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# Trajectories from Childhood to Suicide: The Role of Childhood Adversity and Psychopathology

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## Abstract

**Objective:** With a life course perspective, we have identified the diverse pathways in which cumulative adversity in childhood and adolescence lead to detrimental outcomes: psychopathology and suicide. This study's design allowed us to address some major, controversial developmental issues surrounding the contribution of multiple forms of adversity (victimization events versus non-victimization events) to negative outcomes, specifically mental health disorders and suicide.

**Method:** We combined three statistical analyses: discrete time survival (DTS), latent class growth analysis (LCGA) and path analysis to identify the sequence of events and conditions that contribute to the development of psychopathology and suicide.

**Results:** Our results show that the process implicates early childhood adversities that act in a cascading manner and are cumulative in two ways: quantitatively and qualitatively. Therefore, pathways with more severe adverse experiences in childhood (victimization such as abuse or neglect) or with a greater number of adversity events (non-victimization) both tend to produce mental health problems and suicidal behavior early in life, contrary to pathways with fewer or less severe adversities.

**Keywords:** Developmental approach; Life course; Childhood adversity; Cumulative model of disadvantage; Victimization

## Introduction

Over the course of the past few decades, research has helped to provide conclusive knowledge on the developmental factors associated with suicide. Research with prospective and retrospective designs always identified two major predictors that appear in the process that leads adolescents and adults to suicide: prior mental health problems and adverse experiences in childhood. Epidemiological data and review studies reported that mental disorder was present in 90% to 98% of suicide cases [1-3]. But mental health problems only partially explain suicidal events because they are relatively rare compared to the base rates of these disorders. Thus diagnoses, in and of themselves, are of limited use in predicting suicidal events, and the mental health paradigm in suicide prevention covers just a part of the problem [1]. Researchers have hypothesized that contextual or adverse experiences, specifically in the course of child development, also contribute to suicidal behaviors. Two major issues arise when we attempt to understand how childhood adversity is related to suicidal behavior. First, many different terms and sometimes overlapping concepts are used in the literature on suicidal behavior referring to "contextual adverse experiences" in childhood. The operationalization varies from a specific form of maltreatment (i.e. sexual abuse) to "adversity", a more encompassing and complex situational factor. Therefore, results show no consistency and it is difficult to establish exactly which "contextual adverse experience" in childhood may have predicted suicidal behavior. Secondly, most of the research in the suicidal field has adopted a cross-sectional design and a correlational analysis strategy. These methodological approaches constitute important limits for an in-depth comprehension of the impact of contextual factors during childhood development on suicidal behaviors that arise in mid-adolescence and adult life.

### The role of maltreatment on suicidal behaviors

Despite an abundance of studies, there is little agreement in the literature concerning the contribution of maltreatment to suicidal behavior. Literature reviews of the best available scientific information on the role of child abuse in the etiology of suicide have found evidence that child abuse is a statistically significant, although general and non-specific, risk factor for suicide [4-7]. Exposure to childhood maltreatment accounts for a large spectrum of maladaptive outcomes, which include problems in the areas of physical health, mental health, social functioning and suicidal behavior [8]. Thus, the issue in the assessment of the impact of maltreatment on suicidal behavior in adolescence or adulthood concerns the possible role of confounding factors that may be associated with both childhood abuse and adult suicidality. To date, the available longitudinal data suggest that any form of abuse or childhood trauma, and psychiatric disorders may either act independently or interact to increase the risk of suicide in adolescence or adult life [9-11]. It is worthwhile to note that these longitudinal studies used a correlational design to examine the impact of multiple separate predictor variables. This variables-oriented strategy is developmentally static and has a very limited ability to provide information on developmental patterns by which contextual risk factors can trigger maladaptation [12,13]. The best approach for finding this information is through a life course method in which we can identify one or more sequential processes where early negative experience may affect mental health and suicidal behaviors [14,15].

### The measurement of childhood adversity

In the literature on suicide, the notion of childhood adversity was often limited to the concept of maltreatment. Studies focused specifically on one or two forms of childhood maltreatment like physical abuse and sexual abuse, which are perceived to be the more severe types of childhood victimization experiences [16]. We have to keep in mind that different forms of abuse often occur together as well as with other negative childhood events. For example, the Adverse Childhood Experience (ACE) study conduct by Felliti and colleagues [17] revealed that when respondents experienced one childhood adversity, the probability of having experienced another was approximately 80%. Similarly, the victimization research field has

recently brought to light the phenomenon of polyvictimization: a co-occurrence of multiple forms of victimization [18]. Thus, when predicting outcomes, we cannot assume that one specific form of childhood abuse is related to suicidal behavior without controlling for the effects that the different forms of abuse have on each other. Moreover, abuse may be just one of several elements that are present within a context of family problems, and other elements may account for the relationship between abuse and suicide. In fact, other family variables like domestic violence, parental divorce or death, household substance abuse, incarceration of a household member represent several forms of adversity that may combine with other forms of childhood victimization [9,10,19-21] and contribute to suicidal behavior. To better understand adversity's specific contribution to suicide, it is necessary to measure the whole family context and identify which situations fall under the victimization or non-victimization experience categories in order to distinguish the situation's specific influence. In the suicide field, with the few exceptions cited above, previous studies have not used an extensive definition of adversity, one that includes victimization and non-victimization forms, to examine adversity's effect on suicidal behavior [22]. To date, we have had difficulty in establishing the role that early negative childhood experiences play in the development of later adverse outcomes (mental disorders, social functioning, and suicidal behavior). The challenge concerns of two interrelated questions of measurement:

- Which adverse childhood experiences may correspond to the victimization and non-victimization events?
- How is the accumulation or co-occurrence of adverse childhood experiences best captured?

