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Social and Mental Health Pathways to Institutional Trust: A Cohort Study

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CONFLICTS OF INTEREST

The authors report no conflicts of interest.

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DATA ACCESS

Participants of the Québec Longitudinal Study of Child Development only consented to share their data with the study's financial partners and affiliated researchers and their collaborators. To access data from the cohort, researchers should send a request to the Institut de la statistique du Québec (https://statistique.quebec.ca/en/institut/services-for-researchers).

ABSTRACT

Objective: Trust in institutions such as the government is lower in the context of mental health problems and socio-economic disadvantage. However, the roles of structural inequality, interpersonal factors, and mental health on institutional trust remain unclear. This study aimed to examine the associations of social and mental health factors, from early life to adulthood, with institutional trust.

Method: Participants (n=1347; 57.2% female) were from the population-based Québec Longitudinal Study of Child Development (1997-2021). Trust in 13 institutions was self-reported at age 23. Predictors were 20 social and mental health factors during early life, adolescence, and adulthood. Associations were examined with linear regressions corrected for false discovery rate. Pathways were explored using the temporal Peter-Clark algorithm.

Results: Early-life factors associated with lower levels of trust were male sex, racialized minority status, low household income, and maternal history of depression and antisocial behaviors. After adjusting for early-life factors, adolescence factors associated with lower levels of trust were internalizing and externalizing problems, bullying exposure, and school difficulties. Independently of early-life or adolescence factors, adulthood factors associated with lower levels of trust were perceived stress, psychotic experiences, suicidal ideas, and seeking professional help, whereas greater social connectedness was associated with greater trust. Temporal Peter-Clark analyses identified social connectedness and psychotic experiences as potential proximal determinants of institutional trust.

Conclusion: This study identified factors related to structural inequality, interpersonal relationships, and mental health over development that were associated with institutional trust.

Interventions aimed at promoting social connectedness and equity may improve institutional trust and wellbeing.

Key words: cohort study; community mental health; confidence in institutions; political trust; social epidemiology; structural disadvantage

INTRODUCTION

Trust in institutions is generally defined as the belief that institutions, such as the government, health care, or media, will act with integrity and competence, guided by the truster's interests (Citrin & Stoker, 2018). Many government-led surveys worldwide monitor citizens' "confidence in institutions" as a proxy for trust and an indicator of population wellbeing and social cohesion (Citrin & Stoker, 2018; Uslaner, 2018). Yet during recent years, trust in institutions has been low in many countries such as Canada and the U.S, and its possible decline has been attributed to economic uncertainties, the COVID-19 pandemic, and polarizing effects of social media (H. E. Brady & Kent, 2022; Lorenz-Spreen et al., 2023; Steinburg, 2024). Trust in institutions is a key issue for health care and particularly mental health care: not only can institutional mistrust hamper the accessibility and reach of mental health institutions (Gulliver et al., 2010; Leavey, 2024), but population surveys also indicate an association between lower levels of trust and poorer self-reported mental health (Buck-McFadyen et al., 2019; Economou et al., 2014; Hudson, 2006; Lindstrom & Mohseni, 2009), suggesting that mistrust or its underlying causes could be a risk factor for mental health problems. Therefore, understanding the pathways to institutional (mis)trust over development could guide population-based approaches aimed at promoting mental health. Drawing from psychological and sociological theories of trust, we propose a developmental and longitudinal investigation of institutional trust that focuses on three heuristic categories: structural inequality, interpersonal relationships, and mental health problems. Within a social perspective of mental health, the implication of this multifactorial view is that the determinants of trust are unlikely to involve a single mechanism or pathway, requiring a systemic approach.

Theories of trust

Psychological and sociological theories of trust offer complementary explanations to the development of institutional trust over the life course. They point to a range of factors that overlap with the social determinants of mental health, notably structural inequality and interpersonal relationships (Kirkbride et al., 2024; Kirmayer, 2024).

Structural inequality refers to disparities in resources that result from discriminatory treatment from institutions, and which affect specific groups in a given society (Assari, 2019). Performance theory contends that the level of institutional of trust depends on individual experiences of the institution's capacity to produce favorable outcomes (Van Craen, 2013). For example, unfair treatment of racialized minority groups by the police could explain their lower levels of trust in this institution (Murphy et al., 2022; Wilkes & Wu, 2018). Groups in the United States who have reported lower levels of trust in institutions include lower-income (Newton et al., 2018), Black (Macdonald & Stokes, 2006), and gender diverse individuals (Mason et al., 2024). A study in the United Kingdom found a prospective association between socio-economic disadvantage at birth and lower levels of political trust in adulthood (Schoon & Cheng, 2011). Following performance theory, discriminatory treatment makes institutions less trustworthy for affected groups.

With regards to interpersonal factors, the psychological propensity model (Glanville & Paxton, 2007) and the familial socialization of trust hypothesis (Uslaner, 2002) posit that the early-life family environment shape individuals' general propensity to trust or distrust. The notion of a general propensity for trust is supported by positive associations between social and political trust (Newton & Zmerli, 2011) and the stability of social trust over time (Sturgis et al., 2015), and its familial socialization is supported by evidence of a longitudinal association between early-life adversity and adolescent social trust (Reiter et al., 2023). Beyond the early-life stage, Putnam's theory of social capital advances that individuals acquire norms of trust and reciprocity through their social connections with other members of society, and these norms shape their willingness to engage with institutions (Putnam, 1993). In support of this model, some studies (de Vroome et al., 2013; Kääriäinen, 2007), but not all (Meeusen et al., 2024), have found cross-sectional associations between social connectedness and trust in the government and police. Within the realm of interpersonal relationships, online socialization has become increasingly prominent and cannot be overlooked. The use of social media may serve to nurture interpersonal relationships but, as a part of a person's informational habitus, may also contribute to lower levels of institutional trust through access to polarizing or unfavorable news (W. J. Brady et al., 2023; Lorenz-Spreen et al., 2023). Informational habitus, i.e., the habitual ways of individuals of accessing and using information (Vivion & Malo, 2023) could further influence how individuals appraise the performance of institutions. A recent review highlights cross-sectional evidence for a link between internet use and lower levels of trust in political institutions and news media, possibly reflecting the effect of polarizing online contents and, in the context of authoritarian regimes, freer circulation of anti-government information (Lorenz-Spreen et al., 2023).

Mental health problems themselves can influence institutional trust at the social and psychological levels: mental health problems expose individuals to stigma, which contributes to structural inequality and social exclusion (Thornicroft et al., 2022), and mental health problems such as psychotic experiences may emerge from or reflect an underlying propensity for general mistrust (Lopes et al., 2020). Reciprocally, low trust in institutions, especially following unfair treatment from institutions, can be a source of psychological stress and a potential contributor to the risk of mental health problems such as psychosis (C. Morgan et al., 2019).

The present study

In summary, the above theories propose a range of determinants of institutional trust related to structural inequality, interpersonal relationships and mental health problems. However, the corresponding empirical evidence is mostly cross-sectional and tends to focus on small sets of risk factors. Given the potential intercorrelations among factors such as socio-economic disadvantage, early-life adversity, social connections, informational habitus, and other determinants of trust, their independent and longitudinal associations with institutional trust remain unclear. A broader examination of the development of institutional (mis)trust, across multiple potential risk factors and in a longitudinal fashion, could advance theories and interventions on institutional trust by highlighting key factors involved in its formation.

Using a large population-based cohort, this study aimed to examine the longitudinal associations of social and mental health factors to institutional trust from early life to adulthood. We made the general hypothesis that factors related to structural inequality, interpersonal problems, and mental health problems would be associated with lower levels of trust, and we explored potential pathways among these factors using a data-driven approach.

