Derivation of probable child maltreatment indicators using prospectively recorded information between 5 months and 17 years in a longitudinal cohort of Canadian children

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Highlights

- In this longitudinal cohort, maltreatment experts retained 251 of 29,600 items available
- Probable maltreatment indicators were derived: presence, chronicity, extent of exposure, and cumulative maltreatment
- Prevalence rates vary from 3.3% and 44.9% across developmental periods, and 16.5-67.3% by the end of adolescence
- Prospective and retrospective maltreatment identify different groups of individuals
- Most studies rely on prospective data, but our findings suggest complimenting with prospective reports when possible

Keywords: Child maltreatment, prospective and retrospective measures, longitudinal study, abuse, neglect, adversity

Abstract

Background: Both prospective and retrospective measures of child maltreatment predict mental and physical health problems, despite their weak concordance. Research remains largely based on retrospective reports spanning the entire childhood due to a scarcity of prospectively completed measures targeting maltreatment specifically.

Objective: We developed a prospective index of child maltreatment in the Québec Longitudinal Study of Child Development (QLSCD) using prospective information collected from ages 5 months to 17 years and examined its concordance with retrospective maltreatment.

Participants and Setting: The QLSCD is an ongoing population-based cohort that includes 2,120 participants born from 1997-1998 in the Canadian Province of Quebec.

Methods: As the QLSCD did not have maltreatment as a focal variable, we screened 29,600 items completed by multiple informants (mothers, children, teachers, home observations) across 14 measurement points (5 months-17 years). Items that could reflect maltreatment were first extracted. Indicators were derived across preschool, school-age and adolescence periods and by the end of childhood and adolescence, including presence (yes/no), chronicity (re-occurrence), extent of exposure and cumulative maltreatment. Two maltreatment experts reviewed these items for inclusion and determined cut-offs for possible child maltreatment (n=251 items). Retrospective maltreatment was self-reported at 23 years.

Results: Across all developmental periods, the presence of maltreatment was as follows: physical abuse (16.3-21.8%), psychological abuse (3.3-21.9%), emotional neglect (20.4-21.6%), physical neglect (15.0-22.3%), supervisory neglect (25.8-44.9%), family violence (4.1-11.2%) and sexual abuse (9.5% in adolescence only). The degree of concordance between prospective

and retrospective reports for each type of maltreatment was weak (.038-.110), yet significant (p_s<.01), except for emotional neglect (*p*=.148).

Conclusions: In addition to the many future research opportunities offered by these prospective indicators of maltreatment, this study offers a roadmap to researchers wishing to undertake a similar task.

Introduction

Child maltreatment refers to “any act or series of acts of commission or omission by a parent or other caregiver that results in harm, potential for harm, or threat of harm to a child” (Leeb, Paulozzi, Melanson, Simon, & Arias, 2008, p. 11). Maltreatment increases the risk for a range of difficulties, including physical (e.g., obesity, cardiovascular diseases) (Gilbert et al., 2009; Li et al., 2019; Min et al., 2013) and mental health problems (e.g., suicide attempts, depression and substance use) (Geoffroy et al., 2016; Gilbert et al., 2009; Jaffee, 2017; Nanni et al., 2012), as well as economic and social difficulties (Bouchard et al., 2023; Domond et al., 2023; Naicker et al., 2022), across the lifespan. Despite strong evidence supporting the harmful consequences of abuse and neglect on later functioning, the field continues to face its biggest methodological challenge: the very measurement of child maltreatment (Danese & Widom, 2020; Shaffer et al., 2008). Obtaining accurate assessment of maltreatment is not straightforward given limitations noted across all measurement strategies, and resulting wide ranges in estimates depending on the source of information (e.g., official vs. retrospective reports) (Gilbert et al., 2009; Hardt & Rutter, 2004). Research has shown that prospective and retrospective reports of maltreatment are associated with mental and physical health outcomes (albeit to different extents) and identify different groups of individuals (Baldwin et al., 2019; Danese & Widom, 2020; Herrenkohl et al., 2021).

Another alternative to widen our representation of childhood experiences of maltreatment is to collect prospective indicators of maltreatment, across multiple informants and timepoints. This methodological study aims to describe the development of prospective indicators of maltreatment, building on all available information collected in the population-based Quebec Longitudinal Study of Child Development (QLSCD) cohort, from the time participants were 5 months old up to 17 years of age. Our method of identifying potential indicators of child maltreatment using already collected prospective data might provide a useful guide for other cohorts where maltreatment had not been a

primary focus, thereby creating new avenues for research and new possibilities to document associations with both prospective and retrospective measures of maltreatment and health outcomes.

To date, most studies have relied on retrospective self-reports completed by the targeted participants, such as the Childhood Trauma Questionnaire (Bernstein et al., 1998), in which respondents are asked to report on adverse experiences that previously occurred. Retrospective reports contain several strengths, including their feasibility, being less prone to social desirability than those filled out by caregivers and to be better positioned to capture instances of maltreatment spanning a wide range of severity and intensity (i.e., not only the most severe cases) (Kendall-Tackett & Becker-Blease, 2004). However, these reports may be more affected by current mental health (e.g., depressive symptoms) or recall biases (Danese & McCrory, 2015). Moreover, they do not collect data on more detailed accounts of maltreatment, for instance how often the maltreatment re-occurred overtime.

Measuring probable maltreatment using prospectively collected information

Prospective maltreatment information may help to complement retrospective measures of maltreatment. To our knowledge, only few population-based longitudinal cohorts have prospectively measured child maltreatment (Denholm et al., 2013; Houtepen et al., 2018; Kisely et al., 2020; Naicker et al., 2022; Newbury et al., 2018; Patten et al., 2015; Reuben et al., 2016). These cohorts remain, however, somewhat limited by the depth of maltreatment information offered as they often did not operationalize, for examples, extended indicators capturing the chronicity or severity of these experiences. Prospective information can be obtained, for instance, from Youth Protection official records of notified or substantiated maltreatment. While official records carry several strengths (e.g., detailed accounts), they are hampered by under reporting and may only capture the most severe cases (Jaffee, 2017). Alternatively, information can be collected through direct questions to caregivers or participants themselves using standardized questionnaires or interviews (e.g., structured interview about child harm during home visits (Newbury et al., 2018). Although official records and

prospectively collected caregiver information are valuable, especially when complemented by retrospective self-reports, they remain rare, especially spanning several periods of development.

There is no gold standard approach for collecting comprehensive maltreatment data for research purposes as both prospective and retrospective methods have their respective potential biases. However, prospective longitudinal cohorts offer additional opportunity to derive indicators of probable maltreatment (proxy) using general items (non-specific to maltreatment) and data collected across multiple informants and developmental stages. For instance, in the Avon Longitudinal Study of Child Development (ALSPAC) (Houtepen et al., 2018), an adversity index encompassing the ten classic adverse childhood experiences (ACEs) (Felitti et al., 1998) was derived using 541 prospective items responded by parents and children (> 8 years) collected from birth to 18 years. Although most response options were in frequencies (e.g., never to everyday), cut-offs were used to dichotomize each item. Two variables were created, including the presence of distinct types of adversity and a cumulative score (i.e., sum of the types of adversity an individual was exposed to). These derived adversity variables have since been associated with increased depression and drug use in adolescents (Houtepen et al., 2020). Using a similar procedure, an indicator of neglect, operationalized by two variables (presence and severity), was derived in the 1958 British Birth cohort using seven items administered to mothers, fathers, and teachers at seven, 11, and 16 years (Denholm et al., 2013). This indicator has been associated with mental health, cognition, and obesity in adult life (Degli Esposti et al., 2020; Geoffroy et al., 2016; Power et al., 2015), even after controlling for key socioeconomic confounding factors. Typically, these longitudinal cohorts offer global indicators of maltreatment (e.g., presence versus absence) and consider the lifetime occurrence of maltreatment (e.g., any time from birth to 18 years). However, more specific characteristics of maltreatment or adversity (e.g., chronicity), as well as the specific time of occurrence of these experiences are often overlooked.

Importance of research on specific characteristics of child maltreatment

Research suggests that child maltreatment is multidimensional in nature, and several characteristics of maltreatment may jointly contribute to explain later risk for specific mental and physical health impact, as well as and economic and social difficulties (Bouchard et al., 2023; Cicchetti & Toth, 2005; Domond et al., 2023; Egeland et al., 1983; Jackson et al., 2019; Li et al., 2019). Yet, limitations remain as child maltreatment has typically been operationalized through global conceptualizations (presence versus absence of child maltreatment) or by a single type of abuse (e.g., physical or sexual) or neglect. Although challenging, important characteristics of maltreatment should be simultaneously considered to investigate their common and specific contributions, as outlined below.

