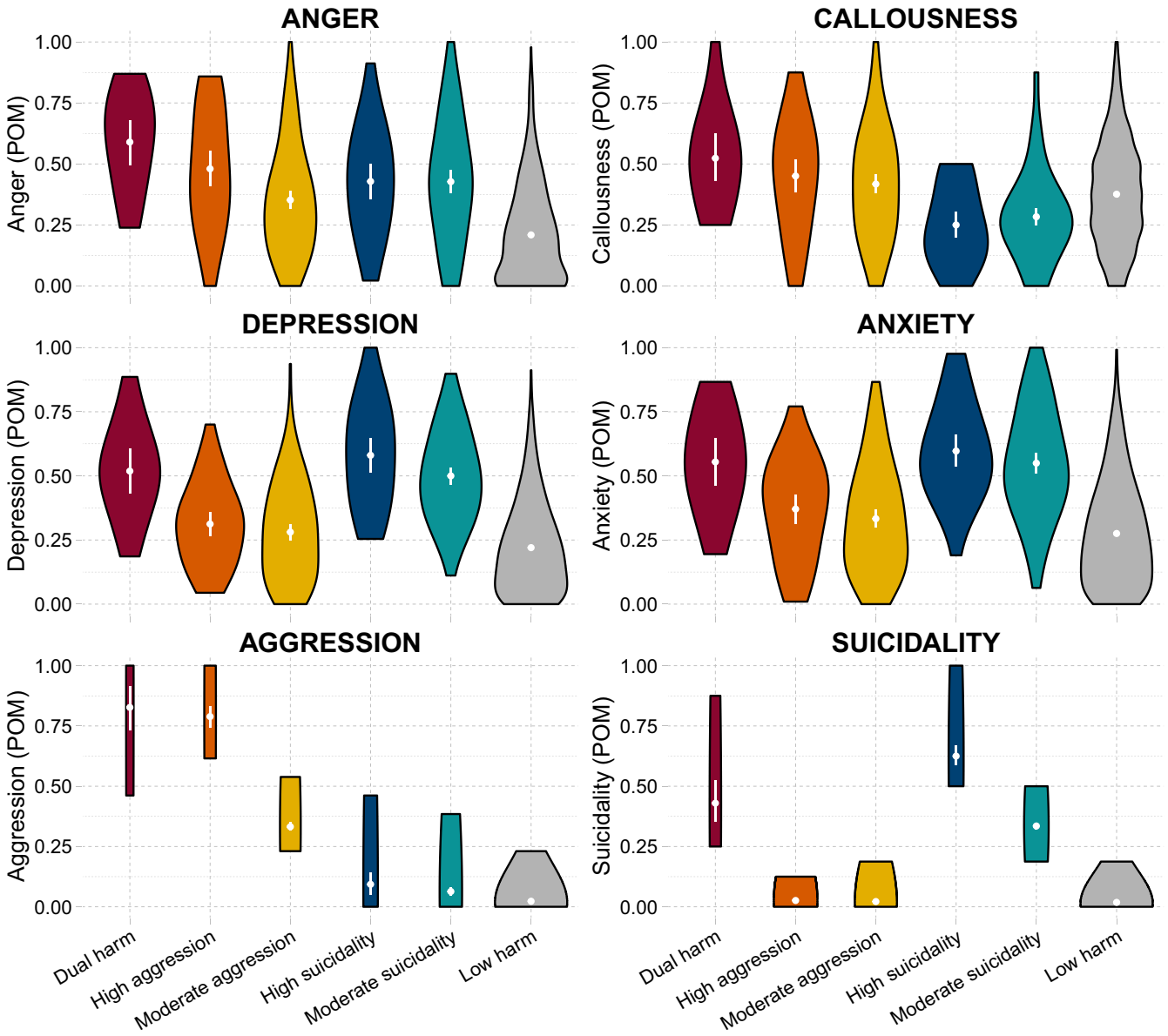

FIGURE 3 | Violin plots illustrating the distribution of responses to indicators within profiles ($n = 1637$). See Figure S1 for pairwise comparisons. Error bars indicate 95% bootstrapped confidence intervals. POM, proportion of maximum. Data were compiled from the final master file of the Québec Longitudinal Study of Child Development (1998–2018), ©Gouvernement du Québec, Institut de la statistique du Québec. [Color figure can be viewed at wileyonlinelibrary.com]

code). Similarly, within most profiles, males tended to be less depressed, more callous, and more aggressive, although these differences were not significant in all cases. This contrasts with the dual-harm group where callousness, depressive symptoms, and aggression appeared more equivalent; however, due to this group's small size, these findings should be interpreted with caution. High and moderate aggression profiles had higher odds of including males compared to the low-harm group (77% and 74% vs. 47% male, respectively; see Table S2). Alternately, high and moderate suicidality profiles included more females compared to the low-harm profile (88% and 76% vs. 53% female, respectively). Although the dual-harm group included a greater proportion of males, they did not significantly differ from the low-harm group in terms of sex (63% vs. 47% male, respectively). The dual harm and high aggression profiles included more males compared to the suicidality profiles (see Figure S2).