METHODS

Participants

We analyzed data from the Québec Longitudinal Study of Child Development, a population-based cohort of 2120 individuals born in the Province of Québec, Canada between 1997 and 1998 (https://www.jesuisjeserai.stat.gouv.qc.ca/) (Orri et al., 2020). Participants and their parents were recruited through stratified sampling from birth registries. Data collection covered all regions, except for Cree and Inuit territories and Indigenous communities due to differences in institutional services and socio-cultural context. Participants were followed annually or biennially from five months to 23 years of age (1997-2021). The cohort was conducted by the Institut de la statistique du Québec and approved by the ethics committees of the Institut de la statistique du Québec, Sainte-Justine Hospital Research Centre, and Montreal West Island Integrated University Health and Social Services Centre. Informed written consent, assent, or both were obtained for each data collection. This study followed the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) reporting guideline (Vandenbroucke et al., 2007). Analyses were conducted between January 2024 and January 2025.

Institutional trust

Institutional trust was measured at age 23 years in 2021 with a 13-item self-report questionnaire adapted from the Canadian and U.S. General Social Surveys (Schellenberg, 2004). Participants were asked “How much confidence do you have in…” for various institutions (e.g., the government, healthcare, media; see Figure 1) on a scale of 1=“A great deal of confidence” to 4=“No confidence at all”. Although “confidence” and “trust” are not fully synonymous (Luhmann, 1988), international surveys commonly use the former term in their question to participants, while in research, the same measure is commonly interpreted as institutional or political “trust” (Citrin & Stoker, 2018). Throughout the article, we use the term “institutional trust” given its more common usage in the literature.

Answers were reverse coded so that a higher score indicates greater trust. To our knowledge, the structural validity of this questionnaire has not been examined before, but previous research has found cross-sectional associations of similar items with greater psychological distress and poorer self-rated mental health (Achdut, 2023; Buck-McFadyen et al., 2019; Lindstrom & Mohseni, 2009). Here, internal reliability was excellent (α=0.92; ω_{total}=0.94), and exploratory and confirmatory factor analyses identified three factors within the scale: trust in social, economic, and mediatic institutions (Figure 1 and Note S1 in the Supplementary Material).

<Figure 1>

Social and mental health factors

Measures were collected across three developmental periods: early-life (birth to 29 months of age), adolescence (15 years), and adulthood (23 years, concurrently with the measure of institutional trust). Time points and variables were selected based on data availability, theory, and parsimony. We selected variables related to structural inequality, interpersonal factors, mental health problems, or their antecedents, such as socio-demographic factors and parental mental health. For mental health problems, we prioritized measures that cut across diagnostic categories and levels of severity. Note S2 in the Supplementary Material provides more information on these decisions.

Table S1 in the Supplementary Material details the source and content of each measure. Briefly, early-life factors were sex assigned at birth, racialized minority status (defined as parental identification of the child as Arab or West Asian, Asian, Black, Indigenous, Latinx, Mixed, or other ethnoracial groups other than White), low household income (relative to regional thresholds; Desrosiers et al., 2001), parental history of depression, and parental history of antisocial behaviors. Adolescence factors included maternal reports of neighborhood trust (i.e., trustworthiness of neighborhood residents) and family cohesion, and participant reports of school difficulties, exposure to bullying, and internalizing and externalizing problems. Adulthood factors were self-reported and included gender diverse status (i.e., transgender or other non-cisgender identification), perceived stress, psychotic experiences, suicidal ideas in the past year, seeking professional help for mental health in the past year, social connectedness (i.e., relationships, sense of belonging, and the availability of social support), and social media use (i.e., daily time spent on social media).

Statistical analysis

Analyses were conducted in R version 4.3.1 (R Foundation for Statistical Computing) in participants with complete data on institutional trust. Of the initial cohort of 2120 participants, 1368 completed the assessment at age 23 years, and 1347 (771 [57.2%] female) had data on institutional trust. In most cases, reasons for loss to follow-up were not known (available information included emigration, n=31, and deaths, n=6). Within the analytic sample of n=1347, data availability ranged between 87.1%–100%, except for paternal history of depression, neighborhood trust, and family cohesion which had more missing data (71.9%–83.8%; Table S2 in the Supplementary Material). Characteristics of participants included in and excluded from analyses on the basis of missing data were compared using effect sizes. Included participants were more likely to be female and in households with sufficient income and had mothers who were more educated (effect sizes > 0.100; Table S3 in the Supplementary Material).

Linear regression models

To examine associations of social and mental health factors with institutional trust, we conducted linear regression models for each predictor. Sex was included as a covariate in all models, and all predictors from the preceding timepoint were additionally included as covariates: early-life variables were covariates for adolescence predictors, and adolescence variables were covariates for adulthood predictors. To account for the testing of multiple predictors within each time period, statistical significance was defined as $p<.05$ after correction for false discovery rate using the Benjamini & Hochberg (1995) method. Variance inflation factors were below 2.00 for all model terms, indicating low collinearity among predictors (James et al., 2021, p. 102). Missing data on predictors was replaced with multiple imputation using chained equations (Buuren & Groothuis-Oudshoorn, 2011): 40 datasets were generated based on a large set of predictor variables, which were selected procedurally according to a criterion of $r>0.15$ with the imputed variable (Buuren & Groothuis-Oudshoorn, 2011; van Buuren et al., 1999).

Temporal Peter-Clark algorithm

To identify pathways of association among all variables including institutional trust, we used the temporal Peter-Clark (tPC) algorithm (Petersen et al., 2021; Spirtes & Glymour, 1991). The tPC algorithm is a data-driven approach to uncover potential causal pathways in the form of a temporal partially directed acyclic graph. The algorithm starts with a fully connected graph. Edges between variables are removed if their association can be explained by any set of covariables that are temporally concurrent or anterior. The impact of covariables is determined by conditional independence testing and using a pre-defined sparsity level, meaning that with a lower sparsity level, only relationships that more robustly survive adjustment for other variables are retained in the graph. Then, edges between variables are oriented, when possible, based on logical rules (e.g., the identification of v-structures and colliders; Petersen et al., 2021; Spirtes & Glymour, 1991) and the temporality of variables. This algorithm has been shown to be mathematically correct for recovering causal pathways, but it relies on strong assumptions, notably that there are no unobserved confounders (Spirtes & Glymour, 1991). We applied the tPC algorithm with 4 sparsity levels, 0.01, 0.001, 0.0001, and 0.00001, and we evaluated conditional independence using a regression-based information-loss test (Petersen et al., 2021). Missing data was handled with test-wise deletion since it is less computationally expensive, and a simulation study found that it performed similarly to multiple imputation when there was a mix of Gaussian and discrete variables (Witte et al., 2022). We performed 100 bootstraps per model to estimate the stability of edges and interpreted stability as modest if edges were identified in 50-74% of bootstraps and good if they were identified in 75-100% (Foraita et al., 2024; Petersen et al., 2023).

Interest in causality

We interpreted results with a primary interest in potential causal effects. Following calls for greater clarity on causal inference in health research (Grosz et al., 2020; Haber et al., 2022; Hernán, 2018), we used terms such as "putative effects" in the Discussion to transparently communicate our interpretation of causality, while considering limitations to causal inference and alternative interpretations. A key limitation to causal inference, across regression and tPC analyses, was bias stemming from unobserved confounders (see Discussion).

Sensitivity analyses

Additional sensitivity analyses were conducted. First, we examined the impact of replacing maternal reports of family cohesion at age 15 with a self-report measure, given that adolescents and parents may perceive family relationships differently. Since a self-report of family cohesion was not available, we used a self-report of parent-child relational problems (Table S1 in the Supplementary Material). A similar substitution was not possible for maternal reports of neighborhood trust because a self-report version was not available. Second, we adjusted for selective attrition at 23 years using inverse probability weights, representing participants' probabilities of being included conditionally on attrition-associated early-life characteristics (sex, household income, and maternal education; Table S3). Because survey weights are not currently implemented in the tPC statistical package, they were only applied to the regression models.