Type. The most common dimension for operationalizing child maltreatment is through the categorization of distinct types (e.g., physical abuse, sexual abuse, emotional neglect) (Jackson et al., 2019). Studies suggest that individual types of maltreatment may contribute specifically or in a shared manner to later outcomes (Cecil et al., 2017; Cheng & Langevin, 2022). For example, a study of emerging adults found that a history of emotional maltreatment contributed globally to the dimensions of emotional regulation, whereas other types of maltreatment (e.g., neglect) contributed individually to specific facets of emotional regulation (e.g., impulsivity) (Cheng & Langevin, 2022). Similarly, associations between childhood maltreatment and mid-adult cardiometabolic markers vary by type of maltreatment (Li et al., 2019). For instance, associations between neglect and abuse were consistent for adiposity (i.e., obesity biomarkers) after controlling for lifestyle factors, yet strengths of associations and effect sizes were smaller for sexual and psychological abuse (Li et al., 2019). Additionally, most research on child maltreatment and later outcomes has focused on physical and sexual abuse (Angelakis et al., 2019; Baldwin et al., 2019; Norman et al., 2012). Conversely, other types of maltreatment have been understudied, including neglect (Stoltenborgh et al., 2013) and psychological abuse (Jackson et al., 2019). As such, studies that provide information on the wider breath of

maltreatment types can allow for more insight on the relative effects of each maltreatment type, as well as their combination.

Cumulative scores. Maltreatment types are highly correlated and often co-occur (Kessler et al., 2010). Despite evidence for individual types being differentially associated with outcomes, growing evidence shows that the number of maltreatment types an individual was exposed to, relates to poorer outcomes later in life (Gilbert et al., 2009; Lacey et al., 2020; Naicker et al., 2022; Putnam et al., 2013). For instance, evidence shows a dose-response relation between cumulative maltreatment exposure and more severe symptomology, including heightened risk for suicide ideation and self-harm (Turner & Colburn, 2022), anxiety and depression (Finkelhor et al., 2007), as well as physical health problems such as obesity and inflammation (Clemens et al., 2018; Gilbert et al., 2009; Lacey et al., 2020). Yet, most studies do not consider the cumulative effects of child maltreatment and tend to focus exclusively on one maltreatment type (e.g., physical abuse). Consequently, associations between specific maltreatment types and outcomes may be overestimated on their own and underestimated in conjunction with co-occurring types of maltreatment.

Recurrence, chronicity, and developmental timing. Child maltreatment can be transient (e.g., situational or limited in time) or it can reoccur over time and over several developmental periods. Developmental chronicity of maltreatment (Manly, 2005) is an important characteristic to consider to adequately ascertain the consequences of maltreatment on functioning across the lifespan. Studies have found that exposure to maltreatment over several developmental stages poses a higher risk for the onset of mental health problems compared to exposure at one developmental period (Jaffee & Maikovich-Fong, 2011; Russotti et al., 2021; Thornberry et al., 2001; Warmingham et al., 2019). Moreover, the timing of exposure (e.g., whether maltreatment occurred in preschool versus school-age versus adolescence) can also provide specificity regarding differential outcomes. Based on substantiated reports of sexual abuse, physical abuse and neglect, Thornberry et al. (2010) found that individuals exposed to any type of maltreatment during childhood were more likely to report internalizing

problems (i.e., suicidal thoughts and depression) in early adulthood, while those who were exposed later on, in adolescence, were more likely to exhibit externalizing problems (e.g. criminal behavior and substance use (Thornberry et al., 2010). Another study found that maltreatment occurring earlier in life (e.g., infancy and toddlerhood) was more strongly associated with poor emotion regulation in childhood (Kim & Cicchetti, 2010), than maltreatment occurring later in preschool/school-age. Developmental chronicity and timing can be more challenging to capture in comparison to global indicators (i.e., presence versus absence) to ascertain that maltreatment of a similar type persists rather than swapped by experienced of another type, contributing to a loss of acuity in subsequent analyses. To our knowledge, there are no population-based longitudinal cohorts that consider chronicity and timing, in addition to other maltreatment-based characteristics despite their longitudinal design.

The present study

The study of child maltreatment is complex given heterogeneity in types of experiences, extent of exposure, time of onset, chronicity, and more. As such, there has been limited advancements in operationalizing extended characteristics of maltreatment that contribute to this heterogeneity. Longitudinal study designs can allow for the consideration of time-variant maltreatment indicators and patterns. Using prospectively collected data from a large population-based cohort, the Quebec Longitudinal Study of Child Development (QLSCD), we hereby describe the process implemented to derive multiple prospective indicators of child maltreatment during three developmental periods (preschool, school-age and adolescence) and by the end of childhood (birth to 12 years) and adolescence (birth to 17 years). Specifically, we first provided a roadmap for the derivation of the following variables: (a) the *probable presence* of seven types of maltreatment (i.e., sexual, physical and psychological abuse, family violence, and emotional, physical, and supervisory/educational neglect), and (b) the scores of *cumulative maltreatment* referring to the number of types of maltreatment experienced at each developmental period and by the end of childhood and adolescence. Second, we described how other indicators relevant in child maltreatment research could be derived to complement

the above-described indices, including (c) *maltreatment recurrence* and *chronicity* (repeated occurrence of each type of maltreatment within and across developmental periods, respectively). In an exploratory fashion, we derived the (d) *extent of exposure*, referring to the number of different or repeating acts. Third, we compared the prevalence resulting from prospective and retrospective assessments of maltreatment and examined the level of concordance between these measures. We expect that the lifetime prospective (5 months to 17 years) and retrospective measures will show a significant, albeit weak, concordance. For our derived indicators, and across time, we use an exploratory approach given the scarcity of evidence on these extended characteristics of maltreatment

Method

Definition of child maltreatment

The following seven maltreatment categories of child maltreatment were selected for inclusion: (1) sexual abuse, (2) physical abuse, (3) psychological abuse, (4) emotional neglect, (5) physical neglect, (6) exposure or presence of family violence, and (7) supervisory/educational neglect. These categories and their definitions, presented in **Table 1**, are in accordance with the Québec Youth Protection Act (Québec, 2021) and the Québec Directors of Youth Protection (*Grounds for Reporting a Situation*, 2022). These are also aligned with international definitions of child maltreatment (e.g., the Center for Disease Control and Prevention) (Leeb, Paulozzi, Melanson, Simon, & Arias, 2008).

Participants and Procedures

The QLSCD conducted by Institut de la Statistique du Québec, is an ongoing longitudinal cohort of children born in 1997-1998 between 24 and 42 weeks of gestation to mothers residing in the Canadian province of Québec and speaking either French or English. Families from all regions of Québec were included, excluding administrative regions 10 (Northern Québec), 17 (Cree Territory), 18 (Inuit Territory) (2.2% of all births). The Québec Master Birth Registry of the Ministry of Health and Social Services was used to randomly select participants based on living area and birth rates (Jetté M, 2000; Orri et al., 2021). The final longitudinal cohort included 2120 participants from primarily White

European descendants, which was representative of the ethnic distribution in Québec at the cohort's inception, and initially covered the full range of socioeconomic statuses. To derive the child maltreatment indicators, we used information collected across three developmental periods (1) preschool – six timepoints at 5, 17, 29, 41, 45-56 months and 5 years, (2) school-age – five timepoints at 6, 7, 8, 10, 12 years, and (3) adolescence – three timepoints at 13, 15 and 17 years. Participants also retrospectively reported on their child maltreatment history at age 23 years (see **Supplemental Table 1** for items).

All the data collected and presented in this study has been approved by ethical committees of Institut de la Statistique du Québec and the CHU Sainte-Justine Hospital Research Centre. The 2021 Special Round data collection (23 years) was also approved by the Douglas Research Center Ethics Committee and by the CHU Ste-Justine research ethics committee. Written informed consent was obtained from participants and-or their parents at each data collection. The QLSCD collects information on the target child's development, including, but not limited to, parent-child relations, physical and mental health, cognitive development, the family environment, educational attainment and genetic data. More information can be found in the cohort profile (Orri et al., 2021) and online: https://www.iamillbe.stat.gouv.qc.ca/default_an.htm.

Search strategy

The items search strategy is presented in **Figure 1**. At step 1, all available items between 5 months and 17 years (≈ 29,600 items) were screened by two independent screeners (SS, MCC) to determine (1) the possible eligibility of the items in the context of child maltreatment definitions, and (2) the preliminary maltreatment categorization (e.g., physical abuse). Information from all informants were considered except fathers' reports as the rate of missingness was high and uncertainties remained about the frequency of contact between them and their child in instances of parental separation. Thus, their capacity to adequately evaluate the specific experiences enquired in the considered items was questionable (Orri et al., 2021). Four different informants were retained: mothers, teachers, interviewer

observations (Bradley & Caldwell, 1977), and the target child. SS compared the lists of items retained by SS and MCC; duplicate items were removed. The following information was extracted for each retained item: child's age, informant (mother, interviewer observations, child, teacher) and the corresponding maltreatment type (preliminary classification).