3.4 | Early Factor Links to Elevated Youth Harm Profiles (Compared to Low-Harm Group)

Sex was included as a control for childhood Models 2a and 2b. No one in the dual-harm group was born premature or low weight, leading to a significant negative association between neonatal risk and dual harm. However, having no neonatal risk was common ($> 90\%$; $n = 1535$) and the dual-harm group included few individuals (1%; $n = 16$), potentially accounting for this association. This association between low neonatal risk and higher odds of dual-harm membership should be treated with caution and was therefore not included in the trimmed model.

Combined parental reports of depression at 5 months and 10 years were consistently associated with the moderate suicidality profile (see Tables 2 and 3). However, this relation with

TABLE 2 | Model 1b: Perinatal predictors of adolescent profiles.

	Dual harm ($n = 16$)			High aggression ($n = 43$)			Moderate aggression ($n = 135$)			High suicidality ($n = 33$)			Moderate suicidality ($n = 108$)		
Characteristic	**OR**	**95% CI**	***p* value**	**OR**	**95% CI**	***p* value**	**OR**	**95% CI**	***p* value**	**OR**	**95% CI**	***p* value**	**OR**	**95% CI**	***p* value**
Sex (female)	0.51	0.18, 1.43	0.201	**0.25**	**0.12, 0.51**	**< 0.001**	**0.30**	**0.20, 0.45**	**< 0.001**	**6.35**	**2.21, 18.2**	**< 0.001**	**2.81**	**1.78, 4.43**	**< 0.001**
Pregnancy smoking	0.92	0.07, 12.1	0.947	3.55	0.90, 14.0	0.070	1.28	0.51, 3.25	0.601	3.85	0.89, 16.7	0.071	1.23	0.43, 3.49	0.704
Pregnancy alcohol use	0.15	0.00, 49.3	0.518	0.47	0.03, 7.33	0.590	1.44	0.35, 5.87	0.614	0.65	0.03, 14.2	0.786	0.83	0.15, 4.51	0.832
Neonatal risk	**0.00**	**0.00, 0.00**	**< 0.001**	0.14	0.00, 4.83	0.276	0.60	0.18, 1.99	0.401	0.80	0.09, 6.97	0.843	1.19	0.37, 3.80	0.765
Household income	0.23	0.03, 1.92	0.176	0.87	0.23, 3.33	0.843	**0.26**	**0.12, 0.55**	**< 0.001**	0.50	0.12, 2.12	0.345	0.90	0.39, 2.09	0.812
Number of siblings	8.17	0.92, 72.8	0.06	5.46	1.24, 24.1	0.025	1.47	0.60, 3.60	0.395	0.21	0.03, 1.39	0.106	1.01	0.38, 2.66	0.989
Intact family	0.70	0.22, 2.26	0.548	1.35	0.56, 3.29	0.505	0.98	0.61, 1.57	0.932	0.75	0.31, 1.82	0.523	0.94	0.55, 1.60	0.808
Parents' age	0.92	0.81, 1.04	0.171	0.96	0.89, 1.03	0.293	1.00	0.96, 1.04	0.995	1.00	0.92, 1.09	0.974	1.01	0.96, 1.06	0.702
Parents' depression	2.89	0.18, 47.4	0.457	1.60	0.22, 11.8	0.644	1.88	0.61, 5.80	0.271	0.67	0.05, 8.31	0.755	4.11	1.20, 14.1	0.024
Ethnicity	0.73	0.16, 3.33	0.689	1.82	0.54, 6.07	0.332	1.48	0.79, 2.78	0.222	1.98	0.46, 8.59	0.362	1.68	0.79, 3.57	0.178

Note: Modal 1b shows the odds of being in one of the elevated harm profiles relative to the low-harm profile ($n = 1302$) based on perinatal factors. All measures were assessed between 5 and 29 months, except for number of siblings (41 months). Values are bolded if *p* value is significant after adjusting for false discovery rate (adjusted threshold = 0.01). Data were compiled from the final master file of the Québec Longitudinal Study of Child Development (1998–2018), ©Gouvernement du Québec, Institut de la statistique du Québec.
Abbreviations: CI, confidence interval; OR, odds ratio.