Researchers in the victimization research field have routinely employed the Juvenile Victimization Questionnaire (JVQ) developed by Finkelhor and colleagues [23,24]. The JVQ is a checklist approach to life event measurement that itemizes different types of victimization and focuses on establishing poly-victimization rates. These rates are based upon responses to questions in larger, aggregate categories of victimization that each covers one of five areas of concern: Child Maltreatment, Conventional Crime, Peer and Sibling Victimization, Sexual Victimization, and Witnessing and Indirect Victimization. Although this instrument has the advantage of documenting a large range of negative situations experienced during childhood, it is based upon questionable assumptions. Namely, each form of victimization within a category is considered to be equal in terms of severity (e.g., witnessing parental assault of a sibling is equal to witnessing a stranger assaulting another stranger) since they all carry the same statistical weight, and all areas of concern are also considered to be qualitatively similar (e.g., the Child Maltreatment category is similar to the Witnessing and Indirect Victimization category). There is some evidence that indicated that a simple sum score may mask important information about the extent of impact for different types of events [25]. For example, the research group that created the JVQ has concluded in one of its studies that some categories have a stronger positive coefficient for mental disorder, and some indexes in the same category have varying strengths of association with mental health outcomes. Moreover, the presence of internalized (depression) et externalized (anger/aggression) symptoms in children and adolescents aged 2-17 is better explained by their family maltreatment experiences than by any other category or type of victimization listed [26]. Thus, perhaps respondents had disproportionately poorer mental health because of the severity of the adversities to which they were exposed, not the cumulative number of different types of adversities experienced.

With some exceptions [26,27], the researchers in the victimization area have paid far less attention to aversive events that generate a high level of stress and are likely to have important mental health implications. Such events are non-victimization experiences or contextual factors that increase the risk of developing a mental disorder and other adjustment problems. In the developmental research field, many adverse conditions were identified as risk factors for the development of psychopathology: harsh physical discipline, inconsistent parenting, residential instability, parental verbal conflict, parental psychopathology, parental substance use (drug) and abuse (alcohol), academic difficulties, conflict with peers, and so on [28,29]. Because these family dysfunctions are often and perhaps usually present, it is unclear whether the negative outcome attributed to abuse are specific effects of abuse experience. Alternatively, they may be due to the dysfunctional familial context in which maltreatment occur.

The victimization model is of limited use for conducting an investigation of the complex process that may link childhood abuse and the development of negative outcomes. First, in employing the strategy of summing the number of victimization events as a predictor of outcome, the model assumes a linear relationship between cause and effect. It appears that the effects of multiple adversities on mental health problems are not simply additive and are more complex than a simple linear association [25,30,31]. The differential severity of each adversity is clearly an important factor to consider when constructing a cumulative adversity variable. Second, the scope of the victimization model allows the capture of all of a child's experiences of violence, but it neglects the aversive context in which those experiences occurred. One considered that many stressful family contexts are chronic living conditions and not isolated or episodic events that may contribute directly to the development of negative outcome (social impairments, mental health problems, suicidal behavior).

Hence, major research questions remain concerning the role of childhood adversities in the development of a person's life course. An abundance of practical problems have arisen while attempting to answer those questions; a key problem is representing the multiplicity of childhood risk variables and their significance in the context in which they arise. The optimal solution to such a problem is strong conceptualization of burden of adversity. A few published studies on the cumulative impact of adversities draw on conceptualization and a burden of adversity approach to measuring the cumulative impact of life events [32-34]. This is the approach that supports the importance of identifying deployment-related conditions that are linked to an outcome. Moreover, the burden of adversity approach enables us to explain how an accumulation of negative environmental and psychosocial factors can result in a sequence of negative outcomes. Specifically, this approach enables us to explain how an accumulation of environmental and psychosocial disadvantage factors can result in a cascade of negative outcomes. In this paper, we adopt the burden of adversity approach developed by Séguin and colleagues [34] and used in a psychological autopsy method for assessment of life trajectory of deceased persons [35,36].

## The present study

Our study mainly concerns itself with disentangling the relationships between, childhood adversities - mental health problems and suicide - by adopting a developmental and life course perspective. Given that not many studies focused on the life course of childhood

adversities and suicidal behavior [19] and that few studies explored the longitudinal burden that childhood adversities place on adolescent and adult development [22] our study can contribute to clarifying these major issues. Our study consists of an investigation of developmental pathways of negative outcome, i.e mental disorders and suicide, in a sample of suicide decedents from the general population of the province of Québec. The identification of these pathways allows us to meet three objectives:

- To examine whether childhood adversities contribute to the development of mental health problems depending on the type of childhood adversities (victimization versus non-victimization)?
- To examine whether childhood adversities distinguish suicide groups depending on the type of childhood adversities (victimization versus non-victimization)?
- To examine whether differing patterns of maladaptation are seen in life course development depending on the type of childhood adversities (victimization versus non-victimization)?