Maltreatment experts (RL and DCV) then independently reviewed the retained items to evaluate their suitability and determined at which response option each item would be indicative of the presence of maltreatment while considering the developmental period of the child (e.g., never, about once a week or less, a few times a week, one or two times each day, many times each day). Specifically, item selection and determination of cut-off scores were pursued on the basis that a stand-alone item could reflect serious concerns over possible maltreatment. For example, the item "how often do you tell him/her that he/she is bad or not as good as others?" was recoded as "absence" if parents answered "never" or "about once a week or less" and "probable maltreatment" if parents answered "a few times a week" or more at 5 months. However, at 17 months, the item was recoded as "absence" if parents answered "never", "about once a week or less" or "a few times a week" and "probable maltreatment" when "one or two times each day" or more was endorsed. We opted for a more rigorous cut-off approach, given that certain scales (i.e., 0 [not at all what I did] to 10 [exactly what I did]) lacked definitive clarity regarding the intended measure (e.g., measuring severity versus frequency of the targeted behavior). As such, depending on the positive or negative valence of items, either extreme (0 or 10) of the scale were used as the indication of maltreatment. An expert consensus approach was selected and RL, DCV, and SS met to discuss discrepancies and to make final decisions about inclusion and cut-offs (approximately 15 hours). Based on the determined cut-off, all items in the final sample were scored 0 (absence) or 1 (probable maltreatment).

Statistical Analyses

Deriving child maltreatment indicators. The individual items retained by the maltreatment experts were used to code four indicators of child maltreatment: 1. presence by type of maltreatment, 2.

cumulative maltreatment, 3. recurrence and chronicity of maltreatment (by type) and, 4. extent of exposure to different or repeating acts. These indicators were derived at each developmental period (preschool, school-age, and adolescence) as well as by the end of childhood (birth to 12 years) and by the end of adolescence (birth to 17 years). The definitions for each indicator along with the coding decisions used to derive each variable are presented in **Table 2**.

Descriptive statistics of child maltreatment indicators. Descriptive statistics outlined the frequencies and means of the child maltreatment indicators (i.e., presence by type, recurrence, chronicity, extent of exposure) at each developmental period and by the end of childhood and adolescence. As response rates varied across developmental periods, we compared participants with valid data to those present at inception on key early-life individual and family characteristics (e.g., externalizing symptoms, socio-economic status) according to their status of missingness. We then examined the concordance between the prospectively derived and retrospectively reported indicators of child maltreatment using Cohen's Kappa. To quantify the extent of discordance between these indicators, a percentage bias (Atherton et al., 2008) was also calculated which refers to the proportional difference between those that were included versus the initial cohort (sample(by developmental period)% - total initial cohort%)/total initial cohort%).

Results

Number of included items

A total of 251 items, out of a total of 29,600 items from birth to 17 years, were included to derive indicators of child maltreatment. These items as well as their respective cut-offs and informants are presented in **Supplemental Table 2**. Most items enquire about exposure of intrafamilial maltreatment for which the indicated time window was within the past 6 or 12 months (e.g., "In the past 12 months…"), or since the beginning of the school year. From 5 months to age 17 years, 60.0% of items were reported by the mother, 12.7% of items were drawn from the interviewer's observational reports of the home environment (between birth to 56 months), 12.3% by the child's schoolteacher (starting when children

reached formal schooling, i.e., 6 years old to 13 years) and 15.0% of items were child reported (starting at age 10 to 17 years). Notably, the number of items varied according to the maltreatment types and developmental periods. For example, psychological abuse was derived according to a varying number of items in preschool (*n*=16), school-age (*n*=2) and adolescence (*n*=2), whereas sexual abuse is measured solely in adolescence. Educational/supervisory neglect contains the most items (*n*=26 unique items) from birth to 17 years.

Prospective prevalence rates of maltreatment indicators

Presence by maltreatment type. Prevalence rates for the types of child maltreatment are presented in **Table 3** within developmental periods and by the end of childhood and adolescence. Across all developmental periods, physical abuse varies from 16.3-21.8% while psychological abuse varies from 3.3-21.9%, emotional neglect from 20.4-21.6%, physical neglect varies from 15.0-22.3%, supervisory neglect from 25.8-44.9%, family violence from 4.1-11.2% and sexual abuse was present in 9.5% of the population in adolescence. Estimates by the end of adolescence (birth to 17 years) across all maltreatment types range from 16.5-67.3%.

Cumulative maltreatment. Cumulative maltreatment across development periods and retrospectively is presented in **Table 3**. Given the high prevalence of supervisory/educational neglect (67.3% by adolescence) and unavailability of corresponding retrospective indicators, we also estimated cumulative maltreatment excluding supervisory/educational neglect. The occurrence of 0, 1, 2, and 3+ maltreatment types, excluding supervisory/educational neglect, was distributed as follows by the end childhood 35.0%, 31.4%, 20.6% and 13.0% and by the end of adolescence, 33.2%, 34.9%, 20.5%, and 11.4%, respectively.

Extended indicators of maltreatment. Table 4 presents the recurrence of each type of maltreatment within and across developmental periods (i.e., chronicity). This indicator captures exposure to each type of maltreatment at more than one age point within a developmental period. Estimates of recurrence by the end of adolescence varied between 3.2-29.5% across the five types of

maltreatment indexed at all three developmental periods (physical abuse, psychological abuse, emotional neglect, supervisory/educational neglect, family violence). When considering any type of maltreatment, 39% of our sample was exposed to maltreatment at two or more developmental periods (excluding supervisory/educational neglect). As expected, our indicator of extent of exposure to different or repeating acts **(Table 5)**, both within and across developmental periods, was highly skewed, indicating that most children are not exposed to numerous maltreatment acts.

Concordance between retrospective and prospective maltreatment indicators

In comparison to child maltreatment prevalence based on prospectively collected data, retrospective measures of child maltreatment were much lower, ranging from 2.5-14.6% across all types of maltreatment (**Table 3**). **Table 6** shows that the concordance estimates between prospective (by the end of adolescence) and retrospective reports by types of maltreatment were small (.038 - .110), yet statistically significant (p_s = <.01), except for emotional neglect (p= .14). Of note, 29.9% (n=190) of individuals with any type of maltreatment documented from birth to 17 years using our prospective index subsequently reported maltreatment at age 23 years (kappa: .067, p= .003). The degree of concordance between prospective and retrospective cumulative maltreatment (0, 1, 2, 3+) was small but significant (kappa=.058, p = .001).

Quantifying attrition and non-response

Due to attrition and non-responses, the sample sizes varied according to each maltreatment indicator. Participants with valid data for each derived indicator were compared to the initial cohort on key characteristics that have the potential to identity the most vulnerable participants, thus most likely to be lost to follow up. This comparison is expressed as percentage bias (Atherton et al., 2008), **Table 3 in Supplemental material**). Biases ranged from 0% (for internalizing and externalizing behaviors) to 36.36% (for maternal age at birth). Across all developmental periods and retrospective indicators, participants with missing data tended to be male (e.g., in school-age and retrospective reports), to be of non-Canadian descent (e.g., in adolescence), to be born to a mother younger than 20 years old (e.g., by

the end of adolescence) or who reported higher levels of depressive symptoms (e.g., in adolescence), to have grown-up in a single-headed or blended family (e.g., by the end of adolescence) or in a family with a lower socioeconomic status (e.g., by the end of adolescence).

Discussion

This article outlines our strategy to derive prospective indicators of maltreatment anchored in a developmental perspective using various time-relevant indicators of maltreatment (e.g., recurrence, chronicity), rarely assessed in the literature, especially in population-based cohorts. We offer a practical approach for detecting prospective child maltreatment for research purposes in datasets that did not directly assess this construct through the inclusion of targeted measures of maltreatment. Using a systematic screening method, child maltreatment experts retained a total of 251 items from an original pool of 29,600 available items. These items were used to derive five indicators: maltreatment presence and cumulative scores, as well as recurrence, chronicity, and the extent of exposure. By the end of adolescence (5 months to 17 years), a little more than one in three children (37.3%) were exposed to probable physical abuse, 9.5% to probable sexual abuse (measured in adolescence only), 25.7% to probable psychological abuse, 42.1% to probable emotional neglect, 30.3% to probable physical neglect (preschool and school-age), 67.3% to probable supervisory/educational neglect and 16.5% to probable family violence. By the end of adolescence (5 months to 17 years), chronicity estimates ranged from 3.2-29.5% across all maltreatment types. Across all types of maltreatment, our results suggest that exposure to different or repeating acts was infrequent. The concordance between prospective and retrospective maltreatment types were low in magnitude, but significant (except for emotional neglect).

Comparing our prospective estimates with other prospective cohort estimates

Comparison of our prospective maltreatment indicators with other cohort estimates is challenging. To our knowledge, there are no other cohorts that have derived probable maltreatment using several indicators (i.e., type, cumulative, recurrence, chronicity, extent of exposure to different or repeating

acts) according to a longitudinal and non-specific item approach (not specifically designed to assess maltreatment). The ALSPAC cohort adversity index (Houtepen et al., 2018) was derived using a similar general-item and cut-off dichotomization approach. A total of 136 prospective items were used to identify maltreatment defined by abuse or neglect and 43 items were used to identify maltreatment retrospectively. The prevalence rates in ALSPAC were somewhat comparable, and in some instances lower, to ours: physical abuse (ALSPAC: 17.4% vs. QLSCD: 37.4%), sexual abuse (3.7% vs. 9.5%), emotional abuse (22.5% vs. 25.7%), emotional neglect (22.1% vs. 42.1%), and family violence (24.1% vs. 16.5%), with a trend for higher probable prevalence in our cohort (family violence being a notable exception). Specifically, our prevalence rates for physical abuse and emotional neglect are comparable to ALSPAC when considering the individual developmental periods, however, our rates derived by the end of childhood and adolescence are higher. In comparison to ALPSAC, the convergence of several varying items (e.g., in adolescence, our index contains information on physical abuse from a romantic partner) and informants (e.g., home observations) across developmental periods may lead to the increased detection of probable maltreatment. Additionally, our index spans more items (251 vs. 136 prospective maltreatment items) than ALSPAC and data is collected over fourteen timepoints across three developmental periods. Conversely, prospective physical abuse in ALSPAC was evaluated less frequently in adolescence. This may lead to missing prospective reports of intervening maltreatment. As such, it is important to consider that prevalence rates for maltreatment might be sensitive to the number and types of items, informants, and timing at which the information was sought. Notably, ALSPAC used prospective and retrospective maltreatment information interchangeably (i.e., physical abuse was deemed present whether reported prospectively or retrospectively). However, as prospective and retrospective maltreatment reports may identify different groups of individuals (Baldwin et al., 2019), it is now recommended to treat prospective and retrospective separately.