TABLE 3 | Model 2b: Childhood predictors of adolescent profiles.

	Dual harm ($n = 16$)			High aggression ($n = 43$)			Moderate aggression ($n = 135$)			High suicidality ($n = 33$)			Moderate suicidality ($n = 108$)		
Characteristic	**OR**	**95% CI**	***p* value**	**OR**	**95% CI**	***p* value**	**OR**	**95% CI**	***p* value**	**OR**	**95% CI**	***p* value**	**OR**	**95% CI**	***p* value**
Sex (female)	0.52	0.18, 1.51	0.228	**0.29**	**0.14, 0.61**	**0.001**	**0.30**	**0.20, 0.45**	**< 0.001**	**6.25**	**2.16, 18.1**	**< 0.001**	**2.82**	**1.77, 4.49**	**< 0.001**
Household income	0.13	0.01, 1.23	0.076	2.90	0.58, 14.6	0.196	0.33	0.14, 0.80	0.014	0.78	0.15, 4.18	0.774	1.47	0.54, 4.00	0.454
Intact family	0.99	0.32, 3.02	0.981	0.59	0.29, 1.17	0.128	0.75	0.50, 1.13	0.164	0.46	0.21, 1.00	0.051	0.62	0.39, 0.97	0.035
Parents' depression	1.84	0.07, 45.8	0.710	0.09	0.00, 1.82	0.118	0.64	0.15, 2.64	0.536	2.80	0.25, 31.2	0.402	3.35	0.86, 13.1	0.082
Harsh parenting	0.55	0.00, 86.9	0.815	0.84	0.03, 23.7	0.921	3.86	0.76, 19.6	0.104	6.73	0.38, 119	0.194	2.27	0.34, 14.9	0.395
Positive parenting	**0.01**	**0.00, 0.19**	**0.002**	0.09	0.01, 0.57	0.010	0.29	0.10, 0.87	0.027	0.12	0.02, 0.85	0.034	**0.14**	**0.04, 0.44**	**< 0.001**
Adverse life events	0.70	0.08, 6.28	0.750	2.35	0.64, 8.56	0.195	0.73	0.30, 1.75	0.481	0.29	0.04, 2.00	0.210	0.80	0.32, 2.04	0.645
Deviant best friend	19.5	1.41, 269	0.027	**46.7**	**8.34, 261**	**< 0.001**	1.86	0.47, 7.28	0.375	1.39	0.03, 56.3	0.860	3.32	0.58, 19.0	0.177
Prosocial best friend	0.68	0.11, 4.35	0.681	0.24	0.05, 1.21	0.083	1.28	0.70, 2.33	0.426	0.84	0.24, 2.98	0.785	1.15	0.60, 2.21	0.669

Note: Model 2b shows the odds of being in one of the elevated harm profiles relative to the low-harm profile ($n = 1302$) based on childhood factors. All predictors were measured when participants were 10-year-old, with the exception of sex. Values are bolded if *p* value is significant after adjusting for false discovery rate (adjusted threshold = 0.01). Data were compiled from the final master file of the Québec Longitudinal Study of Child Development (1998–2018), ©Gouvernement du Québec, Institut de la statistique du Québec.

Abbreviations: CI, confidence interval; OR, odds ratio.

parental depression was partially accounted for by positive parenting at 10 years; as when positive parenting was removed from the equation, the relation between parental depression and moderate suicidality became stronger (OR = 4.86, 95% CI = 0.92, 25.7, $p = 0.063$ vs. OR = 10.2, 95% CI = 2.16, 48.1, $p = 0.003$). This could suggest that parental depression leads to less positive parenting, resulting in moderately elevated (sole harm) suicidality in adolescence.

At both 5 months and 10 years, paternal depression was associated with moderate suicidality membership above and beyond maternal depression (see Tables S2 and S3). When included together in a trimmed model, paternal depression at both 5 months (OR = 3.95, 95% CI = 1.03, 15.1, $p = 0.044$) and 10 years (OR = 3.51, 95% CI = 0.94, 13.1, $p = 0.062$) were similarly associated to moderate suicidality membership (positive parenting was controlled). Paternal depression, therefore, appeared to be a more robust predictor than combined parental depression. For the final trimmed model, paternal depression at 5 months and 10 years was scaled and combined.