## Method

### Participants and recruiting of informants

Through an ongoing partnership with the Quebec Coroner's Office, our research group recruits suicides occurring in the Province of Quebec (Canada). This successful partnership has enabled us to recruit over the past decade, and we now have a data bank of life course calendars mapping the developmental trajectories of people who died by suicide. The protocol established is always the same: after receiving a first letter from the Coroner's Office, a research assistant follows up with a telephone call to start the recruiting process. Once referred by the Coroner's Office, 75% of close relatives agreed to participate in the study. Suicides were assessed by psychological autopsy (PA) which is the best technique currently available for determining the association between particular risk factors and suicide since the clinical features of suicide ideators, attempters, and completers are different [2]. PA is a validated method used to assign post-mortem psychiatric diagnoses based on interviewing an informant having well known the suicide decedent [37-39].

In this study, we report on the life course data of 214 suicide cases: 85% were males, and the mean age of death was 37 years. As for marital state, 49% were single; 29% were married or living with a partner; and 21% divorced. At the time of death, 54% were working, and 68% had reached a secondary school level, 14% a junior college level and 10% a university level. We have already investigated this sample data in a published study [35] where another statistical analysis was used for different research purposes than those in this study.

### Measurements

For the purposes of this interview, we administered semi-structured questionnaires, the Structured Clinical Interview for DSM-IV axis I and axis II disorders (SCID I and II) [40,41] to an informant (proxy family members) who lived for many years with the decedent and kept contact with him or her until this person's death. The interview process represents on average three different interviews of three hours each. This procedure has been previously described by our group [42,43]. In addition, hospital files were examined to corroborate the information and to determine the mental health services the deceased had used.

The interview method using the life trajectory calendarwas borrowed from life-history calendar research [44-46] and by the ALPHI-Adult Life Phase Interview [47]. The questionnaire uses a life calendar to reconstruct the major events of an individual's life as an aid to accurately recall significant life experiences to effectively order, within the life course, the onset of psychiatric disorder and occurrence of major life events. In order to maximize the accuracy of the retrospective report, we urge the participant to use certain documents that will help to recall events, such as a personal calendar, photos albums, etc. and we had access to medical and psychosocial reports, obtained with the written consent of families. The question of reliability of reporting, or recalling, does not apply equally to all events [48]. It appears that a range of severe events can be measured with reasonable accuracy. Studies on recall factors indicate that people tend to remember important or major events, which contribute to an underestimation rather than an overestimation of difficulties [49]. The reliability of memories associated to life events would improve when using mixed data capture methods and more specifically narrative approaches [50,51]. Even when making efforts in order to maximize recall accuracy, some studies indicate that there are individuals with certain personality traits or attachment styles who will show a cognitive bias in recalling events or reconstructing memories. Even when considering the limits of reporting events, the importance of better understanding the development sequence of suicide trajectories argue for the inclusion of lifetime experience.

The life calendar enables one to track the occurrence of specific events (positive and negative); the length of these occurrences and the severity of the events according to the following 12 different life spheres:

- Place of residence and change of permanent address in a lifespan
- Relationship and events with the family of origin (relationship with parents including child maltreatments) and changes within the family (with parents, siblings, etc.)
- Relationship and events in the affective sphere (affective life, living as couple)
- Relationship and events associated with starting a family, and events that occurred in this/these families (relationship with children, extended family)
- Onset of interpersonal difficulties (difficulties associated with mental health, suicide attempts, illness, etc.)
- Events associated with social life (presence or absence of social support, friends, colleagues)
- Events associated with academic life (path, interruptions, successes, failures, etc.)
- Events associated with professional life (unemployment, stress at work, promotions, etc.)
- Presence of protective factors throughout a life
- Specific events of loss (bereavement, separations, deaths, etc.)
- Specific events of social adversities (financial, legal, etc.)
- Seeking and consulting mental health services (types of treatments, etc.)

Each sphere has a number of variables clearly described, and the severity and duration of each variable is indicated on the calendar. When the interview was completed, clinical case histories were drafted (vignette) according to information obtained from all the measures. Interviewers sought to accumulate sufficient narrative detail about the life events to allow trained raters to pass judgment on the key characteristics of the events, following narrative methodology

developed by other groups [51,52]. The case histories were submitted to a panel of raters, independent of the interviewers. The panel is composed of experts (researchers from our team, clinical practitioners, psychiatrists, psychologists). The raters evaluate the likely "contextual threat" of events by assessing their relative weight, within the respondent's developmental circumstances. Dictionaries of cases were written and used in order to maintain the same evaluation across all cases. For each case, the raters independently scored each five-year period of life course, based on the severity of the burden of adversity. Afterwards, a consensus panel discussion took place for all burdens of adversity scores. The use of a summary variable identified as "burden of adversity" for specific age periods ranged from severe (rating of 1 or 2) to moderate (3 or 4) to low (5 or 6). In studies from our group, the intra-pair agreement for each five-year segment ranged from 76% to 97%; the lower agreement was found in the age group between 0–4 years old.