Notably, children who have once been maltreated are at a higher risk for recurring exposure to maltreatment. Since ALSPAC did not derive extended indicators of chronicity and recurrence,

comparison is not possible. Other studies using Child Youth Protection records categorize and define recurrence slightly different from our study. For instance, most studies determine recurrence of maltreatment according to the number of reports after the initial substantiation (Kim & Drake, 2019), whereas our data allowed us to consider recurrence as repeating acts over more than one age point. Using Quebec child protection records, one study found that 32.5% of children identified for having experienced at least one instance of maltreatment, experienced recurring maltreatment over 15 years (Esposito et al., 2021). In our study, we found that 39% of individuals were exposed to recurring maltreatment (i.e., 2+ developmental periods). Direct comparisons between our prospective prevalence rates and other cohorts (e.g., Environmental Risk Longitudinal Twin Study and the Dunedin Longitudinal Study) is difficult given that the approaches differ, however, our prevalence rates tend to be higher compared to cohorts that use specific item approaches (i.e., items specifically targeting maltreatment) (Newbury et al., 2018; Reuben et al., 2016).

Comparing prospective and retrospective reports (concordance)

Concordance estimates between prospective and retrospective reports of maltreatment by type (.038-.110) demonstrate that those who report maltreatment experiences retrospectively are not necessarily the same individuals who are identified in prospective reports, which falls in line with the slight to fair agreement found in previous studies (Baldwin et al., 2019). Relatedly, previous studies have found stronger associations between retrospective reports of child maltreatment and mental health later in life (Danese & Widom, 2020), which may point to potential bias in self-reports affected by current mental states and due to the same-informant and same methods shared variance between these measures. Notably, however, the studies included in Baldwin et al. (2019)'s analysis contained a variety of prospective report types (e.g., self, parent, medical records), but mainly reports from Child Protective Services. Conversely, our prospective estimates are based on multiple informants through questionnaire format (and home observations). In the QLSCD, the retrospective report was solely based on self-report questionnaire items, whereas those in Baldwin et al. (2019) included interviews in

addition to self-report questionnaires. According to Baldwin et al. (2019), the concordance between prospective and retrospective reports was higher in studies that used interview versus questionnaires in retrospective self-reports, which may indicate that our estimate of concordance is conservative. Nonetheless, concordance estimates have been found to be low, thus, prospective and retrospective reports of maltreatment should be kept separate. However, future cohorts may consider collecting both prospective and retrospective maltreatment data to further explore differential associations.

Methodological considerations

Our study had the following strengths. Information was collected from four types of informants (parents, teachers, the target child, and interviewer's observations), allowing us to capture multiple perspectives and schemes of reference. Further, given the longitudinal nature of the QLSCD cohort, comprising data collected at 14 time points, our indicators offer insight into the probable presence of maltreatment occurring at different developmental periods in early life (preschool, school-age and adolescence). As such, our study provides opportunities to examine more often the role of time-varying characteristics of maltreatment (other than presence of maltreatment), including chronicity and recurrence, by providing researchers a blueprint guiding their creation in longitudinal cohorts that did not explicitly measure various types of maltreatment. The definitions selected to guide the maltreatment experts for item selection reflected the Québec Youth Protection Act and supporting resources (*Grounds for Reporting a Situation*, 2022; Québec, 2021). These definitions generally align with conventional definitions and categorizations of maltreatment, such as the Centers for Disease Control and Prevention report (Leeb, Paulozzi, Melanson, Simon, & Arias, 2008), and the United Kingdom government report on Working Together to Safeguard Children (Government, 2018). Notably, we used a rigorous screening process to extract relevant items in collaboration with experts in child development and maltreatment. The standardized sum of endorsed items was highly skewed, representing more conservative thresholds to determine the *probable* presence of child maltreatment. Further, bias was minimized as the maltreatment experts decided on the cut-offs for each of the items

prior to analyzing prevalence rates of the derived variables and engaged in discussions to minimize subjective risk.

However, our study also has limitations that need to be considered when interpreting the results. First, the pool of items available in the QLSCD was not originally designed to assess maltreatment. While we included a wide range of potential harmful behaviors to derive our indicators (e.g., presence), such as "I have shaken my baby/twin when he/she was particularly fussy" and "there was more than one incident involving physical punishment during the visit" (for physical abuse), no individual item alone indicates a definitive presence of maltreatment. Moreover, the selection of items to be considered in the derivation of the maltreatment indicators was not data driven. Nonetheless, we took a rigorous, conceptual and policy driven approach for item inclusion and cut-offs. Second, due to the high rate of missingness and questionable validity, we excluded father questionnaires. It is possible that fathers would have brought an additional light and have potentially flagged probable instances of maltreatment for additional children, or to have contributed to better ascertain the extent of the experiences of maltreatment that have occurred in a children's life. In general, there is a high percentage of missingness for questionnaires completed by fathers beyond preschool, and our cohort is no exception to this. Third, we were unable to derive an indicator of severity as based on the relative frequency of occurrence of each item. For instance, while physical abuse is measured in terms of "hitting" and "shaking", other severe forms are not available, such as "kicking or "chocking". Moreover, severe cut-off scores were selected for each item as indicative of probable maltreatment, depending on the developmental period (e.g., the cut off for "in the past 6 months, your parents hit you or threaten to do so" was "often" when this item was measured in adolescence). Instead, we opted to derive the indicator "extent of exposure to different or repeating acts" as reflective of the relative extent of exposure to each type of maltreatment. However, this indicator captures indistinctively a) repeated acts (e.g., same items present at two different time points) and b) the variety of acts within a given type (e.g., two different items within the same time point). Fourth, similarly to all measurement methods, there is a risk of over-

and under estimation of maltreatment types as based on social desirability and parents' mental states, for instance, and we cannot ascertain whether the prevalence rates are "true" representations of maltreatment in the QLSCD (Denholm et al., 2013; Fallon et al., 2010; Mathews et al., 2020). Fifth, the generally high prevalence of supervisory/educational neglect may reflect a higher number of items in comparison to other types, despite using a stringent cut off for each item (e.g., the response "often" for "in the past 12 months, how often did he/she see television shows or movies that have a lot of violence in them?" was coded as "probable maltreatment"). This finding is nevertheless consistent with a cross-sectional Québec population-based study that evaluated supervisory neglect using the short version of the Parent-Report Multidimensional Neglectful Behavior Scale, which found this type of maltreatment to have the highest annual prevalence rates (e.g., 24% for children 5-9 years) (Clément et al., 2016). On a related point, psychological abuse and sexual abuse may have been underestimated given the detection of less relevant items. The screening for sexual abuse was limited to late adolescence and covered sexual abuse with a romantic partner only. That is, experiences that may have occurred in infancy or childhood, as well as in other contexts, could not be considered because of the lack of items that have enquired such a possibility, altogether yielding possible lower estimates of sexual abuse in adolescence. It is also important to consider that the family violence subtype combines items that reflect instances of family violence (without the guarantee that the child witnessed the violence), and most items only evaluate past 12-month trauma exposure at 41 and 45-56 months and 5, 6, 8, 10, 12 and 13 years, which may have missed intervening trauma. Sixth, although our prevalence rates are generally consistent across developmental periods (preschool, school-age and adolescence; 21.8%, 17.4% and 16.3% for physical abuse, respectively), comparison across developmental periods is not without bias, as discussed previously. Specifically, there is the possibility that the prevalence rates vary depending on the number of items used to derive the variables. For instance, to derive psychological abuse in preschool, there are 15 items, whereas there were only 2 items to derive school-age exposure. As such, comparison across developmental periods should be examined cautiously. Seventh, there are