All elevated harm profiles had lower odds of receiving positive parenting at 10 years (see Table 3). Lower household income was associated with moderate aggression (5 months and 10 years) and dual harm (5 months) profile membership. The relation between household income at 5 months and dual harm was only apparent when other nonsignificant variables were trimmed (see Table 4 for trimmed Model 3). When both income at 5 months and 10 years were included a trimmed model, only income at 5 months remained significantly associated with the moderate aggression profile (5 months: OR = 0.33, 95% CI = 0.15, 0.73, $p = 0.006$; 10 years: OR = 0.60, 95% CI = 0.22, 1.67, $p = 0.332$), thus was retained for the trimmed predictor model. Those in the dual harm and high aggression profiles were at greater odds of having a best friend who engaged in antisocial behavior (see Figure 4 and Table 4 for final trimmed predictor Model 3).

To compare elevated harm profiles, odd ratio plots were used to visualize differences between profiles with similar forms of harm (e.g., high suicidality vs. moderate suicidality) and highest harm profiles (e.g., high aggression vs. high suicidality; see Figure S2). On average, higher harm profiles (especially dual harm) had lower household incomes, although these differences were not significant in most cases. Paternal depression was on average higher in the moderate suicidality group compared to the dual harm and high suicidality groups, however, not significantly. The dual-harm group on average had best friends with the highest antisocial behaviors and the least positive parenting, most confidently so when compared to the moderate suicidality (only for friend deviancy) and moderate aggression profiles.

4 | Discussion

This study investigated how harmful thoughts and acts towards oneself and others co-occur and develop in a population-based sample of Canadian adolescents. Youth who engaged in harm typically had a preferred target. Namely, the moderate/high suicidality profiles (8.5%) tended to exhibit only slight relative

TABLE 4 | Model 3: Trimmed model of early predictors of adolescent profiles.

Characteristic	Dual harm ($n = 16$)			High aggression ($n = 43$)			Moderate aggression ($n = 135$)			High suicidality ($n = 33$)			Moderate suicidality ($n = 108$)		
	OR	95% CI	*p* value	OR	95% CI	*p* value	OR	95% CI	*p* value	OR	95% CI	*p* value	OR	95% CI	*p* value
Sex (female)	0.55	0.19, 1.59	0.271	**0.30**	**0.15, 0.63**	**0.001**	**0.30**	**0.20, 0.45**	**< 0.001**	**6.13**	**2.12, 17.7**	**< 0.001**	**2.74**	**1.72, 4.37**	**< 0.001**
Household income (5 months)	**0.15**	**0.03, 0.95**	**0.044**	0.76	0.25, 2.29	0.625	**0.27**	**0.14, 0.52**	**< 0.001**	0.40	0.12, 1.39	0.152	0.95	0.45, 1.98	0.883
Fathers' depression (5 months and 10 years)	0.56	0.04, 7.96	0.670	1.05	0.23, 4.78	0.951	0.94	0.37, 2.40	0.905	0.65	0.10, 4.34	0.657	**3.73**	**1.58, 8.78**	**0.003**
Positive parenting (10 years)	**0.01**	**0.00, 0.20**	**0.002**	**0.17**	**0.03, 0.95**	**0.044**	**0.28**	**0.10, 0.78**	**0.016**	**0.10**	**0.01, 0.69**	**0.020**	**0.13**	**0.04, 0.40**	**< 0.001**
Deviant best friend (10 years)	**19.7**	**1.80, 216**	**0.015**	**21.6**	**4.71, 99.5**	**< 0.001**	2.26	0.60, 8.44	0.226	1.39	0.04, 52.1	0.859	3.02	0.54, 17.0	0.210

Note: Model 3 shows the odds of being in one of the elevated harm profiles relative to the low-harm profile ($n = 1302$) based on most robust perinatal and childhood factors. Values are bolded if *p* value is significant (threshold = 0.05). Data were compiled from the final master file of the Québec Longitudinal Study of Child Development (1998–2018). ©Gouvernement du Québec, Institut de la statistique du Québec.
Abbreviations: CI, confidence interval; OR, odds ratio.