RESULTS

Associations with institutional trust

Descriptive statistics on key study variables are presented in Table 1 and Figure S1 (Supplementary Material). Regression results are in Figure 2. Early-life factors significantly associated with lower levels of institutional trust were racialized minority status, low household income, maternal history of depression, and maternal history of antisocial behaviors. Female sex was associated with greater institutional trust. Adolescence factors associated with lower levels of institutional trust were exposure to bullying, school difficulties, and internalizing and externalizing problems. Adulthood factors associated with lower levels of institutional trust were higher levels of perceived stress and psychotic-like experiences, suicidal ideas, and seeking professional help. Greater social connectedness was associated with greater institutional trust. Associations were generally consistent across the three domains of institutional trust (social, political, and mediatic factors) and alternative sets of covariables (Figures S2-S7). Of note, greater neighborhood trust and family cohesion were initially associated with greater institutional trust (Figure S3), but these associations lost statistical significance after adjusting for early-life factors (Figure S4). Greater social media use was associated with lower levels of institutional trust (Figures S5-S6), but this association lost statistical significance after adjusting for adolescence factors (Figure S7).

<Table 1>

<Figure 2>

Pathways to institutional trust

We focused here on the least sparse model (sparsity level=0.01; Figure 3) given the exploratory aim of the analysis. In this model, there were edges from sex, psychotic experiences and social connectedness to institutional trust, and from institutional trust to perceived stress. Externalizing problems and bullying were indirectly connected to institutional trust via psychotic experiences. Other factors were not linked to institutional trust.

Across bootstraps (Table S4), the edge from sex to institutional trust was only found in 47% of models and thus did not meet the threshold of stability. There was an edge between psychotic experiences and institutional trust in 93% of models, with good stability of the orientation from psychotic experiences to institutional trust (77% of models), and few models finding an edge in the opposition direction, from institutional trust to psychotic experiences (14%), or an undirected edge (2%). The edge between social connectedness and institutional trust was found in 90% of models: its orientation was variably from social connectedness to institutional trust (41%), from institutional trust to social connectedness (35%), or undirected (14%). The edge between institutional trust and perceived stress was found in 87% of models, and its orientation from institutional trust to perceived stress had good stability (81%), with few models in the opposite direction (6%) and no models with an undirected edge (0%).

Models with more stringent sparsity levels (Figures S8-S10) did not reproduce the edge from sex to institutional trust, but they consistently identified an edge from psychotic experiences to institutional trust. Edges from social connectedness to institutional trust were less consistent: they were found in one model (sparsity=0.00001) and were the reverse (from institutional trust to social connectedness) in the other two models. At all sparsity levels, there was an edge from institutional trust to perceived stress. Bootstrap stability was similar across sparsity levels, with the exception that the edge from institutional trust to perceived stress was less robust in more sparse models (see Supplementary Data at https://osf.io/82f4q/).

<Figure 3>

Sensitivity analyses

Figure S11 (Supplementary Material) presents regression models using self-reported parent-child relational problems instead of maternal reports of family cohesion. In contrast to family cohesion, which was not significantly associated with institutional trust, higher levels of parent-child relational problems were significantly associated with lower levels of institutional trust. Adjusting for parent-child relational problems did not influence the associations of adulthood factors with institutional trust. In the tPC algorithm, there was no edge between parent-child relational problems and institutional trust (Figure S12). Figure S13 presents the regression models adjusted for attrition using survey weights. Estimates were stable, and significant associations were the same as above.

DISCUSSION

General considerations

In this population-based cohort, we found that multiple social and mental health factors across developmental stages were associated with institutional trust. The tPC algorithm (at sparsity=0.01) identified sex, psychotic experiences and social connectedness as having direct putative effects on institutional trust, while institutional trust was identified as having a putative effect on perceived stress. Although these results highlight potential key factors in the formation of trust and its impact on mental health, they should be interpreted with caution, given the likelihood of unobserved confounders and the limitations of the algorithm. We first discuss the regression results before providing tentative interpretations of the tPC algorithm.

Social factors associated with institutional trust

In line with the notion of structural inequality, low household income, racialized minority status and school difficulties were associated with lower levels of trust in institutions. For household income and racialized minority status, these results are consistent with previous empirical research and the performance theory of trust (Schoon & Cheng, 2011; Wilkes & Wu, 2018). The association of school difficulties with institutional trust can also be interpreted according to performance theory: institutions, and particularly school, may be perceived as failing to meet the needs of adolescents with learning difficulties, undermining the adolescents' trust in institutions.

The putative effect of interpersonal factors on institutional trust was supported by the associations of bullying exposure with less institutional trust and of social connectedness with greater institutional trust. These findings align with the notion that experiences of social reciprocity influence the inferred trustworthiness of institutions (Newton et al., 2018). Other studies that similarly measured social connectedness in terms of relationships and social support also found positive associations with institutional trust (de Vroome et al., 2013; Kääriäinen, 2007). In contrast, Meeusen et al. (2024) found no association with institutional trust, owing perhaps to a less detailed measure of social connections as simply the frequency of social contacts. Another negative finding comes from Sturgis et al. (2015), a longitudinal cohort of adults in the United Kingdom. Using measures of formal social connections (i.e., civic participation, a component of social capital in Putnam's conception) and informal social connections, they found no evidence that changes in social connectedness predicted changes in social trust over a 10-year period. If we assume that their results about social trust also apply to institutional trust, they appear to be at odds with the present study. A first explanation is that, in the present study, there may be a general disposition for trust that confounds the association between institutional trust and social connectedness – and this confounding influence would have to be independent of the other social and mental health variables accounted for. A second explanation concerns the age periods: the study by Sturgis et al. (2015) focused on adults, whereas the present study followed youths across developmental stages. It is possible that a person's trust in institution forms during youth, when they are actively developing their social identity and political views, but becomes less sensitive to interpersonal factors in later life.

Other factors associated with lower institutional trust were male sex and maternal mental health problems. Sex or gender differences in institutional trust have not been consistent in the literature (Xiao & McCright, 2015) but may echo, here, the polarization of socially disenfranchised young men (e.g., the incel phenomenon) (Broyd et al., 2023). Maternal mental health problems may be related to institutional trust through confounding influences (e.g., lower income) or via effects on youth's mental health and the parent-child relationship. The absence of association with paternal mental health could be due to the greater proportion of missing data or lower involvement of fathers in some households.

Associations were not significant for neighborhood trust, family cohesion, gender diverse status, and social media use. Both family cohesion and neighborhood trust at age 15 were reported by mothers rather than by participants. These external accounts may not reliably capture participants' experiences of social connectedness during adolescence, which would explain why self-reports of parent-child relational problems, in contrast, were associated with lower levels of institutional trust. Another consideration is that during adolescence, factors that influence relationships with peers in the school environment (such as bullying and mental health problems) might be more influential on youth's sense of belonging and trust, compared to experiences in other spheres of their environment (such as family and neighborhood) – pointing to the role of school as the primary institution during adolescence. The lack of association of gender diverse status with institutional trust may be the product of insufficient statistical power due to small group size, as well as because of heterogenous experiences of interactions with institutions, as we suggested above in relation to racialized minority status. The lack of association for social media use may similarly be due to heterogeneous causal pathways that compete with each other at the group level: social media might amplify or alleviate mistrust depending on how the technology is used (Paquin, Ackerman, et al., 2024), and its use may be influenced by prior mental health problems and structural factors (Houghton et al., 2018; Nagata et al., 2022; Paquin, Philippe, et al., 2024).