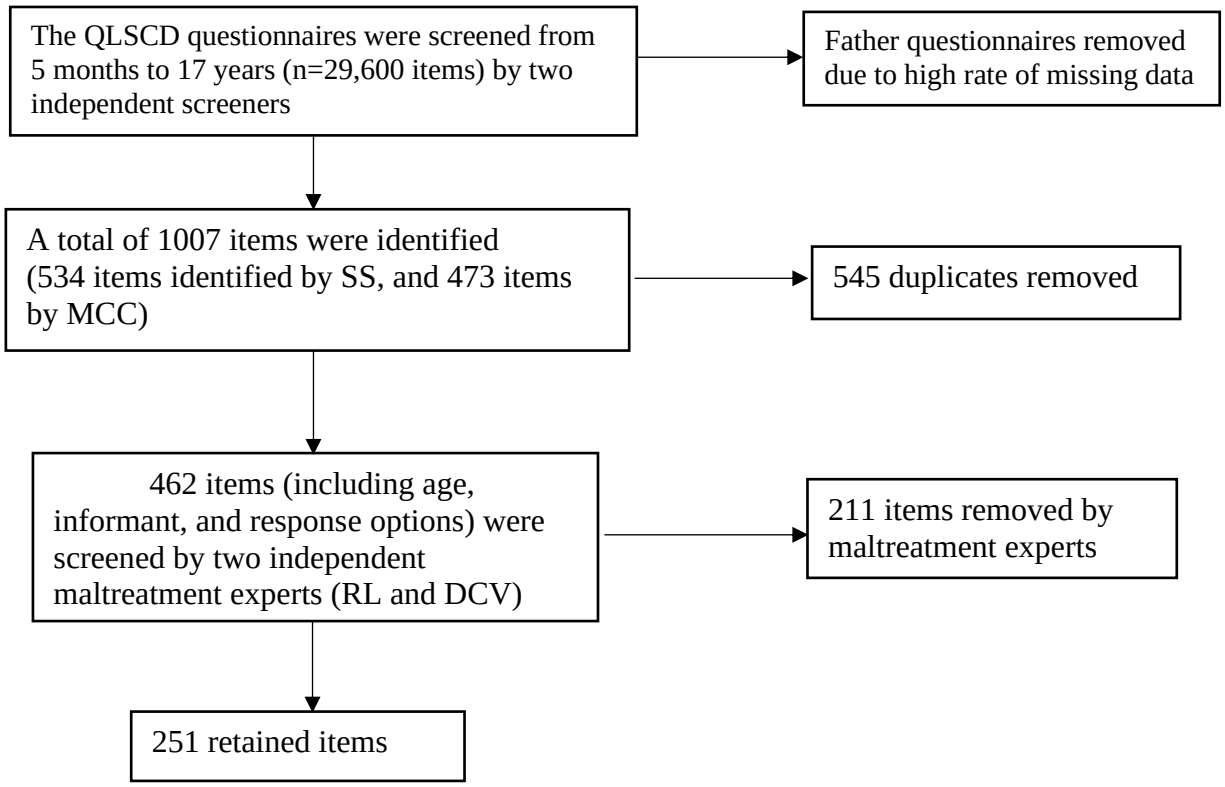
limitations regarding the representativeness of the cohort. Indigenous youth were excluded, yet they are more likely to report maltreatment compared to non-Indigenous youth (Government of Canada, 2017). Differential longitudinal attrition occurred and accelerated over time, comparable to other prospective cohorts, such as the 1958 British Birth Cohort (Atherton et al., 2008). The extent of biases varies depending on the variables examined. To illustrate, the extent of bias was lowest for externalizing behaviors ranging from 0% to -2.55% and largest for maternal age under 20 at child's birth (-7.89% to -36.36%). Finally, the retrospective measure of child maltreatment available in the QLSCD is based on a checklist of only six items and does not provide detailed information on supervisory neglect, as well as important characteristics of maltreatment such as timing and chronicity.

Conclusions

The method used to derive our indicators of child maltreatment offers a relatively novel approach for capturing probable maltreatment in population-based cohorts. Future cohorts may consider undertaking a similar methodological approach for deriving probable maltreatment indicators in order to broaden research investigations that account for characteristics of maltreatment that are often difficult to capture (e.g., chronicity). These characteristics are crucial for studying the long-term consequences of mental and physical health as well as economic and social outcomes. As a next step, we will examine the validity of this approach, and the indicators that resulted from it, by investigating and comparing the prospective and retrospective associations with mental health outcomes, such as depression, and suicidality and early-life correlates such as family socioeconomic status and dysfunction. Child maltreatment is global problem with consequences at the societal and individual level. Our index offers a pragmatic and prospective approach to detecting child maltreatment for research purpose in datasets where it is not directly assessed.

Figure 1

Screening approach used to extract items from the Quebec Longitudinal Study of Children Development (QLSCD) questionnaires



Note. The initial screen included all items of potential interest for maltreatment, while the review of experts stringently retained only the items that could reflect probable maltreatment according to our definition.

Table 1

Definitions of probable child maltreatment

Maltreatment types	Definitions
Physical abuse	A situation in which the child is the victim of bodily injury or is subjected to unreasonable methods of upbringing by his parents or another person, and the child's parents fail to take the necessary steps to put an end to the situation.
Sexual abuse	The child has been subjected to acts sexual in nature by the child's parents or another person, with or without physical contact.
Psychological abuse	A child is seriously or repeatedly subjected to behaviour on the part of the child's parents or another person that could cause harm to the child, and the child's parents fail to take the necessary steps to put an end to the situation (e.g., denigration, emotional rejection, excessive control, threats).
Family (indirect) violence	Children are, in these cases, exposed to domestic or family violence. A child may witness violent words or gestures between their parents, or at the place of another family member. The child may also be exposed to severe separation conflicts.
Emotional neglect	Acts of omission, another form of direct ill-treatment, usually manifest themselves in a parent's lingering indifference to their child. A coldness and lack of investment in the parent-child relationship is palpable. The parent is considerably lacking in emotional sensitivity towards their child.
Physical neglect	Failing to meet the child's basic physical needs with respect to food, clothing, hygiene, or lodging, taking into account their resources.
Educational neglect/supervisory neglect	Failing to provide the child with the appropriate supervision or support or failing to take the necessary steps to ensure that the child receives proper education and stimulation, and if applicable, that he attends school as required under the Quebec Education Act or any other applicable legislation.

Note. Extracted from the Quebec Youth Protection online sources; extended definitions and examples can be found online (Youth Protection Act, 2021; Grounds for Reporting a Situation, 2022).

Table 2

Deriving probable child maltreatment indicators

	According to developmental period	Variables derived by the end of (1) childhood (birth to 12 years) or (2) adolescence (birth to 17 years)
Presence by type of maltreatment	Types of maltreatment experienced (i.e., physical abuse, psychological abuse) scored as "probable maltreatment" (i.e., presence of a given type at any age point[a] within a development period) or "absence" (i.e., calculated only when at least 2/3 of age points were available).	Types of maltreatment experienced (e.g., physical abuse) by the end of childhood (i.e., scored as "probable maltreatment" if a given type was present at preschool and/or school-age) and by adolescence (i.e., scored as "probable maltreatment" if a given type of maltreatment was present at preschool and/or school-age and/or in adolescence). This was derived when all developmental periods for a given type were available (i.e., 2/2 by childhood and 3/3 by adolescence).
Cumulative maltreatment	Total number of maltreatment types experienced (scored as: 0, 1, 2, 3+). It was derived only when at least 2/3 of the indicators *presence by type of maltreatment* were available within a given developmental period.	Total number of maltreatment types (0, 1, 2, 3+) experienced by the end of childhood (over preschool and school-age) and by adolescence (over preschool, school-age and adolescence). This was calculated only when at least 2/3 of indicators for the *presence by type of maltreatment* were available by the end of childhood or by the end of adolescence.[b]
Recurrence and chronicity, by types of maltreatment	Total number of times a child was exposed to a type of maltreatment within a developmental period: 'no recurrence (0 or 1 age point)' 1 'recurrence (2+ ages points)'. It was derived when at least 2/3 of the indicators *presence by types of maltreatment* were available within a given developmental period.	Total number of developmental periods (chronicity) a child was exposed to a given maltreatment type. This was derived when all developmental periods were available for a given type (i.e., 2/2 by childhood and 3/3 by adolescence). By childhood: 0, 1 (no recurrence over developmental periods) versus 2+ developmental periods (recurrence). By adolescence: 0, 1 (no recurrence over developmental periods) versus 2+ developmental periods (recurrence).
Extent of exposure to different or repeating acts, by type of maltreatment	Standardized average of endorsed items ranging from 0-10.	Standardized average of endorsed items ranging from 0-10.

Note. Data were compiled from the final master file of the Québec Longitudinal Study of Child Development (1998-2021), Québec Government, Institut de la Statistique du Québec.

Within each developmental period: No= none or exposure at a single age point; Yes= exposure at more than one age point. Within lifetime: No= none or exposure at one developmental period; Yes=more than one developmental period.

[a]By childhood includes preschool and school-age.

[b]By adolescence includes preschool, school-age and adolescence.