### Modelling and analysis trajectory

For conducting investigations on developmental processes, we drove two analytic strategies using MPLUS software version 7 for Mac. First, we used a growth mixture analysis, the Latent Class Growth Analysis (LCGA), combined with discrete-time survival (DTS) to examine the individual variation in burden of adversity over time. LCGA can a posteriori identify distinct subpopulations of trajectories and in doing so generates a set of continuous growth factors, namely the intercept, slope and quadratic term. The suicide of individuals is considered as a unique event slated in time and in that respect DTS analysis (generating a proportional odds continuous latent variable) was added to the growth mixture analysis in order to construct a categorical latent class variable related to the heterogeneity of the study sample. Finally, the addition of covariates completed the explored statistical model. The objective of the analytic method is to

- Identify subgroups of people who followed distinct trajectories based on the severity of their burden of adversity,
- Examine the pattern of variation and stability over time for the subgroups in question.
- Identify covariates that are predictive of the variation in observed burden of adversity between classes (or groups).

In line with multivariate analysis requirements (normal distribution), burden of adversity scores for the 0-4 and 5-9 age periods were excluded from the model. For each individual, the statistical procedure yielded a probability of being classified in each group and assigned group membership was based on the highest probability of classification. Together with the Bayesian Information Criterion (BIC) and entropy value, these indices provided estimates of model fit and quality of group separation.

The second analytic strategy used path analysis modeling to describe specific variables in each trajectory. The nature and the number of events for each 12 spheres of the life calendar were identified quantitatively, taking into account the age period. A series of logistic regression analyses were conducted in order to explore the significance of each individual risk factor separately in predicting the outcome (i.e., different trajectories established in the growth mixture analysis). Once significance was established, bivariate relationships among all variables were tested in the form of odds ratios (Wald test, zero order correlations) with the goal of detecting potential mediational chains. The value of path analysis resides in the examination of chains of influences among independent variables, and in hypothesizing the possible cause-and-effect associations among variables. Accordingly, the path model was tested and the fit indices comparative fit index (CFI), Tucker Lewis index (TLI) and root mean square-error of approximation (RMSEA) were examined. Since all variables were of a categorical nature, path models were fitted with the robust weighted least square (WLSMV) estimator. Tetrachoric correlations were established (asymptotic covariance matrix) leading to the production of latent continuous variables. In this framework, we were also able to isolate the direct and indirect effects of all exogenous variables in the final model [53].

## Results

### Latent class growth analysis with discrete-time survival

The LCGA analysis combined with DTS allowed to answer questions related to: a) identify subgroups of people who followed distinct trajectories based on the severity of their burden of adversity, b) examine the pattern of variation and stability over time for the subgroups in question, and c) identify covariates that are predictive of the variation in observed burden of adversity between classes (or groups). To select the best-fitted model, we compared the BIC for models with a different number of trajectories. The results shown in Table 1 enabled us to select a model with two trajectories, as the BIC value indicates a good data fit and the entropy values indicates an excellent separation of latent classes. Furthermore, the Lo-Mendel-Rubin LRT statistic indicates the greatest improvement for the two-trajectory model. Table 2 provides specific data for the two developmental trajectories found. The average posterior probability assignment for each trajectory is very high (0.968 and 0.985 respectively for Trajectories 1 and 2).

| Number of groups | BIC | Null Model | P Lo-Mendel-Rubin (κ−1) | Entropy |
|---|---|---|---|---|
| 1 | 5153.607 | | | |
| 2 | 3911.056 | 1 | <0.0001 | |
| 3 | 3709.347 | 2 | 0.24 | |
| | - | - | | - |

**Table 1:** Model fit indices and tests for different numbers of groups in the model.

| | Trajectory 1 | Trajectory 2 |
|---|---|---|
| Percentage of sample | 47 | 53 |
| **Parameters (SE)** | | |
| Intercept | 3.014 (0.151)*** | 4.934 (0.151)*** |
| Linear change | −0.223 (0.148) | 0.063 (0.078) |
| Quadratic change | 0.021 (0.022) | −0.039 (0.012)** |
| **Note:** *p<0.05; ** p<0 .01; *** p<0.001. | | |