Mental health factors associated with institutional trust

Internalizing and externalizing problems at age 15 years were associated with less institutional trust at age 23, independent of early-life factors. To our knowledge, this is the first study examining longitudinal associations of mental health problems with institutional trust, confirming prior cross-sectional findings in adults (Buck-McFadyen et al., 2019; Economou et al., 2014; Hudson, 2006; Lindstrom & Mohseni, 2009). This result suggests that adolescent mental health problems are a potential risk factor for lower levels of trust in institutions. Mental health problems may contribute to institutional mistrust through social exclusion in the school environment: adolescents experiencing mental health problems, and particularly externalizing difficulties, are at increased risk of stigma and rejection by their peers (Corrigan et al., 2005; Lau et al., 2016; Martin et al., 2007). Mental health problems may also directly hamper institutional trust via the development of paranoid ideas about institutions. Internalizing and externalizing problems are known risk factors for psychotic experiences (e.g., Healy et al., 2020), and general mistrust has been proposed to be an intermediary phenotype en route to the emergence of psychotic experiences (Catone et al., 2024). However, the relationship between mistrust as a general disposition and mental health is likely dynamic and multifaceted, including the possibility that general mistrust is a confounding variable in the apparent effects of mental health problems on institutional trust (Catone et al., 2024; Wong et al., 2014).

Higher levels of mental health problems at age 23 were associated cross-sectionally with less trust in institutions. This association may be bidirectional, including at once the effect of mental health problems on institutional mistrust (discussed above) and the effect of institutional mistrust on mental health problems. Institutional mistrust may contribute to mental health problems because of the psychological strain of expecting unreliable, unfair, or hostile treatment from institutions (C. Morgan et al., 2019). Unmeasured confounders may further underlie a shared propensity for institutional mistrust and mental health problems. These include general mistrust, genetics, and aspects of the social environment (e.g., childhood adversity; Reiter et al., 2023) that were not fully covered by the present measures.

Factors identified by the temporal Peter-Clark algorithm

Direct putative effects of psychotic experiences and social connectedness were identified in the least sparse tPC model. The putative effect of psychotic experiences was stable across bootstrap analyses and sparsity levels, whereas for social connectedness, the presence of an association was stable, but its orientation was not. We take these findings as indicative of particularly strong associations of psychotic experiences (and to a lesser extent, social connectedness) with institutional trust, with the important caveat that their causal nature remains uncertain. The association between perceived stress and institutional trust was consistently oriented in the reverse direction by the tPC algorithm, suggesting that the lack of institutional trust putatively contributed to more stress in adulthood. Sex was identified as having a putative effect on institutional trust, but this finding was not stable across bootstrap analyses and sparsity levels. Bullying exposure and externalizing problems had indirect associations with institutional trust through their putative effects on psychotic experiences, and there was an undirected edge between bullying exposure and externalizing problems. These findings provide tentative support to the interpretation discussed above, that externalizing problems may contribute to lower institutional trust via social exclusion.

The putative effects of many factors, such as income, racialized minority status and school difficulties, were not supported by the algorithm. It is likely that the mechanisms linking these factors to institutional trust are heterogeneous, complicating their identification at the population level as in the present study. For example, in some individuals, low household income at birth may impact future trust in institutions through lower access to educational and occupational resources (Schoon & Cheng, 2011), whereas in other individuals, the key mechanism may be the adverse experience of living in an unsafe neighborhood (Intravia et al., 2016). Selection bias related to household income and racialized minority status, either at the time of study inception or following attrition, might also have attenuated the association of these factors with institutional trust. In addition, different racialized groups will have varied experiences of discrimination and institutional treatment, which we could not parse out here due to the small number of individuals within groups other than White.

Of note, although the tPC aims to identify causal relationships, it makes strong assumptions that can hardly be met in social sciences, notably that all confounding factors were included in the set of considered variables. The presence of unobserved confounders may introduce spurious edges and errors in their orientation (Spirtes et al., 2001). The tPC algorithm also cannot identify cyclic associations between two variables, such as a bidirectional relationship where social connectedness and institutional trust, or stress and institutional trust, mutually influence each other. In practice, it seems likely that many variables had bidirectional relationships; these had to be collapsed by the algorithm into a single direction or left undirected. Identification of bidirectional relationships ideally requires repeated measures of both variables, and to our knowledge very limited data of the sort have been published in relation to institutional trust (e.g., Brehm & Rahn, 1997). The present findings should therefore be interpreted with caution given the possibility of unobserved confounders and bidirectional relationships.

The tPC algorithm cannot identify cyclic associations between two variables, but the model at sparsity=0.01 did include a cycle made of *three* variables: institutional trust → perceived stress → psychotic experiences → institutional trust. This cyclic structure is plausible according to the arguments made above that mental health problems and institutional trust might mutually influence each other, and it has been shown that the Peter-Clark algorithm (of which tPC is an extension) remains correct if the true data generating mechanism is in fact cyclic (Mooij & Claassen, 2020). However, given that the tPC algorithm assumes acyclicity, we cannot exclude that the presence of a cycle stems from conflicting results of the conditional independence tests, in which case at least one of the edge orientations in the cycle would not be trustworthy.

Implications of the findings

Although further research on developmental pathways towards institutional trust is needed, the results point to the possible effects of social and mental health factors, underlining the importance of a developmental and systemic perspective on the study of institutional trust. Based on the tPC algorithm, putative causal effects on institutional trust were primarily identified for factors during adulthood, and to a lesser extent, through indirect pathways, for factors during adolescence. We tentatively suggest, from these results, that institutional trust is not fixed in childhood but rather continues to evolve between adolescence and adulthood, echoing previous findings on the longitudinal variability of political trust in youth (Devine & Valgarðsson, 2024). However, given the limitations of the present study, we caution against concluding that the early-life period is not involved in the formation of trust. The improvement of social conditions throughout development may be essential for fostering better trust in institutions over the life course – but to better identify the causal influences of factors in the early-life period, we believe that future research will need to employ more granular measurements and targeted sampling strategies to understand how specific groups and their intersections develop low trust in institutions.

Because adolescents and young adults with mental health problems tend to develop less trust in institutions, youth mental health services may be an appropriate space to intervene on trust, especially given the potential reciprocal effects of mistrust on mental health problems. However, considering the putative roles of psychological and social factors shaping trust, interventions that focus on psychological factors during adolescence or adulthood without addressing the social dimension would likely be insufficient. Social interventions may help restore trust in institutions if they reinforce the young person's connectedness within society and demonstrate that institutions are successfully enabling them to thrive within it. For instance, approaches that involve shared activities with others, such as sports- or arts-based interventions, can help individuals expand their social connections within and beyond their local communities (H. Morgan & Parker, 2017), with hypothetical benefits for replenishing institutional trust. In sum, a comprehensive agenda for improving institutional trust should propose interventions that span life stages and the psychological and social domains.

Strengths and limitations

This study benefited from longitudinal data covering socio-demographic, household, parental, interpersonal, and mental health characteristics over 23 years. By combining traditional regression analyses with causal discovery approaches, we identified risk factors for institutional mistrust and possible mechanistic pathways. An important limitation of the study, however, is the potential for sampling bias. Families were recruited using recruitment material in English or French, limiting access for families who did not understand those languages, and those residing in Indigenous communities were not included. Families with less trust in institutions may also have been more likely to decline study participation or to withdraw from the study before age 23. As a result, the results may not generalize well to the populations that are the least trusting of institutions. The regression models yielded consistent results after adjusting for attrition using survey weights, but we cannot rule out potential bias stemming from attrition. The determinants of institutional trust also depend on historical context. Here, institutional trust was measured between February and June 2021, when the state of emergency for the COVID-19 pandemic was ongoing. Therefore, institutional trust was probably shaped by additional contextual factors, such as attitudes to vaccination, lockdown, or other public health measures (Allington et al., 2023; Burns et al., 2024).

More generally, institutional trust was indexed as the degree of confidence in 13 institutions, which does not fully capture the conceptual definition of trust (see Introduction). Other relevant measures were not available in the dataset, such as in-group and out-group social connections (sometimes referred to as "bonding" and "bridging" social capital; Claridge, 2018). Data on potential confounders, such as institutional or generalized trust at age 15, was not available. The frequency of psychotic experiences was measured at age 23 without a specified timeframe (i.e., "Have you ever felt as if…"), meaning that we could not parse out experiences that preceded other measures during adolescence or adulthood. However, this measure was strongly correlated to period-specific adaptations of the scale among college students in China and Australia: r=0.84 with a past-month timeframe ("In the past month, have you...", Sun et al., 2020) and r=0.64 with a 3-month timeframe (Capra et al., 2017). Although these strong correlations suggest that the scale primarily captures recent or current experiences, we cannot rule out the possibility of incorrect temporal ordering for psychotic experiences that occurred at or before age 15.