Table 3

Prevalence estimates of probable childhood maltreatment indicators across developmental periods, the lifetime and retrospective reports (%, n)

	Preschool (birth to 5 years)	**Childhood** (6 to 12 years)	**Adolescence** (13 to 17 years)	**By the end of childhood** (birth to 12 years)[a]	**By the end of adolescence** (birth to 17 years)[b]	**Retrospectively assessed at age 23 years** (birth to 18 years)
Maltreatment types						
Physical abuse	21.8(427)	17.4(236)	16.3(227)	29.7(400)	37.3(446)	4.9(64)
Sexual abuse	-	-	9.5(114)	-	-	11.7(154)
Psychological abuse	21.9(426)	3.3(39)	6.8(94)	22.6(263)	25.7(277)	13.6(179)
Emotional neglect	20.7(413)	21.6(285)	20.4(237)	34.9(458)	42.1(431)	14.6(192)
Physical neglect	15.0(299)	22.3(199)	-	30.3(270)	-	2.5(33)
Supervisory/educational neglect	25.8(508)	44.9(562)	36.5(497)	55.2(683)	67.3(715)	-
Family Violence	11.2(209)	8.5(99)	4.1(44)	16.0(184)	16.5(150)	4.2(56)
Cumulative maltreatment[c]	*n=1969*	*n =1221*	*n=1309*	*n=1207*	*n=964*	
0	36.6(720)	40.7(497)	46.3(606)	22.0(266)	15.9(153)	
1	32.7(643)	34.5(421)	32.6(427)	30.6(369)	31.6(305)	
2	18.5(364)	16.2(198)	13.1(172)	21.9(264)	25.6(247)	
3+	12.3(242)	8.6(105)	7.9(104)	25.5(308)	26.9(259)	
Cumulative maltreatment *(without supervisory/educational neglect)*[d]	*n=1952*	*n=1129*	*n=1169*	*n=1111*	*n=1019*	*n=1323*
0	44.3(865)	58.4(659)	64.2(750)	35.0(389)	33.2(338)	69.7(922)
1	33.5(653)	29.9(338)	23.5(275)	31.4(349)	34.9(356)	18.6(246)
2	15.1(139)	8.9(101)	8.8(103)	20.6(229)	20.5(209)	5.8(77)
3+	7.1(139)	2.7(31)	3.5(41)	13.0(144)	11.4(116)	5.9(78)

Note. Data were compiled from the final master file of the Québec Longitudinal Study of Child Development (1998-2021), Québec Government, Institut de la Statistique du Québec.

The number of items vary by maltreatment type and across each developmental period. See supplemental Table 2 for more information.

[a]By the end of childhood includes preschool and school-age.

[b]By the end of adolescence includes preschool, school-age and adolescence.

[c]Cumulative maltreatment by the end of adolescence (birth to 17 years) excludes sexual abuse and physical neglect as they are not available at all three developmental periods.

[d]Given the relatively high prevalence of supervisory/educational neglect, we also present cumulative maltreatment while excluding this category.

Table 4

Recurrence of probable child maltreatment (%, n)

	Preschool (birth to 5 years)		**School-age** (6 to 12 years)		**Adolescence** (13 to 17 years)		**By the end of childhood** (birth to 12 years)[a]		**By the end of adolescence** (birth to 17 years)[b]	
	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Physical abuse	92.0(1789)	8.0(156)	95.7(1266)	4.3(57)	98.0(1349)	2.0(27)	90.9(1223)	9.1(122)	88.0(1053)	12.0(144)
Sexual abuse	-	-	-	-	99.3(1175)	.7(8)	-	-	-	-
Psychological abuse	96.0(1856)	4.0(77)	99.7(1180)	NA	99.2(1362)	.8(11)	98.8(1148)	1.2(14)	96.8(1042)	3.2(34)
Emotional neglect	95.7(1892)	4.3(85)	96.6(1215)	3.4(43)	97.0(1083)	3.0(34)	92.2(1210)	7.8(102)	85.9(879)	14.1(144)
Physical neglect	97.1(1917)	2.9(57)	97.4(772)	2.6(21)	-	-	94.2(838)	5.8(52)	-	-
Supervisory/educational neglect	94.1(1836)	5.9(115)	90.3(997)	9.7(107)	92.8(1219)	7.2(95)	83.8(1037)	16.2(200)	70.5(749)	29.5(313)
Family violence	97.9(1822)	2.1(40)	99.2(1145)	.8(9)	-	-	97.5(1118)	2.5(29)	96.8(882)	3.2(29)

Note. Data were compiled from the final master file of the Québec Longitudinal Study of Child Development (1998-2018), Québec Government, Institut de la Statistique du Québec.

Within each developmetal period: No= none or exposure at a single age point; Yes= exposure at more than one age point. Within lifetime: No= none or exposure at one developmental period; Yes=more than one developmental period.

[a]By childhood includes preschool and school-age;

[b]By adolescence includes preschool, school-age and adolescence.

NA refers to <5 participants.

Table 5

Extent of exposure to different or repeating acts of maltreatment by type across developmental periods

	Preschool (birth to 5 years)		**School-age** (6 to 12 years)		**Adolescence** (13 to 17 years)		**By the end of childhood** (birth to 12 years)[a]		**By the end of adolescence** (birth to 17 years)[b]	
	Range	**M(SD)**	**Range**	**M(SD)**	**Range**	**M(SD)**	**Range**	**M(SD)**	**Range**	**M(SD)**
Physical abuse (item range: 15-18)	0-7	.25(.62)	0-7.25	.19(.59)	0-3	.13(.39)	0-5.46	.21(.49)	0-3.64	.17(.35)
Sexual abuse (4 items in adolescence)	-	-	-	-	0-10	.28(1.07)	-	-	-	-
Psychological abuse (item range: 2-16)	0-5.25	.20(.54)	0-1	.01(.09)	0-6.67	.26(1.04)	0-2.63	.11(.28)	0-2.97	.14(.38)
Emotional neglect (item range: 11-28)	0-4	.10(.28)	0-4	.14(.36)	0-3.50	.21(.58)	0-2.80	.12(.25)	0-2.09	.14(.27)
Physical neglect (item range: 0-14)	0-5.67	.14(.47)	0-3.60	.08(.29)	-	-	0-3.08	.09(.24)	-	-
Supervisory/educational neglect (item range: 13-33)	0-4.33	.26(.53)	0-2.25	.17(.30)	0-5	.18(.37)	0-2.47	.21(.32)	0-1.21	.19(.23)
Family Violence (item range: 2-6)	0-7.50	.22(.76)	0-7.50	.16(.69)	0-10	.21(1.05)	0-6.25	.18(.55)	0-4.31	.17(.49)

Note. Data were compiled from the final master file of the Québec Longitudinal Study of Child Development (1998-2021), Québec Government, Institut de la Statistique du Québec.

All scales were coded to range from 0-10. The ranges presented here are those observed. "Item range" refers to the number of items in each developmental period.

[a]By childhood includes preschool and school-age.

[b]by adolescence includes preschool, school-age and adolescence.

Table 6

Agreement between our prospective presence indicator (by the end of adolescence) and retrospective maltreatment

	K	*p*
Physical abuse	.075	<.001
Sexual abuse	.110	<.001
Psychological abuse	.110	<.001
Emotional neglect	.037	.148
Physical neglect	.057	.002
Supervisory/educational neglect	-	-
Family Violence	.060	.009
Any types	.067	.003
Cumulative maltreatment	.058	.001

Note. Data were compiled from the final master file of the Québec Longitudinal Study of Child Development (1998-2021), Québec Government, Institut de la Statistique du Québec.
K = kappa estimate.
Prospective physical neglect by the end of childhood was used to estimate agreement (by the end of adolescence not available). Prospective sexual abuse "adolescence" was used to estimate agreement.
Supervisory/educational neglect is not included in prospective "any types", as it is not measured retrospectively.

Supplementary Material

Table 1

Retrospective maltreatment items in the Quebec Longitudinal Study of Children Development (QLSCD) questionnaire at 23 years

Maltreatment types	Item
Physical abuse	In the first 17 years of your life and prior to your 18th birthday: Did a parent or other adult in the household often or very often push, grab, slap, or throw something at you or ever hit you so hard that you had marks or were injured?
Sexual abuse	Did an adult or another person ever touched you, or forced or coerced you to touch another person on an intimate or private part of the body (e.g. breasts, thighs, genitals) in a way that surprised you or made you feel uncomfortable; or have you ever been forced or coerced to kiss someone in a sexual rather than an affectionate way? OR ever have genital sex with you against your will, or were you ever forced or coerced to perform oral sex on someone; or did you ever experience someone rubbing their genitals against you?
Psychological absue	In the first 17 years of your life and prior to your 18th birthday: Did a parent or other adult in the household often or very often swear at you, insult you, put you down, or humiliate you or act in a way that made you afraid that you might be physically hurt?
Emotional neglect	In the first 17 years of your life and prior to your 18th birthday: Did you often or very often feel that no one in your family loved you or thought you were important or special or your family didn't look out for each other, feel close to each other, or support each other?
Physical neglect	In the first 17 years of your life and prior to your 18th birthday: Did you often or very often feel that you didn't have enough to eat, had to wear dirty clothes, and had no one to protect you or your parents were too drunk or high to take care of you or take you to the doctor if you needed it?
Family violence	In the first 17 years of your life and prior to your 18th birthday: Was your mother or stepmother or your father or stepfather or your sister or your brother often or very often pushed, grabbed, slapped, or had something thrown at her/him or sometimes, often, or very often kicked, bitten, hit with a fist, or hit with something hard or ever repeatedly hit over at least a few minutes or threatened with a gun or knife?

Note. All items are from the Adverse Childhood Experiences International Questionnaire (ACE-IQ; World Health Organization, 2020).