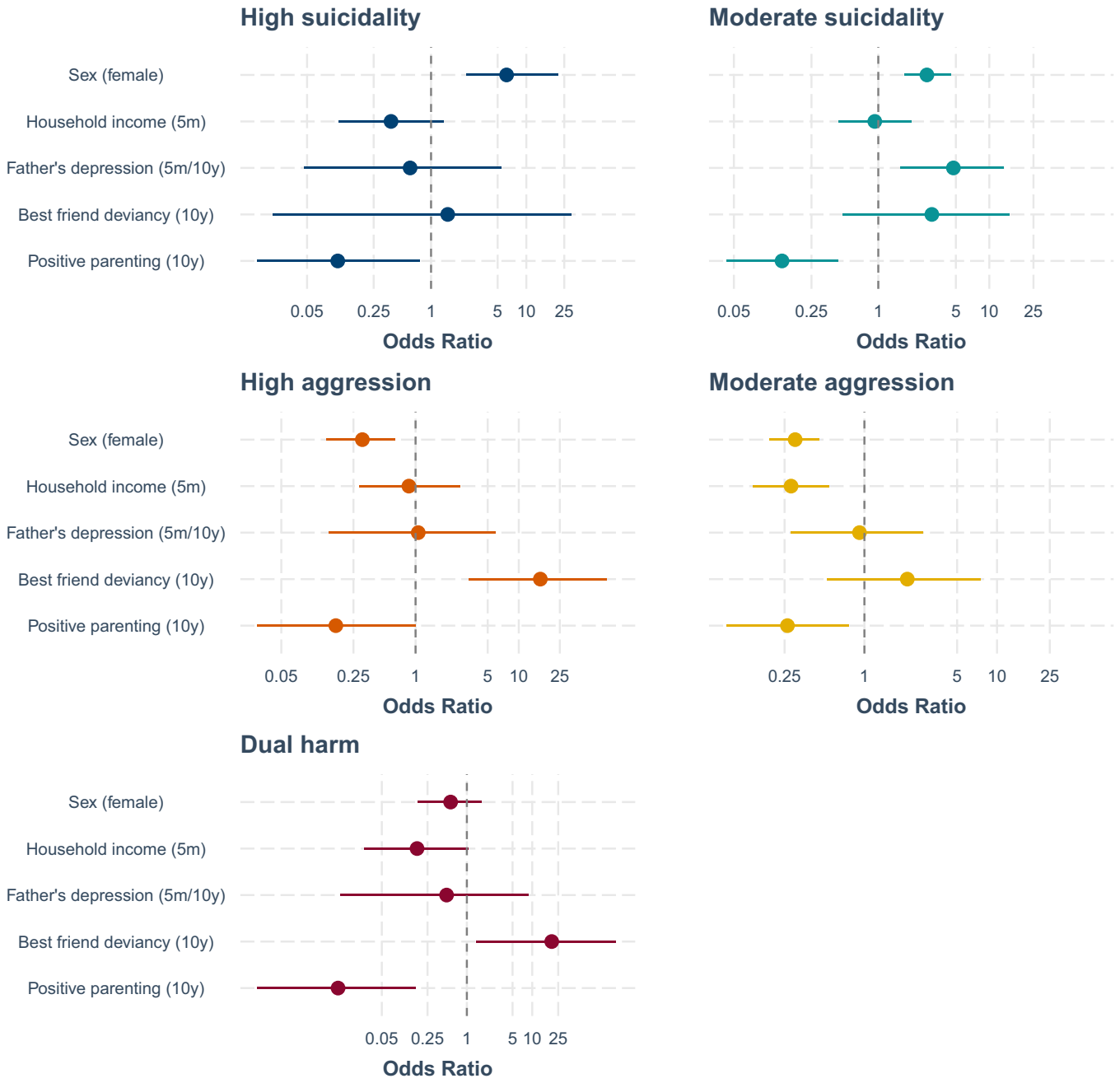

FIGURE 4 | Odds ratio point estimates with 95% confidence intervals for the six adolescent harm profiles (compared to the low-harm group). All early factors were scaled to be between 0 and 1. 5 m = 5-month-old; 10 y = 10-year-old. See Table 4 for model statistics. Data were compiled from the final master file of the Québec Longitudinal Study of Child Development (1998–2018), ©Gouvernement du Québec, Institut de la statistique du Québec. [Color figure can be viewed at wileyonlinelibrary.com]

elevations in physical aggression. The level of physical aggression was also variable, such that some in the suicidality profiles reported moderate physical aggression while others reported none. Moderate/high physical aggression profiles (11%) were generally accompanied by either low or no suicidality. This suggests that most youth who engage in harm have a primary target: others or themselves (i.e., sole harm). A small number of youth engaged in both forms of harm at relatively high levels (1%). This dual-harm group had a combination of the sole-aggression and sole-suicidality emotional profiles: high negative emotionality and callousness. This is consistent with past research showing that dual-harm individuals may have especially poor emotion regulation (Richmond-Rakerd et al. 2019).