Conclusion

This study found longitudinal associations of social and mental health factors, from early life to adulthood, with institutional trust. The results are consistent with the notion that the formation of institutional trust may involve factors related to structural inequality, interpersonal factors, and mental health, but these pathways likely differ depending on the unique context of each individual. Future research should consider how structural and mental health interventions can promote social connectedness and positive interactions with institutions to improve institutional trust and wellbeing.

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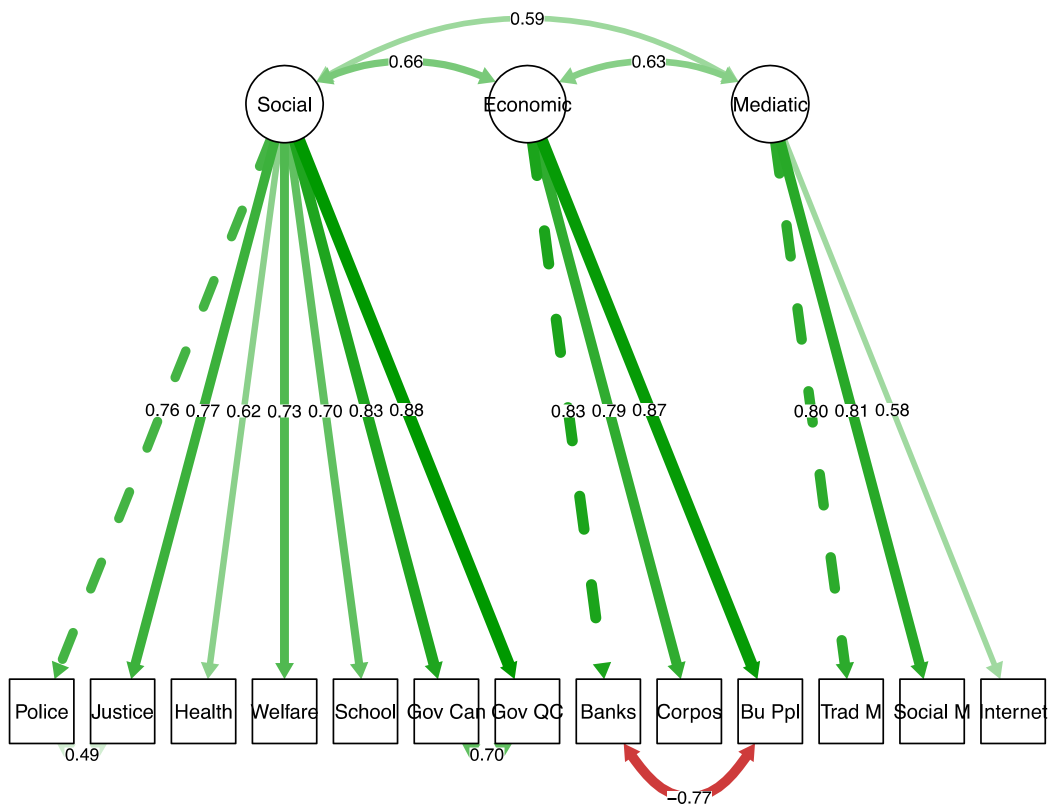
Table 1. Descriptive statistics of key variables in the study

Variable	**N (%) or Mean (SD)**
Early life (0-2.5 years)	
Sex assigned at birth	
Male	576 (42.8%)
Female	771 (57.2%)
Ethnoracial groups	
Arab or West Asian	15 (1.12%)
Asian	15 (1.12%)
Black	24 (1.79%)
Mixed	24 (1.79%)
White	1234 (91.8%)
Other (Indigenous, Latinx, or "Other")	32 (2.38%)
Low household income	
Yes	1063 (79.8%)
No	269 (20.2%)
Maternal history of depression	
Yes	289 (21.7%)
No	1040 (78.3%)
Paternal history of depression	
Yes	156 (14.1%)
No	952 (85.9%)
Maternal adolescent antisocial behaviors, range: 0-5	0.81 (0.92)
Paternal adolescent antisocial behaviors, range: 0-5	0.64 (0.91)
Adolescence (15 years)	
Neighborhood trust, range: 1-4	3.28 (0.56)
Family cohesion, range: 7-28	24.1 (3.04)
Bullying exposure, range: 6-18	8.20 (2.59)
School difficulties, range: 0-1	0.24 (0.26)
Internalizing problems, range: 0-10	3.43 (1.91)

Externalizing problems, range: 0-10	1.43 (0.89)
Adulthood (23 years)	
Gender diverse status	
Yes	30 (2.23%)
No	1317 (97.8%)
Perceived stress, past month, range: 0-40	17.9 (7.20)
Psychotic experiences, lifetime occurrence, range: 15-60	18.9 (4.37)
Suicidal ideas, past year	
Yes	112 (8.48)
No	1209 (91.5%)
Help seeking for mental health, past year	
Yes	276 (20.5%)
No	1071 (79.5%)
Social connectedness, range: 0-40	27.0 (3.92)
Social media use, hours/day, range: 0-6	2.67 (1.74)
Institutional trust, range: 13-52	34.4 (6.89)

Data compiled from the final master file of the Québec Longitudinal Study of Child Development (1998–2021), Gouvernement du Québec, Institut de la statistique du Québec.

Figure 1. Identification of three domains of institutional trust through factor analysis



Confirmatory factor analysis in half of the sample (n=674). From left to right, the items are the police, justice system and courts, health care system, welfare system, school system, federal parliament (of Canada), provincial parliament (of Québec), banks, major corporations, businesspeople, traditional media, social media, and internet. Data compiled from the final master file of the Québec Longitudinal Study of Child Development (1998–2021), Gouvernement du Québec, Institut de la statistique du Québec.

Figure 2. Associations of social and mental health factors with institutional trust

Unstandardized regression coefficients (95% confidence intervals) from 40 multiply imputed datasets (n=1347). Control variables were sex for early-life factors (age 0-2.5 years), sex and early-life factors for adolescence factors (15 years), and sex and adolescence factors for adulthood factors (23 years). Bold indicates p<.05 after adjustment for false discovery rate across columns. Darker shades indicate smaller p-values (orange: negative association; blue: positive association). Data compiled from the final master file of the Québec Longitudinal Study of Child Development (1998–2021), Gouvernement du Québec, Institut de la statistique du Québec.

Figure 3. Paths between social factors, mental health, and institutional trust (sparsity=0.01)

Temporal Peter-Clark algorithm with test-wide deletion (n=1347). Edges (lines) indicate putative causal relationships between variables. Some edges have no arrowheads, indicating that the direction of causality could not be determined by the algorithm. Data compiled from the final master file of the Québec Longitudinal Study of Child Development (1998–2021), Gouvernement du Québec, Institut de la statistique du Québec.