Sexual abuse exposure was evaluated using two items derived from the recombination of six items from the Early Trauma Inventory Self-Report Short Form (ETI; Bremner, J.D. *et al*., 2007).

References

Bremner, J. D., Bolus, R., & Mayer, E. A. (2007). Psychometric properties of the early trauma inventory–self report. The Journal of nervous and mental disease, 195(3), 211-218.

World Health Organization. (2020). Adverse Childhood Experiences International Questionnaire (ACE-IQ).

Table 2
Individual items selected by maltreatment experts across preschool, school-age and adolescence

Item	Informant	Dichotimization Cut-off	Age points
Physical abuse (*n*=11 unique items)			
The mother slaps the baby and spanks him or her on the buttocks during the visit.	Interviewer Observation	Rarely Yes	5m, 17m, 29m 45-56m
I have spanked my baby when he/she was particularly fussy.	Mother	10 (exactly what I did)	5m, 17m, 29m
I have shaken my baby when he/she was particularly fussy.	Mother	10 (exactly what I did)	5m, 29m
In the past 12 months, when your child broke the rules or did things that he/she was not supposed to, how often did you: use physical punishment?	Mother	Often Sometimes	29m, 41m 45-56m, 5y, 6y, 8y, 10y, 12y, 13y, 15y, 17y
In the past 12 months, how often did you hit "child" when they were difficult?	Mother	A few times a week About once per two weeks	41m, 5y, 6y 8y, 10y, 12y, 13y, 15y, 17y
In the past 3 months, how often did you hit "child" when they were difficult?		A few times a week	45-56m
There was more than one incident involving physical punishment during the visit.	Interviewer Observation	Yes	45-56m
In the past 12 months, how often did you grab firmly or shake your child when they were difficult?	Mother	A few times a week	5y, 6y, 8y, 10y, 12y
In the past 6 months, my parents grab firmly or shake me	Child	Often	12y, 13y, 15y, 17y
In the past 6 months, your parents hit you or threaten to do so	Child	Often	10y, 12y, 13y, 15y, 17y
In the past 12 months, a romantic partner has grabbed me (held me by the arms); he/she pushed me around; he/she shook me.	Child	Sometimes	15y, 17y
In the past 12 months, a romantic partner has slapped me	Child	Sometimes	15y, 17y
In the past 12 months, a romantic partner has used his/her fists or feet, an object or a weapon to hurt me.	Child	Sometimes	15y, 17y
Sexual abuse (*n*=2 unique items)			
In the past 12 months, a romantic partner has forced me to kiss or caress him/her when I didn't want to.	Child	Sometimes true	15y, 17y
In the past 12 months, a romantic partner has forced me to have sexual contact or sexual intercourse when I didn't want to.	Child	Sometimes true	15y, 17y
Psychological abuse (*n*=9 unique items)			
How often do you tell him/her that he/she is bad or not as good as others?	Mother	A few times a week One or two times each day	5m 17m, 29m

The mother yells at the baby during the visit.	Interviewer Observation	Rarely Sometimes Often	5m 17m 29m
The mother appears to be obviously annoyed (derangée) by her baby and shows hostility towards him.	Interviewer Observation	Sometimes Often	5m, 17m 29m
The mother scolds and belittles the baby during the visit.	Interviewer Observation	Rarely Often	5m 17m, 29m
I have raised my voice with or shouted at my baby when he/she was particularly fussy.	Mother	10 (exactly what I did)	5m
In the past 12 months, all the times that you talked to him/her about his/her behaviour, what proportion was disapproval?	Mother	More than half the time	29m
The child can express negative feelings without harsh reprimands.	Interviewer Observation	No	45-56m
The child can disturb the parent without harsh reprimands	Interviewer Observation	No	45-56m
In the past 6 months, your parents get angry and yell at you	Child	Always	10y, 12y, 13y, 15y, 17y
Neglect			
Emotional neglect *(n=15 unique items)*			
How often do you praise ...(name), by saying something like “Good for you!” or “What a nice thing you did!” or “That’s good going!”?	Mother	Never About once a week or less	5m 17m
How often do you and he/she talk or play with each other, focussing attention on each other for five minutes or more, just for fun?	Mother	A few times a week About once a week or less About once per two weeks About once a month or less Never	5m, 17m 29m, 41m, 45-56m, 5y 6y 8y, 10y 12y
How often do you and he/she laugh together?	Mother	About once a week or less	5m, 17m
How often do you do something special with him/her that he/she enjoys?	Mother	Never	5m, 17m, 29m, 41m, 45-56m, 5y, 6y, 8y, 10y, 12y
The mother responds to the baby's vocalizations by speaking to him	Interviewer Observation	Never	5m, 17m, 29m
I often play with my baby. For example, I regularly take the time to amuse him/her or make him/her laugh when I change his/her diaper.	Mother	0	5m, 17m
How often do you play sports, hobbies or games with him/her?	Mother	Never	17m, 29m, 41m, 45-56m, 5y
In the past 12 months, how often did you play sports activities, hobbies or games with him/her?			6y, 8y

How often do you play games with him/her?	Mother	About once a week or less	17m
In past 12 months, all the times that you talked to ...(name) about his/her behaviour, what proportion was praise?	Mother	Never	29m, 6y
In the past 12 months, how often did you comfort your child when they were sad?	Mother	Never	5y, 6y
How many days a week do you and your child talk about things together?	Mother	1 to 2 days per week Rarely or never	6y 7y
In the past 6 months, your parent(s) seem too busy to spend as much time with you as you would like	child	Always	10y, 12y, 13y, 15y, 17y
Since September, how often do you ask your child how things are going at school?	Mother	Never	13y, 15y
Since last September, how many times did one of your parents do the following: ask me about school (assignments, tests, activities, friends, teachers…)	child	Never	13y, 15y
How often do you talk to your child about his/her plans for future (education, career, family, etc)	child	Never	13y, 15y
Physical Neglect *(n=11 unique items)*			
The environment in which the baby play seems safe and not hazardous.	Interviewer Observation	No	5m, 17m, 29m, 41m
Overall, the interior of the house was…	Interviewer Observation	Very messy and dirty	5m, 17m, 29m, 41m
How old was your child when his teeth were first brushed?	Mother	Never brushed	29m
Who usually brushes your child's teeth?	Mother	Never brushed	41m, 45-56m, 5y, 6y, 8y
The building appears safe and nonhazardous	Interviewer Observation	No	45-56m
The outdoor play environment appears to be safe	Interviewer Observation	No	45-56m
Since the start of school in the fall, how often has this child arrived: over or underdressed for school-related activities?	Teacher	Usually	6y
		Often	8y, 10y
Since the beginning of this school year, how often has this child arrived inadequately clothed to participate in school-related activities?	Teacher	Often	7y, 8y, 10y
Since the beginning of this school year, how often has this child arrived inadequately dressed for the weather conditions?	Teacher	Usually	6y
Since the start of school in the fall, how often has this child arrived: too tired to do schoolwork?	Teacher	Usually	6y
Since the start of school in the fall, how often has this child arrived: hungry?	Teacher	Usually	6y
		Often	7y, 8y, 10y, 12y
Since the beginning of this school year, how often has this child arrived without adequate nourishment/hungry?	Teacher	Often	7y, 8y, 10y
Since the beginning of this school year, how often has this child arrived without a lunch/snacks?			

Supervisory/Educational Neglect *(n=26 unique items)*			
The mother tends to keep her baby in sight and looks at him often	Interviewer Observation	Never	5m, 17m, 29m
Do you or another adult ever read to ... (name), or show him/her pictures or wordless baby books?	Mother	No	17m
In the past 12 months, when ...(name) broke the rules or did things that he/she was not supposed to, how often did you: ignore it, do nothing?	Mother	Always Often	29m, 41m 45-56m, 5y, 6y, 8y, 10y, 12y, 13y, 15y, 17y
In the past 12 months, how often did he/she see television shows or movies that have a lot of violence in them?	Mother	Often	41m, 45-56m, 5y, 6y
Currently, how often do you or another adult of the household read aloud to your child or listen to your child read or try to read?	Mother	Never or rarely Once a month	45-56m 5y, 6y, 7y
How often do you or another adult of the household teach him to NAME printed letters or to read words?	Mother	Rarely or never	6y
How often do you or another adult of the household teach him/her to PRINT letters or words?	Mother	Rarely or never	6y
Since the start of school in the fall, how often has this child arrived: late?	Teacher	Always	6y, 7y, 8y, 10y
What type of school is your child currently in?	Mother	Not in school	6y
How often do you and your child talk about their schoolwork or activities?	Mother	Once a month Less than once a month	6y 7y
Since the beginning of this school year, how often has this child arrived without the materials needed to do his/her work?	Teacher	Always	7y, 8y, 10y
Since the beginning of this school year, how often has this child arrived without his/her homework completed?	Teacher	Always	7y, 8y, 10y, 12y, 13y
Since the beginning of this school year, how often has this child arrived too tired to do school work?	Teacher	Often	7y, 8y, 10y
When your child goes out with friends, do you ask where they are going and what they are going to do?	Mother	Rarely Never	10y, 12y 13y, 15y
In the past 6 months, your parents want to know exactly where you are going and what you are doing	Child	Never	10, 12y, 13y, 15y
If your child wants to go out with friends at night during the week, should your child ask your permission?	Mother	Sometimes Rarely	10y, 12y 13y
In the past 6 months, your parents let you go out any evening you want	Child	Always	10y, 12y, 13y, 15y
How often do you know where your child is when he/she is not at home?	Mother	Seldom Never	13y 15y