**Table 2:** Resulting Model of the two trajectories.

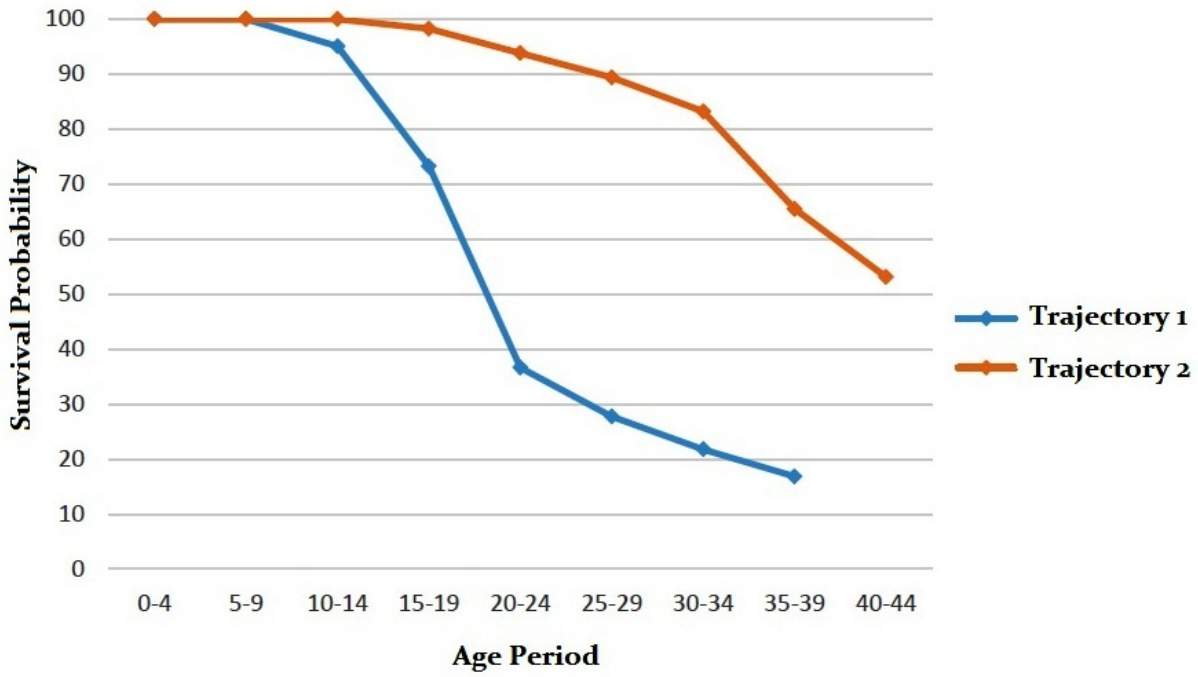


**Figure 1:** Survival probability for the two trajectories in the model.

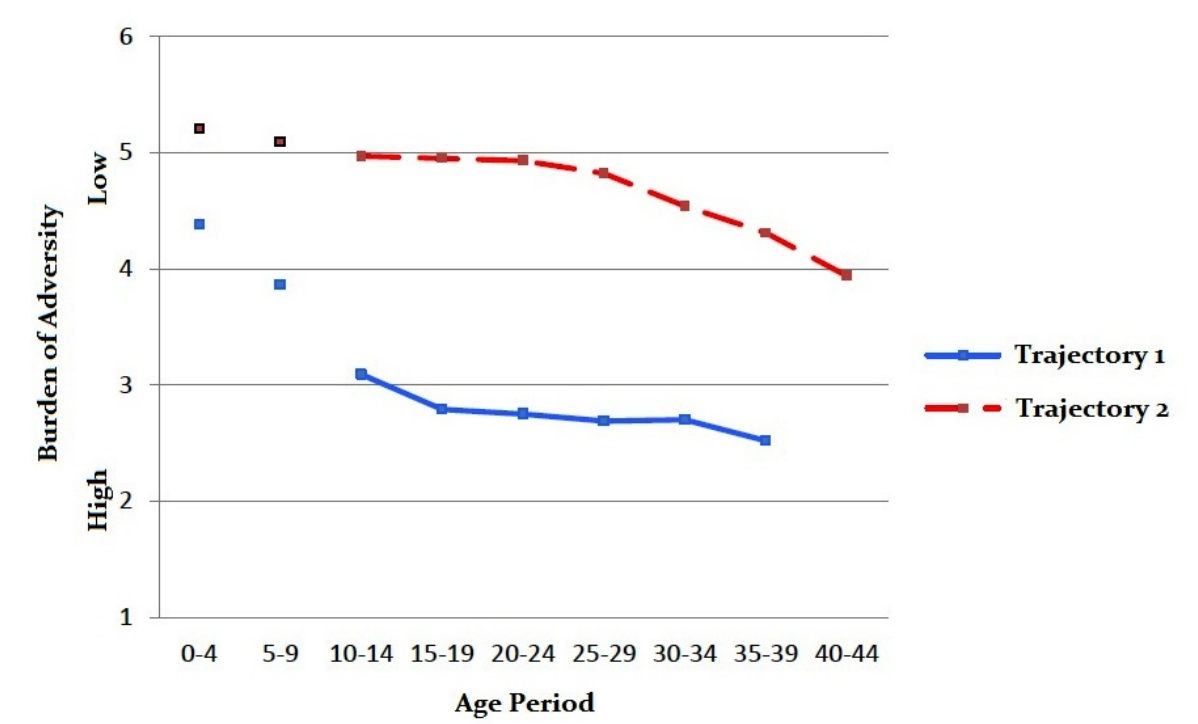


**Figure 2:** Trajectory subgroups for a two-class survival and mixture model. Data points at 0–4 and 5–9 years of age were not included in the statistical model.