Supplementary Material

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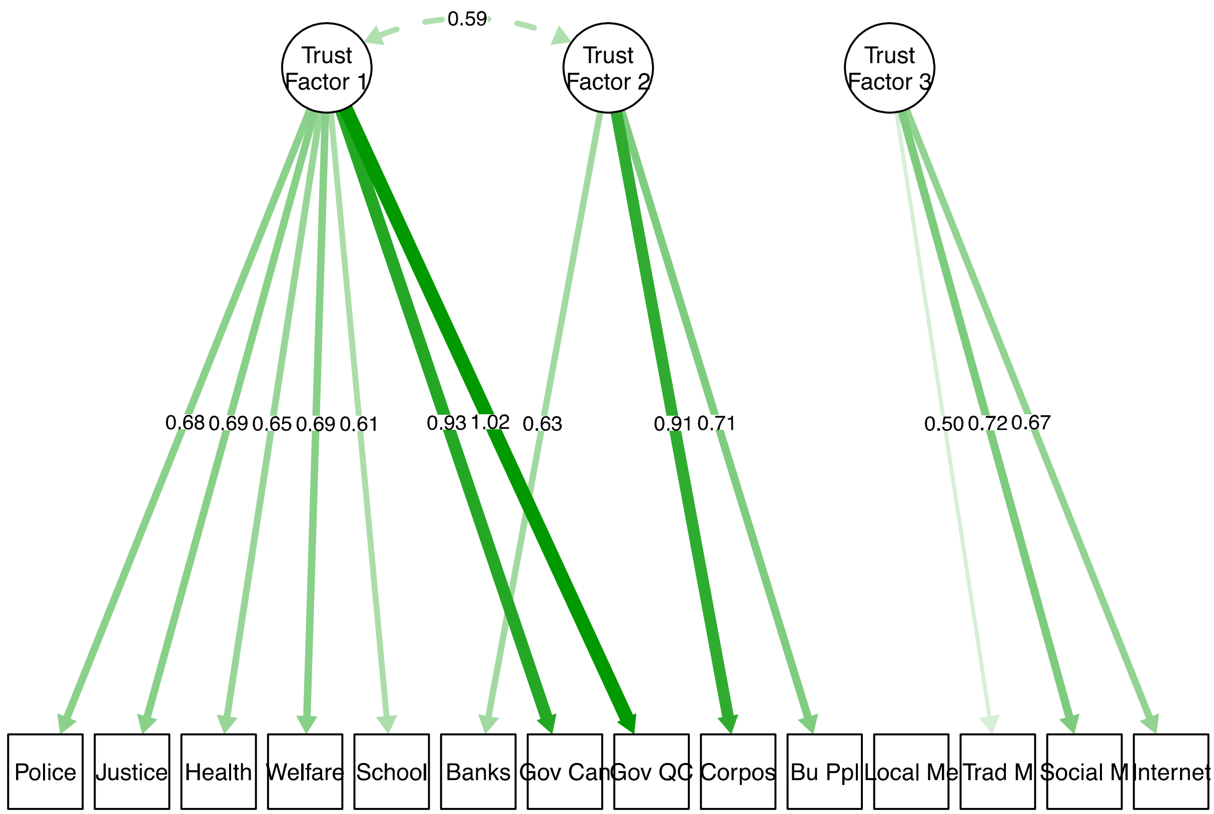
Note S1. Factor analyses of institutional trust

We began factor analyses by randomly splitting the total analytical sample into two independent subsamples of equal sizes. We used the first subsample for exploratory factor analyses and the second subsample for confirmatory factor analyses. All models were estimated using lavaan version 0.6-17 with weighted least squares mean and variance adjusted methods.[1] Exploratory factor analyses were done with oblimin oblique rotation. We selected the number of factors according to the scree plot and eigenvalues. Items with no factor loading >0.4 were removed.[2] For confirmatory factor analyses, we used robust, mean and variance adjusted fit statistics. We defined comparative fit index (CFI)>0.90 as acceptable and >0.95 as good fit; and root mean square error approximation (RMSEA) and standardized root mean squared residual (SRMR) <0.08 as acceptable and <0.05 as good fit.[3,4] If fit was not satisfactory, we revised the model based on modification indices and theoretical considerations.

The Kaiser-Meyer-Olkin was 0.89 and the Bartlett's test for sphericity was significant (p<.001), supporting the suitability of the data for factor analysis. The eigenvalues and scree plot indicated a 3-factor solution, which we explored in the first subsample (n=673; Figure A1). One item (local merchants) had no primary factor loading above 0.40 and was thus excluded in subsequent analyses and from the total trust score.

Figure A1. Exploratory factor analysis (n=673) with 3 factors



From left to right, items are the police, justice system and courts, health care system, welfare system, school system, banks, federal parliament (of Canada), provincial parliament (of Québec), major corporations, businesspeople, local merchants, traditional media, social media, and internet. Data compiled from the final master file of the Québec Longitudinal Study of Child Development (1998–2021), Gouvernement du Québec, Institut de la statistique du Québec.

In the confirmatory analysis, the fit of this 3-factor model was not satisfactory: $\chi^2(62)=763.70$, $p<.001$; CFI=0.959; RMSEA=0.130 (90% CI: 0.122, 0.138); SRMR=0.067. Based on modification indices, we added residual correlations between police and justice, federal and provincial parliaments, banks and businesspeople, health care and school, welfare and school, and welfare and health care. The resulting 3-factor solution achieved acceptable to good fit: $\chi^2(56)=270.87$, $p<.001$; CFI=0.987; RMSEA=0.076 (90% CI: 0.067, 0.085); SRMR=0.047. We labeled the factors as trust in social, economic, and mediatic institutions (Figure 1 in the main text). Internal reliability was adequate: respectively ω=0.827, ω=0.860, and ω=0.714.

Note S2. Selection of social and mental health variables

The Québec Longitudinal Study of Child Development has been collecting data every 1 to 2 years since 1997, with 26 time points to date and several thousands of variables. This presented us with the dilemma of selecting which measures and time points to include in the present study. Below, we outline our decision process that led to the selection of variables presented in the article.

General considerations

We were broadly interested in the role of social and mental health factors, from birth to early adulthood, on institutional trust. We heuristically categorized these factors according to three categories of determinants, based on theorized causal mechanisms: structural inequality, interpersonal factors, and mental health (see the article introduction). In relation to these three categories, we additionally aimed to account for key antecedents or confounding factors: e.g., parental history of mental health problems as a shared risk factor for mental health and social problems.

In selecting social and mental health variables, we aimed to balance comprehensiveness and parsimony, focusing on the factors that appeared most salient based on theory. We therefore constrained the selection of measures to 3 time points between birth and adulthood in order to simplify the analyses, their interpretation, and their reporting.

Selection of time points

Early life. We measured socio-demographic factors and parental history of mental health problems in early life, given that their putative effects on structural inequality and institutional trust could potentially operate over the life course.[5]

Adolescence. We initially considered having the second time point in late childhood or pre-adolescence (e.g., age 12) as a midpoint between early life and adulthood. However, we ultimately opted for a time point in adolescence (at age 15) since mental health problems more commonly emerge during that period or later.[6]

Adulthood. Institutional trust was measured at age 23. We opted to include adulthood predictors at the same age (i.e., cross-sectionally) given the availability of key variables at this age, notably social connectedness and psychotic experiences. An additional advantage of having predictors that were cross-sectional to institutional trust (rather than anterior) was the possibility of identifying reverse associations (e.g., from trust to mental health) in the temporal Peter-Clark algorithm.

Measures related to structural inequality

Measures related to structural inequality were racialized minority status, gender diverse status, low household income, and school difficulties. We included racialized minority status and gender diverse status based on the associated risk of exposure to discrimination and lower trust in institutions.[7,8] We measured gender diverse status at age 23 given that the realization of gender diverse identity often occurs during adolescence or later.[9] Lower socio-economic status (indexed here with household income) can engender unfair treatment from institutions and is commonly associated with lower trust in institutions.[10] We included school difficulties because, even though they are not typically described as a source of structural inequality, they can have lasting effects on wealth and social disparities that are consistent with the definition of structural inequality employed here.[11]

Measures related to interpersonal relationships

Measures related to interpersonal relationships included neighborhood trust, family cohesion, exposure to bullying, school difficulties, social connectedness, and social media use. The rationale for these inclusions is that neighborhood trust[12] and family cohesion[13] contribute to social connectedness, whereas school difficulties and bullying may hamper the sense of belonging in the school environment.[14] Social connectedness is a component of social capital according to Putnam's conception, alongside trust, norms of reciprocity, and civic participation.[15] We included social media use as a factor variably related to social connections, in the sense that social media can foster social connections or undermine them, depending on the types and contexts of use;[16] and social media may further influence trust in institutions by disseminating information that makes institutions appear less trustworthy.[17]

Measures related to mental health

We did not have strong *a priori* to anticipate that any particular category of mental health problems would be more strongly related to institutional trust than others. One exception is the spectrum of psychotic experiences, which includes paranoia and has been linked to interpersonal mistrust;[18] although the link of psychotic experiences with institutional trust has not been previously examined, we expected that its putative impact on interpersonal trust would also lead to lower trust in institutions. For other measures related to mental health, we selected transdiagnostic markers of mental health problems, spanning all levels of severity. In adolescence, we included internalizing and externalizing problems. In adulthood, we included perceived stress (a sensitive marker at low levels of psychopathology), psychotic experiences, and two markers of more severe mental health problems: help seeking and suicidal ideations.