4.1 | Emotional Characteristics of the Emotion-Harm Profiles

The negative emotion patterns in the identified harm-emotion profiles were partially in-line with our expectations. As anticipated, the dual-harm group exhibited relatively high negative emotionality. On the other hand, we expected that the sole-

aggression group would be callous and unemotional, however, they ended up being more so callous-*emotional*. The sole-aggression group's negative emotionality levels were on average lower than those of the dual-harm group, but were still relatively elevated compared to low-harm youth. Further, we did not expect the dual-harm group to have high callousness, as that tends to be a feature of proactive, rather than reactive aggression. Thus, both dual harm and high sole-aggression profiles tended to show a callous-emotional disposition; the main emotional distinction between the two groups ended up being the severity of their negative emotionality.

In the literature on callous-unemotional traits, a distinction is made between primary and secondary traits. Primary callous-unemotional traits are thought to represent those with a genetic predisposition for callousness and a lack of emotionality (Blair 1995; Kimonis et al. 2008). On the other hand, secondary callous-unemotional traits are thought to develop due to environmental adversity, which gives rise to callousness and negative emotionality (Craig et al. 2021; Kochanska 1997). This secondary variant fits all the youth profiles we found showing aggression: elevated negative emotionality, callousness, and early life adversity. Interestingly, a meta-analysis by Cardinale and Marsh (2020) showed that the "unemotional" component of the measures assessing callous-unemotional traits lacks internal consistency and external validity. Thus, our results add to the discussion surrounding the utility of the "unemotional" facet of callous-unemotional traits, at least in the context of youth aggression in the general population.

Based on Conner et al. (2003), we thought the dual-harm group would be more representative of the features of reactive aggression—that being, high negative emotionality but not callous. This could suggest that these profiles do not tap into these differing functions of aggression. Alternately, it may suggest that aggression in the general population is better understood by the severity of the accompanied negative emotionality, which modulates whether the aggression will coincide with suicidality. This mirrors a past study by Kerr et al. (2007) showing that internalizing symptoms severity is especially predictive of suicide attempts when youth also display aggression. Further research using measures of reactive and proactive aggression and suicidality, in addition to emotionality and callousness, is needed to clarify our findings here.

Interestingly, the sole-suicidality groups may be especially considerate of others and feel more guilt (i.e., low callousness), even when compared to the low-harm youth. This is akin to previous research showing that people who attempt suicide experience greater distress in response to others' suffering (Scocco et al. 2020). Perhaps this added social care worsens their negative emotionality. Conversely, both the dual harm and high aggression groups had higher callousness, but also elevated negative emotionality (compared to the low harm group). On face value, high callousness co-occurring with high negative emotionality seems counter-intuitive given that, on average, we found that being more callousness was linked to *less* negative emotions. The latter is consistent with past research in youth showing that more empathy and guilt are related to more internalizing symptoms (Gambin and Sharp 2016; Muris et al. 2016). Thus, variable-centered approaches imply that caring for others tends to co-occur with more negative emotions. Whereas preliminary evidence from our person-centered approach suggests that this is true for youth experiencing primarily suicidality, but not for youth showing aggression. Further research with a larger sample or oversampled for violent behavior is needed to confirm this finding.

4.2 | Early Life Antecedents and Demographics of the Harm-Emotion Profiles

Similar to past studies, we found that suicidality profiles were more female, physically aggressive profiles were more male, while the low and dual-harm profiles were similarly mixed sex (Harford et al. 2018). Across profiles, males tended to be more callous and physically aggressive, while females tended to report more anger, anxiety, depressive symptoms, and suicidality. Youth engaging in harm tended to experience less positive parenting in childhood compared to the low-harm group. More physically aggressive profiles were characterized by lower household income (except for the high aggression profile) and having an antisocial best friend (except for the moderate aggression profile) compared to low-harm youth. However, when profiles with elevated aggression were compared to each other, they did not significantly differ by income. Together, this suggests that youth aggression in the general population is characterized by early economic disadvantage and less positively involved parents. An antisocial best friend was characteristic of youth with especially high aggression. All of these findings are consistent with past research (Karriker-Jaffe et al. 2013; Merrin et al. 2019; Resnick et al. 2004; Shafti et al. 2023).

The dual-harm youth had (on average) the lowest household income and least positive parenting in early life compared to other youth with elevated harm. Although these differences were not statistically significant between harm groups—likely due to low power—they provide preliminary support for the dual-harm group having more severe early life challenges. This is consistent with past findings on dual-harm suggesting it is related to especially difficult life circumstances (Boxer 2010; Richmond-Rakerd et al. 2019; Shafti et al. 2023).