How often do you know with whom your child is with when he/she is not at home?	Mother	Seldom	13y
		Never	15y
Do you ever tell your child that...it is important to you that he/she succeed in school?	Mother	Never	13y, 15y
Do you ever tell your child that..it is important to you that he/she works hard in school?	Mother	Never	13y, 15y
Since September, how often do you ask your child if he/she has done his/her schoolwork?	Mother	Never	13y
	Child		13y
Since last September, how many times did one of your parents do the following: ask me if I did my homework			
Since September, how often do you ask your child questions about how he/she is doing at school? (test, assignments, grades, etc.)	Mother	Never	13y
How often is this student absent from class without a valid reason.	Teacher	Often	13y
During this school year, how many times have you missed school without a valid reason?	Child	Quite often	13y, 15y
Since last September, how many times did one of your parents do the following: help me with my homework when I ask for help	Child	Never	13y, 15y
In what grade level are you enrolled this current school year?	Child	don't go to school anymore	15y
Family Violence (*n*=3 unique items)			
In the past 12 months, how often does your child see adults or teenagers in your house physically fighting, hitting or otherwise trying to hurt others?	Mother	Sometimes	41m, 5y, 6y
In the past 3 months, how often does your child see adults or teenagers in your house physically fighting, hitting or otherwise trying to hurt others?			45-56m
Since the birth of you child, have you been hit, slapped, kicked or otherwise physically hurt by someone?	Mother	Yes	41m
In the past 12 months, have you been hit, slapped, kicked or otherwise physically hurt by someone?			41m, 5y, 8y, 10y, 12y, 13y
In the past 3 months, have you been hit, slapped, kicked or otherwise physically hurt by someone?			45-56m
In the past 12 months, how many times did your partner (or ex-partner) insult you or swear at you when there was a problem?	Mother	More than 20 times	12y, 13y

Note. Data were compiled from the final master file of the Québec Longitudinal Study of Child Development (1998-2021), Québec Government, Québec Statistics Institute.

Table 3

Key characteristics[a] of included participants compared to the initial cohort

		Preschool (birth to 5 years)			**School-age** (6 to 12 years)		**Adolescence** (13 to 17 years)		**By the end of childhood** (birth to 12 years)		**By the end of adolescence** (birth to 17 years)		**Retrospective** (birth to 17 years)	
		Initial cohort (n=2120)	included participants (n=1969)	% bias	Included participants (n=1221)	% bias	Included participants (n=1309)	% bias	Included participants (n=1207)	% bias	Included participants (n=964)	% bias	Included participants (n=1323)	% bias
Child characteristics														
Sex														
	Male	50.9(1080)	50.3(991)	-1.18	47.5(580)	-6.68	47.3(619)	-7.07	52.6(635)	3.54	45.9(442)	-9.82	42.3(559)	-16.90
	Female	49.1(1040)	49.7(978)	1.22	52.5(641)	6.92	52.7(690)	7.33	47.4(572)	-3.46	54.1(522)	10.18	57.7(764)	17.52
Birth weight (grams)														
	<2500	3.3(69)	3.3(64)	0.00	2.9(35)	-12.12	2.6(34)	-21.21	2.9(35)	-12.12	2.4(23)	-27.27	2.9(38)	-12.12
	≥ 2500	96.7(2050)	96.7(1904)	0.00	97.1(1185)	0.41	97.4(1274)	0.72	97.1(1171)	0.41	97.6(940)	0.93	97.1(1285)	0.41
Ethnicity														
	Non-Canadian	28.5(600)	26.9(527)	-5.61	25.4(309)	-10.88	25.3(330)	-11.23	25.3(304)	-11.23	23.0(221)	-19.30	26.4(348)	-7.37
	Canadian	71.5(1506)	73.1(1429)	2.24	74.6(906)	4.34	74.7(973)	4.48	74.7(897)	4.48	77.0(740)	7.69	73.6(968)	2.94
Externalizing behaviors[b]														
	Low (≤3)	33.5(669)	33.7(658)	0.60	33.4(406)	-0.30	33.9(442)	1.19	33.2(400)	-0.90	33.8(325)	0.90	34.2(451)	2.09
	Medium (>3 and ≤ 6	39.1(790)	38.9(761)	-0.51	39.4(479)	0.77	38.8(506)	-0.77	39.5(476)	1.02	39.9(384)	2.05	39.0(514)	-0.26
	High (>6)	27.4(548)	27.4(535)	0.00	27.2(330)	-0.73	27.3(356)	-0.36	27.2(328)	-0.73	26.3(253)	-4.01	26.7(352)	-2.55
Internalizing behaviors[c]														
	Low (≤0)	50.7(1013)	50.5(986)	-0.39	49.1(596)	-3.16	49.7(648)	-1.97	49.2(592)	-2.96	49.8(479)	-1.78	50.9(670)	0.39
	Medium (>0 and ≤ 1	25.1(502)	25.4(497)	1.20	27.1(329)	7.97	26.7(348)	6.37	27.0(325)	7.57	27.5(265)	9.56	25.9(341)	3.19

	High (>1)	24.1(482)	24.1(471)	0.00	23.9(290)	-0.83	23.6(308)	-2.07	23.8(287)	-1.24	22.7(218)	-5.81	23.2(306)	-3.73
Family Characteristics														
Maternal age at birth														
	<20	3.8(81)	3.5(69)	-7.89	3.3(40)	-15.15	3.1(41)	-21.21	3.1(38)	-21.21	2.6(25)	-36.36	2.9(39)	-27.27
	20-29	53.2(1128)	53.2(1047)	0.00	52.1(636)	-2.06	52.2(683)	-1.88	52.4(632)	-1.50	51.1(493)	-3.94	52.6(696)	-1.13
	30+	42.9(910)	43.3(852)	0.93	44.6(545)	3.96	44.7(585)	4.20	44.5(537)	3.73	46.3(446)	7.93	44.4(588)	3.50
Maternal depression[d]														
	Low (≤2.67)	85.0(1795)	85.6(1680)	0.71	86.8(1056)	2.12	86.9(1134)	2.24	86.7(1043)	2.00	88.0(847)	3.53	87.0(1148)	2.35
	High (>2.67)	15.0(318)	14.4(283)	-4.00	13.2(161)	-11.33	13.1(171)	-12.67	13.3(160)	-11.33	12.0(116)	-20.00	13.0(172)	-13.33
Family structure														
	Intact	80.8(1706)	81.8(1605)	1.24	82.7(1007)	2.35	82.2(1074)	1.73	82.7(996)	2.35	84.3(811)	4.33	82.0(1083)	1.49
	Single or blended	19.2(406)	18.2(357)	-5.21	17.3(211)	-9.90	17.8(233)	-7.29	17.3(208)	-9.90	15.7(151)	-18.23	18.0(237)	-6.25
Family socioeconomic status[e]														
	Low (≤-.439)	33.0(696)	31.3(610)	-5.15	28.1(342)	-14.85	27.3(356)	-17.27	27.8(334)	-15.76	24.1(232)	-26.97	27.8(366)	-15.76
	Medium (>.44 and ≤ .45	33.0(696)	34.0(667)	2.94	34.7(422)	5.15	34.0(444)	3.03	34.8(419)	5.45	34.8(335)	5.45	33.8(445)	2.42
	High (>.450)	34.0(717)	34.9(686)	2.65	37.2(453)	9.41	38.7(506)	13.82	37.4(450)	10.00	41.1(395)	21.76	38.4(506)	12.94

Note. Data were compiled from the final master file of the Québec Longitudinal Study of Child Development (1998-2021), Québec Government, Québec Statistics Institute.
The samples from our cumulative maltreatment indicator were used to compare included participants (by developmental period) to the initial sample.
Percentage bias: (includedparticipants(by developmental stage)% - total initial cohort%)/total initial cohort%); positive bias represents an overrepresentation of the characteristic in the sample compared with the total cohort, negative bias is an underrepresentation.
[a]Variables were measured when the child was 5 months of age, unless otherwise indicated.
[b]Assessed at 29 months, missing values were replaced with 17 months; 10 items from the Behavior Questionnaire (e.g., cannot sit still, is agitated) (Collet et al., 2022), scores range from 0-18. Cut-offs based on 33 and 66 percentile.
[c]Assessed at 29 months, missing values were replaced with 17 months; 6 items from the Behavior Questionnaire (e.g., is too fearful or anxious) (Collet et al., 2022), scores range from 0-8. Cut-offs based on 33 and 66 percentile.
[d]Assessed using a shortened version (12 items) of the Center for Epidemiologic Studies-Depression (Poulin, C. *et al.*, 2005). Scores were standardized to range from 0-10. Cut-offs are based on the recommended instrument threshold.
[e]Standardized index based on annual gross income, parental education level and occupational prestige (Geoffroy *et al*., 2016). Cut-offs based on 33 and 66 percentile.

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