Table S1. Description of mental health and social measures

Measure	Informant (age)	Content	Coding
Early life			
Sex	Medical records (birth)	Male or female	0 = Male 1 = Female
Racialized minority status	Parents (5 months)	12 categories, e.g., “White”, “Black”, “Indigenous”	0 = “White” 1 = any of the other categories
Household income insufficiency	Parents (5 months)	Defined as exceeding by 20% or more the average proportion of annual income spent on basic needs among households of similar size and regional population density [19].	0 = Sufficient 1 = Insufficient
Parental history of depression	Parents (29 months)	16 items from the Diagnostic Interview Schedule, e.g., periods of feeling sad most of the time for 2 weeks or more [20]	0 = No history of depression 1 = History of depression
Parental antisocial behaviors in adolescence	Parents (5 months)	5 items from the Diagnostic Interview Schedule, e.g., stealing, skipping school [21]	Sum score, range: 0–5
Adolescence			
Neighborhood trust	Mothers (15 years)	5 items, ad hoc, e.g., people help each other, adults can be trusted [22]	Sum score, range: 1-4
Family cohesion	Mothers (15 years)	7 items from the McMaster Family Assessment Device, e.g., “We confide in each other”, “We feel accepted for what we are” [23,24]	Sum score, range: 7-28
Parent-child relational problems*	Self (15 years)	4 items, ad hoc, e.g., “In the past 6 months, my parents get angry and yell at me”.	Sum score, rescaled to range: 0-10
Bullying exposure	Self (15 years)	6 items adapted from the Self-Report Victimization Scale, e.g., being called names, getting pushed, hit or kicked [25],	Sum score: range: 6-18
School difficulties	Self (15 years)	Dropout Prediction Index, 8 items, e.g., average grades, motivation for school [26]	Formula (see reference), range: 0-1

Internalizing problems	Self (15 years)	25 items from the Mental Health and Social Inadaptation Assessment for Adolescents [27]	Sum score, rescaled to range: 0-10
Externalizing problems	Self (15 years)	57 items from the Mental Health and Social Inadaptation Assessment for Adolescents [27]	Sum score, rescaled to range: 0-10
Adulthood			
Gender diverse status	Self (23 years)	Gender assessed with 1 item (options: masculine, feminine, or other) and coded in relation to sex assigned at birth.	0 = cisgender 1 = transgender or other gender
Perceived stress	Self (23 years)	Perceived Stress Scale – Past-month version, 10 items, e.g., feeling nervous and stressed, feeling on top of things (reverse coded) [28]	Sum score, range: 0-40
Psychotic experiences	Self (23 years)	Community Assessment of Psychic Experiences, 15 items, e.g., "Have you ever felt as if the thoughts in your head are not your own?" [29]	Sum score, range: 15-60
Suicidal ideas	Self (23 years)	1 item: "In the past 12 months, did you ever seriously consider taking your own life or killing yourself?"	0 = No 1 = Yes
Help seeking	Self (23 years)	1 item: "In the past 12 months, have you sought professional help for psychological difficulties such as loneliness, sadness, anxiety, depression, violence or substance abuse?"	0 = No 1 = Yes
Social connectedness	Self (23 years)	Social Provisions Questionnaire, 10 items, e.g., "There are people I can depend on", "I have close relationships" [30]	Sum score, range: 0-40
Social media use	Self (23 years)	1 item: "During the past 3 months, how much time on average per day did you spend using social media such as Facebook, Instagram, Snapchat, Twitter or TikTok?" (options ranging from 0 = "did not use" to 6 = "6 hours or more") [31]	Transformed into numeric values based on the midpoint of response categories: 0, 0.5, 2, 4.5, and 6

*Used in sensitivity analyses as an alternative to maternal reports of family cohesion.

Table S2. Data availability in the analytic sample (n=1347)

Variable	Availability, N	Availability, %
Sex assigned at birth	1347	100
Racialized group	1344	99.8
Household income	1332	98.9
Maternal history of depression	1329	98.7
Paternal history of depression	1108	82.3
Maternal antisocial behaviors in adolescence	1308	97.1
Paternal antisocial behaviors in adolescence	1173	87.1
Neighborhood trust	1129	83.8
Family cohesion	968	71.9
Parent-child relational problems	1196	88.8
Bullying exposure	1197	88.9
School difficulties	1188	88.2
Internalizing behaviors	1199	89.0
Externalizing behaviors	1199	89.0
Gender minority status	1347	100.0
Perceived stress	1345	99.9
Psychotic experiences	1316	97.7
Suicidal ideas	1321	98.1
Help seeking	1347	100.0
Social connectedness	1347	100.0

Social media use	1347	100.0
Institutional trust	1347	100.0

Table S3. Early-life characteristics of participants included in and excluded from the analyses

	Participant, No. (%)		Effect size
	Included N=1347	Excluded N=773	
Sex assigned at birth			**0.216**
Male	576 (42.8%)	504 (65.2%)	
Female	771 (57.2%)	269 (34.8%)	
Racialized minority group			0.094
Yes	110 (8.18%)	109 (14.1%)	
No	1234 (91.8%)	664 (85.9%)	
Low household income at 5 months[a]			**0.135**
Yes	1063 (79.8%)	508 (67.7%)	
No	269 (20.2%)	242 (32.3%)	
Single parent household at 5 months			0.071
Yes	89 (6.63%)	82 (10.7%)	
No	1254 (93.4%)	687 (89.3%)	
Maternal age in years at child's birth, Mean (SD)	29.2 (5.10)	28.4 (5.40)	0.071
Maternal educational attainment at 5 months			**0.110**
No high school diploma	309 (23.0%)	255 (33.1%)	
High school diploma or higher	1037 (77.0%)	516 (66.9%)	
Maternal depressive symptoms at 5 months, Mean (SD)[b]	1.33 (1.28)	1.54 (1.43)	0.070
Internalizing behaviors at 29 months, Mean (SD)[c]	1.15 (0.20)	1.15 (0.21)	0.004
Externalizing behaviors at 29 months, Mean (SD)[c]	1.50 (0.29)	1.51 (0.31)	0.011

Effect sizes for comparing included and excluded participants are Cramer's V and absolute Spearman correlations (range: 0.000–1.000). In bold: effect sizes > 0.100. Reasons for exclusion were no assessment at age 23 (n=752) or missing data on institutional trust (n=21). Data compiled from the final master file of the Québec Longitudinal Study of Child Development (1998–2021), Gouvernement du Québec, Institut de la statistique du Québec.

[a] Low income defined as spending more than 20% of the annual income for basic needs, in addition to the average proportion spent by households of similar size and regional population density.

[b] 12-item version of the Center for Epidemiologic Studies-Depression,[32] rescaled to range 0–10.

[c] From the Behavior Questionnaire;[33] mean scores (range 1-3) of 6 items for internalizing and 10 items for externalizing behaviors; missing values replaced with 17 months.