Interestingly, other than sex, there were no consistent predictors for the high sole-suicidality group. On the other hand, parental (especially paternal) depression perinatally and in childhood was associated with the moderate sole-suicidality group in adolescence. This is partially in-line with past research suggesting that paternal and maternal depression are related to adolescent internalizing and externalizing symptoms (Wickersham et al. 2020). Our findings may indicate that the relation between parental depression and externalizing could be better explained by co-occurring internalizing symptoms. Similarly, our findings may suggest that past associations found between childhood income and suicidality (e.g., Page et al. 2014) may result from co-occurring aggressive symptoms. When comparing the highest harm profiles (dual harm, high sole-aggression/suicidality) to each other, the only significant differentiator was sex assigned at birth; thus, whether youth target themselves and/or others might be nudged by sex-related socialization and/or biological factors (e.g., hormones). Together, this suggests that suicidality and aggression

may have distinct etiologies when their co-occurrence is largely parceled out. Early life paternal depression and being assigned female are associated with suicidality, while early life low income, peer deviancy, and being assigned male are associated with aggression. All elevated harm groups tended to have parents who were less positively involved during childhood.

4.3 | Strengths and Limitations

As with any study, ours had both strengths and limitations. The sample was population-based, which allowed us to estimate the prevalence of the identified harm profiles in youth, but it also meant that the most severe forms of suicidality and aggression were relatively rare. The smallest of which was the dual-harm profile, including only 16 participants; this represents a clinically relevant group that little is known about, likely due to its rarity. Despite these power limitations, being a part of the dual-harm group was significantly associated with several early life factors. Although many factors were tested, the factors linked to the dual-harm group were shared with the sole-aggression profiles, suggesting these relations are reliable and consistent among these groups.

However, these small group sizes—in addition to the long time-lag between the early predictors and adolescent outcomes—may have reduced our ability to confidently detect antecedents of the profiles. For example, in the present study, there was a weak correlation between harsh parenting at 10 years and aggression ($r = 0.07$) and no significant relations to harm profiles. However, in another study using the QLSCD sample, concurrent harsh parenting was associated slightly more strongly with adolescent aggression ($r = 0.18$; Acland et al. 2025). Furthermore, many of the included predictors were significantly associated with suicidality and aggression in correlations, suggesting their lack of relation to profiles was an issue of power and/or that these weak relations were better explained by other variables. Research using clinical samples that over-represent these forms of harm and studies with larger samples may help further elucidate these relations.

We asked youth to report on their own thoughts and behaviors. Suicide and aggression are stigmatized, potentially reducing youths' willingness to report such behaviors. However, past research on the co-occurrence of self- and other-directed harm suggests that results are similar regardless of whether official records or self-reports of aggression are used (Richmond-Rakerd et al. 2019). Further, the prevalence of suicidality in our sample (~ 30% of youth reported non-zero levels of suicidality) was similar or even greater than the prevalence rate estimated in a meta-analysis on youth suicide ideation (14%–23%; Van Meter et al. 2023), suggesting social desirability biases likely had minimal impact.

This sample is a part of a longitudinal study ongoing for decades to assess multiple facets of these youths' development. This provides a rich set of data to draw from, however, it requires a balance between the number of measures and the number of items per measure to retain quality of the data and to reduce attrition. For example, our measure of adverse life events only covered events reported over the last 12 months when children were 10 years, limiting the breadth of adversity captured by this measure. Further, the callousness items were adapted for the MIA from the four-items identified from the Antisocial Process Screening Device as measuring callous-unemotional traits (Frick 2004; Frick et al. 2000). Given our focus on emotionality for this project, we included the items on concern for others and guilt, which meant there were four items available for our scale of callousness (two from age 15 and two from age 17). Despite the limitations of this scale, the measure's retest reliability was similar to related measures with more items, suggesting moderate scale stability over time (see Appendix S2). Additionally, although our callousness items are similar to those found in the Callous-Unemotional Inventory (ICU; Frick 2004), both items included were positively valenced (i.e., asking about the presence of prosocial emotions, rather than absence). Respondents answer positive and negative ICU items differently: negative items (focused on absence of prosocial emotions) are less endorsed and may be more associated with severe conduct problems, whereas positive items may be more appropriate for discriminating mild-to-moderate cases (Ray et al. 2016). Thus, our measure of callousness may have been suited for distinguishing those who exhibit aggression, but may be less apt for distinguishing the severity of that aggression.