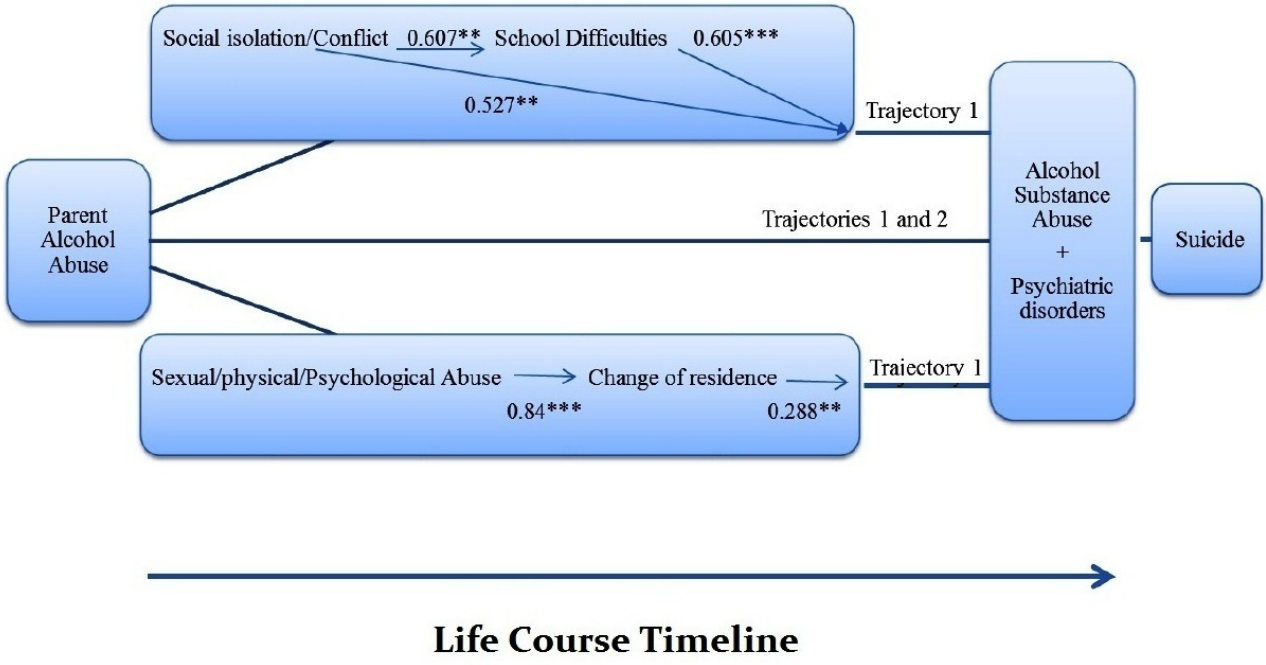


Figure 3: Developmental sequences of negative outcomes in life course trajectories of suicide.

Results from a discrete-time survival analysis (Figure 1) indicate that more than 70% of individuals in Trajectory 1 and 10% of individuals in Trajectory 2 died before the age of 30. The survival analysis shows a shorter and more abrupt life curve in Trajectory 1. Survival probabilities are much higher for each age period among the members of the Trajectory 2. The results in Figure 2 exhibit two different trajectories leading to suicide where the X axis corresponded to the age period and the Y axis to the burden of adversity (low burden 5 or 6, moderate burden 3 or 4, high burden 1 or 2). Based on this Figure, the two groups had a different level of adversity during childhood—it is clearly greater for the members of Trajectory 1 (0-4 years of age, rating near 4) than for those in Trajectory 2 (0-4 years of age, rating near 5).

Individuals who followed Trajectory 1, accounting for 47% of the sample, declined rapidly, accumulating a high level of burden of adversity in following age periods, until early death: nearly 2/3 of this sub-group had died of suicide before the age of 25 (highly significant negative linear term) and less than 10% remained at age of 40. Individuals who followed Trajectory 2 were (accounting for 53% of the sample), on the other hand, essentially exposed to an overall moderate burden of adversity during their whole lifetime which varied little (non-significant linear term). The high significance of the quadratic term (Table 2) is due to the sharp increase in the burden of adversity taking place following the 25-29 age period for this group. Most died by suicide at a time when the burden was still somewhat moderate.

At the final step in the analysis, we have integrated a set of covariates (Table 3) in a path analysis based on the trajectories as the outcome where the model is characterized by very good fit indices (CFI=0.98, TLI=0.96 and RMSEA=0.05); the R2 value is 0.61). The covariates were selected from the twelve life spheres and confirmed by a significant bivariate relationship with the outcome. We used the covariates in path analysis to move beyond the descriptive phase into the causal analysis stage and delineate the two suicide courses by identifying the specific sequence of events that lead to suicidal behavior. The final model is displayed in Figure 3. The results indicate that individuals from the two trajectories share certain characteristics. They have been exposed to parent's alcohol abuse problems and, later, have developed the same difficulties with a co-occurrence of mental health problems in Axis 1 (specifically mood disorders) and/or Axis II (personality disorder). No other family and personal factors characterized the life course of members of Trajectory 2. For their part, individuals in Trajectory 1 (who have a higher burden of adversity than those in Trajectory 2) had experienced more adverse events during their early development. We can see two specific pathways related to their trajectory. Some of them were victims of physical/psychological or sexual abuse during childhood and were removed from home care to drift from one placement to another. In the same period, another sequence of difficulties process may occur. Their adaptation in the school setting was difficult and this period was marked by isolation, conflict with others and academic difficulties. Isolation and conflicts have a direct effect on the outcome and were also mediated by school difficulties. These two latter types of processes may explain the higher scores in the burden of adversity for individuals of Trajectory 1 but also their lowered likelihood of reaching adulthood.