Table S4. Selected edges over 100 bootstraps of the temporal Peter-Clark algorithm (sparsity level=0.01)

	Sex	Perceived stress	Psychotic experiences	Social connectedness	Institutional trust
Sex	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Perceived stress	47 (0)	0 (0)	66 (0)	95 (0)	81 (0)
Psychotic experiences	0 (0)	34 (0)	0 (0)	54 (0)	77 (2)
Social connectedness	12 (0)	2 (0)	5 (0)	0 (0)	35 (14)
Institutional trust	47 (0)	6 (0)	14 (2)	41 (14)	0 (0)

Variables in this table are those that shared a direct edge with institutional trust in the primary tPC model (sparsity=0.01). Full results of the bootstrap analyses are available in the Supplementary Data: https://osf.io/82f4q/

The numbers indicate how many times edges were identified over 100 bootstraps of the temporal Peter-Clark algorithm. The first number in each cell indicates bootstraps where the variable at the top (column) had a putative causal effect on the variable on the left (row). The second number in parentheses indicates bootstraps where the edge was undirected, that is, where the direction of causality was undetermined.

Data compiled from the final master file of the Québec Longitudinal Study of Child Development (1998–2021), Gouvernement du Québec, Institut de la statistique du Québec.

Figure S1. Heatmap of correlations between all variables

Pearson's correlation. Data compiled from the final master file of the Québec Longitudinal Study of Child Development (1998–2021), Gouvernement du Québec, Institut de la statistique du Québec.

Figure S2. Associations of early-life factors with institutional trust (adjusted for sex)

Linear regression models pooled over 40 multiply imputed datasets (n=1347). Cells indicate unstandardized regression coefficients (95% confidence intervals). Each association is modeled separately. Bold indicates p<.05 after adjustment for false discovery rate across columns. Darker shades indicate smaller p-values (orange: negative association; blue: positive association). Data compiled from the final master file of the Québec Longitudinal Study of Child Development (1998–2021), Gouvernement du Québec, Institut de la statistique du Québec.

Figure S3. Associations of adolescence factors with institutional trust (adjusted for sex)

Linear regression models pooled over 40 multiply imputed datasets (n=1347). Cells indicate unstandardized regression coefficients (95% confidence intervals). Each association is modeled separately. Bold indicates p<.05 after adjustment for false discovery rate across columns. Darker shades indicate smaller p-values (orange: negative association; blue: positive association). Data compiled from the final master file of the Québec Longitudinal Study of Child Development (1998–2021), Gouvernement du Québec, Institut de la statistique du Québec.

Figure S4. Associations of adolescence factors with institutional trust (adjusted for sex and early-life factors)

Linear regression models pooled over 40 multiply imputed datasets (n=1347). Cells indicate unstandardized regression coefficients (95% confidence intervals). Each association is modeled separately. Bold indicates p<.05 after adjustment for false discovery rate across columns. Darker shades indicate smaller p-values (orange: negative association; blue: positive association). Data compiled from the final master file of the Québec Longitudinal Study of Child Development (1998–2021), Gouvernement du Québec, Institut de la statistique du Québec.

Figure S5. Associations of adulthood factors with institutional trust (adjusted for sex)

Linear regression models pooled over 40 multiply imputed datasets (n=1347). Cells indicate unstandardized regression coefficients (95% confidence intervals). Each association is modeled separately. Bold indicates p<.05 after adjustment for false discovery rate across columns. Darker shades indicate smaller p-values (orange: negative association; blue: positive association). Data compiled from the final master file of the Québec Longitudinal Study of Child Development (1998–2021), Gouvernement du Québec, Institut de la statistique du Québec.

Figure S6. Associations of adulthood factors with institutional trust (adjusted for sex and early-life factors)

Linear regression models pooled over 40 multiply imputed datasets (n=1347). Cells indicate unstandardized regression coefficients (95% confidence intervals). Each association is modeled separately. Bold indicates p<.05 after adjustment for false discovery rate across columns. Darker shades indicate smaller p-values (orange: negative association; blue: positive association). Data compiled from the final master file of the Québec Longitudinal Study of Child Development (1998–2021), Gouvernement du Québec, Institut de la statistique du Québec.

Figure S7. Associations of adulthood factors with institutional trust (adjusted for sex and adolescence factors)

Linear regression models pooled over 40 multiply imputed datasets (n=1347). Cells indicate unstandardized regression coefficients (95% confidence intervals). Each association is modeled separately. Bold indicates p<.05 after adjustment for false discovery rate across columns. Darker shades indicate smaller p-values (orange: negative association; blue: positive association). Data compiled from the final master file of the Québec Longitudinal Study of Child Development (1998–2021), Gouvernement du Québec, Institut de la statistique du Québec.

Figure S8. Pathways between mental health and social factors and institutional trust (sparsity=0.001)

Temporal Peter-Clark algorithm with test-wide deletion (n=1347). Edges (lines) indicate putative causal relationships between variables. Some edges have no arrowheads, indicating that the direction of causality could not be determined by the algorithm. Data compiled from the final master file of the Québec Longitudinal Study of Child Development (1998–2021), Gouvernement du Québec, Institut de la statistique du Québec.

Figure S9. Pathways between mental health and social factors and institutional trust (sparsity=0.0001)

Temporal Peter-Clark algorithm with test-wide deletion (n=1347). Edges (lines) indicate putative causal relationships between variables. Some edges have no arrowheads, indicating that the direction of causality could not be determined by the algorithm. Data compiled from the final master file of the Québec Longitudinal Study of Child Development (1998–2021), Gouvernement du Québec, Institut de la statistique du Québec.

Figure S10. Pathways between mental health and social factors and institutional trust (sparsity=0.00001)

Temporal Peter-Clark algorithm with test-wide deletion (n=1347). Edges (lines) indicate putative causal relationships between variables. Some edges have no arrowheads, indicating that the direction of causality could not be determined by the algorithm. Data compiled from the final master file of the Québec Longitudinal Study of Child Development (1998–2021), Gouvernement du Québec, Institut de la statistique du Québec.

Figure S11. Associations of mental health and social factors with institutional trust (sensitivity analysis with parent-child relational problems)

Unstandardized regression coefficients (95% confidence intervals) pooled over 40 multiply imputed datasets (n=1347). Control variables were sex for early-life factors (age 0-2.5 years), sex and early-life factors for adolescence factors (age 15 years), and sex and adolescence factors for adulthood factors (age 23 years). Bold indicates p<.05 after adjustment for false discovery rate across columns. Darker shades indicate smaller p-values (orange: negative association; blue: positive association). Data compiled from the final master file of the Québec Longitudinal Study of Child Development (1998–2021), Gouvernement du Québec, Institut de la statistique du Québec.

Figure S12. Pathways between mental health and social factors and institutional trust (sensitivity analysis with parent-child relational problems)

Temporal Peter-Clark algorithm with test-wide deletion (n=1347); sparsity=0.01. Edges (lines) indicate putative causal relationships between variables. Some edges have no arrowheads, indicating that the direction of causality could not be determined by the algorithm. Data compiled from the final master file of the Québec Longitudinal Study of Child Development (1998–2021), Gouvernement du Québec, Institut de la statistique du Québec.

Figure S13. Associations of social and mental health factors with institutional trust (sensitivity analysis with survey weights)

Unstandardized regression coefficients (95% confidence intervals), adjusted for attrition using inverse probability weights (based on sex, maternal educational attainment, and household income) and pooled over 40 multiply imputed datasets (n=1347). Control variables were sex for early-life factors (age 0-2.5 years), sex and early-life factors for adolescence factors (age 15 years), and sex and adolescence factors for adulthood factors (age 23 years). Bold indicates p<.05 after adjustment for false discovery rate across columns. Darker shades indicate smaller p-values (orange: negative association; blue: positive association). Data compiled from the final master file of the Québec Longitudinal Study of Child Development (1998–2021), Gouvernement du Québec, Institut de la statistique du Québec.

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