This study is observational; thus we cannot make causal claims about whether the early life predictors actually affected profile membership. For example, childhood aggression and emotionality could have impacted how parents interact with their children (e.g., positive parenting). We also adjusted models for false discovery rate; this could have led to an increase of false negatives, especially given that the predictors were selected due to their prior known associations with suicidality and aggression. We attempted to balance this conservative approach by interpreting findings (even if they became nonsignificant after adjustment) when relations were consistent between perinatal and childhood timepoints or when a predictor associated with multiple profiles similarly.

Although we were able to retain 77% of the original sample for our analyses, we did have a meaningful amount of missing data. This could have biased our results. Given that lower-income households were more likely to drop out, our aggressive and dual-harm profiles may be conservative estimates. We attempted to assess the effect of attrition by replicating the profiles identified in the full sample (via multiple imputations). We found the same profiles in the full sample, with similar prevalence rates (see Appendix S6). An additional issue was that within the subsample used for analyses ($n = 1637$), father-reported measures had significant missing data at age 10 years (50% missing). However, the one finding pertaining to father-reports at 10 years was consistent with findings at 5 months (7%–15% missing father-reports)—such that paternal depression at 5 months and 10 years were both independently associated with moderate suicidality in adolescence. More complete data is needed to investigate how the missingness affected our results.

In the present study, we did not differentiate between acts and thoughts of suicidality, in part due to the rarity of suicide attempts ($n < 3\%$). Additionally, the suicidality questionnaire was written such that only people who reported ideation answered

questions related to suicide attempts, making their disambiguation problematic. Suicide attempts and ideation both loaded > 0.50 onto the same factor, suggesting they all tap into a common suicidality dimension. Research capturing suicide across longer timespans and with clinical populations may be worthwhile to explore the potential differences between how thoughts versus actions of suicide co-occur with aggression. We additionally did not include nonsuicidal self-harm in our measure. Future research should include measures of both to discern whether differences in suicidal versus nonsuicidal actions are meaningful for understanding patterns of harm expression in youth.

5 | Conclusion

We found that most youth who harm exhibit primarily physical aggression or suicidality. A small proportion (1%) of youth exhibited relatively high levels of both physical aggression and suicidality. All elevated harm profiles exhibited more negative affect, while callousness was highest in profiles with relatively elevated aggression. Youth showing dual harm exhibited a combination of the aggressive and suicidal groups' emotional characteristics, however, they appeared more etiologically alike to the primarily aggressive profiles. More positive parenting, less depressed fathers, higher household income, and less antisocial friends early in life were associated with limited youth aggression and suicidality in this population-based sample. Further research with larger populations is needed to confirm these findings.

This study highlights the impact of early life adversity on the development of suicidality and aggression in youth. This study provides the building blocks for understanding how these forms of harm coalesce (or not) in adolescents. The potentially vital underlying proximal and distal factors of harm identified could be used to inform targeted intervention studies.

Author Contributions

Conceptualization: Erinn Acland, Nina Pocuca, Natalie Castellanos-Ryan, and Marie-Claude Geoffroy. Methodology: Erinn Acland, Nina Pocuca, Sophie Chaput-Langlois, and Natalie Castellanos-Ryan. Investigation: Sylvana Côté. Writing – original draft, formal analysis, and visualization: Erinn Acland. Writing – review and editing: Erinn Acland, Nina Pocuca, Sophie Chaput-Langlois, Jad Hamaoui, Julie Girard-Lapointe, Sylvana Côté, Natalie Castellanos-Ryan, and Marie-Claude Geoffroy. Funding acquisition: Sylvana Côté, Natalie Castellanos-Ryan, and Marie-Claude Geoffroy. Supervision: Natalie Castellanos-Ryan and Marie-Claude Geoffroy.

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Ethics Statement

The QLSCD protocol was approved by the Institut de la statistique du Québec and the St-Justine Hospital Research Centre ethics committees in accordance with the Declaration of Helsinki, and informed assent and consent was acquired at each data collection.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data analyzed in this study was obtained from the Institut de la statistique du Québec and, as stipulated in the clauses 10 and 11 of the Institut de la statistique's Québec Act (Canada), the access to the data is restricted to the parties identified in the partnership agreement signed to ensure the conduct of the study and which describes the author's right. In the QLSCD cohort, the participants only consented to share their data with the study's financial partners and affiliated researchers and their collaborators. Those partners and researchers only have access to the data after signing a data sharing agreement. Requests to access these data can be directed to the Institut de la statistique du Québec's Research Data Access Services—Home (www.quebec.ca). For more information, contact Institut de la statistique du Quebec (SAD@stat.gouv. qc. ca). Measures are provided in Appendices S1 and S3. R code for analyses is provided in Appendices S4–S7.

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