| Factor | | Total | | Traj. 1 | | Traj. 2 | | OR |
|---|---|---|---|---|---|---|---|---|
| | | N | % | N | % | N | % | |
| Social isolation/conflict | 0 | 149 | 69.6 | 52 | 51.5 | 97 | 85.8 | 5.71 |
| | 1 | 65 | 30.4 | 49 | 48.5 | 16 | 14.2 | <0.001 |
| School difficulties | 0 | 102 | 47.7 | 22 | 21.8 | 80 | 70.8 | 8.71 |
| | 1 | 112 | 52.3 | 79 | 78.2 | 33 | 29.2 | <0.001 |
| End of a love relationship | 0 | 172 | 80.4 | 67 | 66.3 | 105 | 92.9 | 6.66 |
| | 1 | 42 | 19.6 | 34 | 33.7 | 8 | 7.1 | <0.001 |
| Suicide attempt | 0 | 186 | 86.9 | 76 | 75.2 | 110 | 97.3 | 12.06 |
| | 1 | 28 | 13.1 | 25 | 24.8 | 3 | 2.7 | <0.001 |
| Conduct/behavioral difficulties | 0 | 167 | 78.0 | 65 | 64.4 | 102 | 90.3 | 5.14 |
| | 1 | 47 | 22.0 | 36 | 35.6 | 11 | 9.7 | <0.001 |
| Present alcohol/drug disorder | 0 | 116 | 54.2 | 46 | 45.5 | 70 | 61.9 | 1.95 |
| | 1 | 98 | 45.8 | 55 | 54.5 | 43 | 38.1 | <0.05 |
| Psychological abuse | 0 | 162 | 75.7 | 66 | 65.3 | 96 | 85.0 | 2.99 |
| | 1 | 52 | 24.3 | 35 | 34.7 | 17 | 15.0 | <0.005 |
| Parent alcohol difficulties | 0 | 140 | 65.4 | 61 | 60.4 | 79 | 69.9 | 1.52 |
| | 1 | 74 | 34.6 | 40 | 39.6 | 34 | 30.1 | NS |
| Residential moves | 0 | 145 | 67.8 | 59 | 58.4 | 86 | 76.1 | 2.27 |
| | 1 | 69 | 32.2 | 42 | 41.6 | 27 | 23.9 | <0.05 |
| Personality disorder | 0 | 110 | 51.4 | 42 | 41.6 | 68 | 60.2 | 2.12 |
| | 1 | 104 | 48.6 | 59 | 58.4 | 45 | 39.8 | <0.01 |
| Lifetime Affective disorder | 0 | 128 | 59.8 | 58 | 57.4 | 70 | 61.9 | 1.21 |
| | 1 | 86 | 40.2 | 43 | 42.6 | 43 | 38.1 | NS |
| Tension | 0 | 154 | 72.0 | 63 | 62.4 | 91 | 80.5 | 2.49 |
| | 1 | 60 | 28.0 | 38 | 37.6 | 22 | 19.5 | <0.005 |
| Sexual/physical abuse | 0 | 130 | 60.7 | 49 | 48.5 | 81 | 71.7 | 2.69 |
| | 1 | 84 | 39.3 | 52 | 51.5 | 32 | 28.3 | <0.005 |

**Note:** 0 and 1 column represents absence and presence respectively. ORs are for Trajectory 1 relative to Trajectory 2. % are calculated as cell value/category total x 100. P values for ORs are indicated.

**Table 3:** Distribution of subjects within LCGA analyses.

## Discussion

In this study, we sought to respond to three specific objectives related to adverse childhood experiences. These objectives are known proximal risk factors in the development of mental health problems and distal risk factors for suicidal behavior. Thus, we examined the life trajectories of 214 suicide victims in order to better understand the nature (victimization versus non-victimization) and the role of childhood adversity in the development of (1) mental health problems; (2) suicidal behavior; and, more broadly, (3) the sequence of adaptation difficulties encountered during the life course.

Our results suggest that the following three conditions—childhood adversities, psychiatric disorders and suicide—can be part of a cascade process. The term 'cascade' describes a process by which dysfunction in one domain may affect the acquisition of skills in domains of adaptation that develop at a later time [54]. In the life course, cascade processes produce a cumulative disadvantage by which difficulties in specific spheres of life (academic, vocational, relational, etc.) act as

stressors that exacerbate early adverse experiences and result in increased vulnerability and/or disability. Accordingly, our results show that, for people who died by suicide, three distinct adversity processes occur during childhood and adolescence. These three processes highlight the probabilistic sequence of the adverse events and situations that give rise to negative outcomes—psychiatric disorders and suicide—from early childhood to adulthood. An examination of these three different developmental patterns in childhood, which lead to the same detrimental outcome, allowed us to expand upon the generic concept of cascade process by shedding light on the importance of two aspects of the process: the number of (quantitative aspect) and the severity of (qualitative aspect) the adversities that start cascade processes. The first pattern involves a non-victimization form of adversity and is the only one present in Trajectory 2. In this pathway, we can see that the presence of a parental alcohol abuse/dependency problem is pervasive and may cause a series of situations with high levels of chronic stress experienced by children (like problematic parenting practices and family tension). Thus, this early adverse experience is associated, in the life course, to later negative situations: the development of alcohol abuse and other psychiatric problems. In this case, adverse events experienced in childhood are few and not severe. Personal characteristics of children, such as a difficult temperament and/or cognitive vulnerability (which were not measured in this study), can possibly exacerbate the family climate and create a set of conditions that may reduce the child's ability to successfully negotiate normative stress [11]. These conditions can ultimately precipitate engagement in detrimental behaviors (alcohol consumption), the onset of additional conditions (psychiatric disorders) and suicide in adulthood [20,21].

The two other developmental processes, observed specifically in Trajectory 1, may increase the likelihood of early (i.e., young adult) mortality. These processes may implicate the same dysfunctional family climate (parental alcohol abuse) to which are added other difficulties that increase the childhood burden of adversity. In one of these two patterns, we observed the development of a sequence of numerous personal difficulties—interpersonal and behavioral problems with peers (conflicts), isolation tendencies, and academic difficulties—prior to the onset of psychiatric disorders (alcohol abuse and psychiatric problems). This developmental pattern suggests that parental alcohol abuse is a contextual factor (a non-victimization situation) that represents an important risk factor for developing early behavioral and relational problems [55,56]. This maladaptive coping disrupt the development of social and personal resources that can both reduce well-being and increase vulnerability to later mental disorders [27].

The last developmental pattern of childhood adversity is marked by the same family climate generated by parental alcohol abuse in addition to events of victimization (one or more of them: physical, psychological, sexual abuse), followed by out-of-home care placements and the development of psychiatric disorders. Children who were abused by their family of origin and moved into many alternative settings for protection and welfare concerns are more likely to have a weak sense of personal control or mastery over their lives [22] because of their inability to resolve or change the traumatic situations of maltreatment and their drifting through multiple placements. Furthermore, these children could have learned to not get attached to anyone [57]. An emerging body of research suggests that when a psychiatric condition does present itself in these children, the nature of the individual's disorder is more problematic or intractable in a number of respects because the disorder develops earlier and with a more severe symptomatology and has a broad rather than focal impact on functioning [8].

This study had a number of limitations due to the autopsy method used. First of all, the reliability of recall of events is a limitation, even though we made every effort to maximize the accuracy of the retrospective reports. It is important to mention that close family members were interviewed between 4 and 12 months after the death of the suicide victim. For close relatives, the grieving period, especially the one after a suicide, is a time during which they try to understand why the suicide occurred. The interview process echoed the bereavement process and made it easy for close relatives to remember events that occurred over the life course. Nevertheless, the difference between recall with respect to younger individuals and older individuals could also be considered a limitation. The close relatives of those who died at a younger age may have fewer events to remember than the close relatives of those who died at an older age. It is also more difficult for the latter group to remember events that happened when the victim was 15 years of age. Second, the number of variables tested as potential predictors was large, but robust statistical methods were used to ensure statistical validity. Worth noting is the effort made throughout this methodology to maximize the accuracy of retrospective reports and effectively order within the life course the timeline of events and the onset of mental health problems. Even though the narrative methodology has its limitations, it is more in harmony with the teleological nature of human thinking that necessitates more than just simple facts in isolation to explain a series of events in terms of ends, goals, or purposes.

## Conclusions

This study adopted a life course approach to investigate the role of childhood abuse and other adversities in the development of mental disorders, behavioral maladaptation and suicide in the trajectories of 214 individuals who died by suicide. This study's design allowed us to respond to some major, controversial developmental issues surrounding the impact of multiple forms of adversity (victimization events versus non-victimization events) on negative outcomes, specifically mental health disorders and suicide. Using life trajectory calendars, a narrative and comprehensive method of data collection, we noted the occurrence, severity and duration of exposure to specific events or conditions (both positive and negative) in each individual's whole lifetime. That information was indexed in a burden of adversity variable calculated for each five-year segment of life and served to draw the trajectories. Statistical analysis using combined discrete time survival (DTS) and latent class growth analysis (LCGA) generated two trajectories of burden of adversity. For one of these trajectories (47% of the sample), we saw that people with a high burden of adversity starting early in childhood had a strong probability of dying by suicide before the age of 25. In contrast, the people with the second trajectory (accounting for 53% of the sample) were exposed to an overall moderate burden of adversity (that varied little) during their whole lifetime. The great majority of them were still alive until the age of 35. Path analysis was then applied to these trajectories to identify the sequential events or conditions that contributed to the development of psychopathology and suicide. Thus, we saw that a greater quantity of childhood adversity, related to individuals' exposure to non-victimization events, tends to rapidly generate mental health problems and suicidal behavior early in life. In the same vein, the particular adversity experiences of maltreatment such as abuse or neglect, which fall under the victimization category of events, are severe enough to

rapidly generate mental health problems and suicidal behavior early in life.

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