Accumulation of economic hardship and health during the COVID-19 pandemic: Social causation or selection?

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A B S T R A C T

This study examines whether economic hardship during the COVID-19 pandemic is deleteriously associated with psychological distress and self-rated health. A social causation perspective suggests that exposure to economic hardship will harm well-being, but a social selection perspective suggests that the appearance of health effects of hardship during the pandemic are attributable to the increased risk of exposure to hardship associated with poor well-being at the start of the pandemic. We also propose a third perspective, economic selection, which suggests that economic hardship prior to the pandemic negatively affects health and increases risk of exposure to hardship during the pandemic; consequently, an association between health and economic hardship during the pandemic may be spurious, and entirely due to pre-existing levels of hardship. To test these competing perspectives, we use a longitudinal study based in Canada that began in late March of 2020 and followed respondents monthly in April, May, and June. Baseline psychological distress and self-rated health, as well as economic hardship prior to the pandemic, independently predict the accumulation of monthly periods of hardship from April to June. The accumulation of periods of hardship from April to June is deleteriously associated with psychological distress and self-rated health in June. Controls for prior economic hardship and baseline health weaken the association between accumulation of periods of hardship and psychological distress, while also eliminating the association between accumulation of hardship and self-rated health. These findings favor a social causation perspective for psychological distress and a social selection perspective for self-rated health, with less evidence found in support of economic selection. This study took place during the first months of the COVID-19 pandemic, though, and associations with self-rated health may have become more evident as hardship further wore on individual well-being over a longer period of time.

1. Introduction

The health effects of economic hardship are a contentious issue in the literature, and debates continue on the question of whether economic hardship influences health in a "social causation" pattern, or if the association between economic hardship and health is better explained by the consequences of poor health for increased hardship in a "social selection" pattern (Chai et al., 2020). Although a number of studies have examined the degree to which the association between economic statuses and health are due to both social causation and social selection (Cerigo and Quesnel-Vallée, 2017; Kröger et al., 2015), we argue that the abrupt nature of the economic recession spurred by the COVID-19 pandemic provides a unique opportunity to re-examine the balance of causation and selection forces and their impact on health.

The onset of the COVID-19 pandemic was an abrupt and pervasive societal event that brought on social distancing requirements in nations around the globe (Galea, Merchant and Lurie, 2020). These measures required curtailing public engagement in meetings, businesses, and informal social gatherings (Douglas et al., 2020). One critical consequence of restricted social engagements was a precipitous contraction in economic activity and spending that resulted in a substantial economic downturn (Deschamps, 2020; Hardy and Logan, 2020). This economic contraction left many at risk of economic hardship (Cain, 2020; Collins et al., 2020; Pezenik, 2020; Shaefer et al., 2020), defined as struggles in

affording basic needs and regular expenses (Koltai et al., 2018). Alongside these financial challenges, another consequence of the social distancing measures implemented in early March was a decrease in both mental and physical well-being in the proceeding months (Devaraj and Patel, 2021; Gollwitzer et al., 2020; Zheng et al., 2020).

In this study, we ask whether economic hardship accrued during the COVID-19 pandemic deleteriously contributed to psychological distress and self-rated health. In addition to considering social causation and social selection perspectives, we also suggest an additional process of selection, which we term "economic selection." In economic selection, the appearance of health effects of economic hardship accrued during the pandemic is illusory and attributable to pre-pandemic economic hardship, as pre-pandemic economic hardship may have continued to affect health during the pandemic and also increased the risk of pandemic hardships.

After describing these perspectives in greater depth, we adjudicate between them using a national study of Canadians. Respondents were initially surveyed in March of 2020, just after start of the pandemic and the initiation of social distancing measures, and then re-examined monthly between April and June. These data permit the study of how accumulation of multiple periods of economic hardship between April and June were associated with physical and mental health, while also examining whether health and economic hardship at the start of the pandemic explain these associations. We therefore contribute critical knowledge to the study of health during the COVID-19 pandemic by showing whether economic hardship accrued during the early months of the pandemic was detrimentally associated with psychological distress and self-rated health as the pandemic unfolded.

2. Background

2.1. Social causation, social selection, and health during the COVID-19 pandemic

This research focuses on psychological distress and self-rated health, which are likely to be key indicators of well-being during the COVID-19 pandemic. Psychological distress is constituted by symptoms of depression and anxiety (Mirowsky and Ross, 2003), and the frequency of a core set of symptoms of distress is broadly reflective of a diverse set of psychological disorders (Kessler et al., 2002). Self-rated health is often measured using single-item questions in which respondents are asked to rate their overall health (Au and Johnston, 2014; Garbarski, 2016; Jylhä, 2009). Methodological research has shown that self-rated health is a holistic measure that is broadly reflective of aggregate physical and mental health statuses, including greater days of poor physical and mental health, reoccurring health problems, and psychiatric morbidity (Dumas et al., 2020; Singh-Manoux et al., 2006), as well as indices of physical stress responses such as inflammation and allostatic load (Leshem-Rubinow et al., 2015; Vie et al., 2014). However, on balance, people tend to draw more heavily on assessments of physical rather than

mental functioning in rating their health (Mavaddat et al., 2011). Moreover, additional research shows that the degree to which individual ratings of health reflect health statuses is invariant of cultural and individual differences in reporting styles (Hardy et al., 2014). Within our study, then, self-rated health is used as an indicator of overall functioning, while psychological distress captures psychological well-being, at the onset of and throughout the pandemic.

Fig. 1 illustrates three perspectives on the association between economic hardship and health during the COVID-19 pandemic. Path a in Fig. 1 demonstrates the social causation perspective, in which economic hardship experienced during the pandemic adversely influences health. Economic hardship harms mental health because economic privation creates conditions of fear and uncertainty that exacerbate distress (Niedzwiedz et al., 2017; Koltai et al., 2018; Pearlin, 1999). Financial problems can also impinge on salubrious health behaviors, impair sleep, and degrade a positive sense of self, all of which can additionally harm mental health (Frankham, Richardson and Maguire, 2020; Kalousová et al., 2019; Mirowsky and Ross, 2003). In terms of physical health, activation of the stress system due to the strain of hardship can interfere with metabolic functioning and lead to greater inflammation that can affect physical well-being (Niedzwiedz et al., 2017). Moreover, inadequate resources that are inherent to economic hardship can also substantially impact health, as a lack of access to food and medical resources brought on by chronic financial difficulties can lead to poor health outcomes (e.g., Phelan et al., 2004). Finally, economic hardship also has a subjective element by which people compare their financial circumstances to those of their peers. From this perspective, chronic financial hardship is a psychosocial stressor, *above and beyond* material hardship, that is associated with worse physical health (Sun et al., 2009).

As is clear from the literature reviewed above, the central component of economic hardship's deleterious effects can be found in the *chronicity of hardship*. A continual inability to afford basic necessities has a wearing effect that degrades individual functioning over time (Pearlin, 1999). Consequently, researchers have focused on the degree to which individuals are continually exposed to hardship over time by tracking periods over the life course in which hardship is experienced (e.g., Kahn and Pearlin, 2006; Shippee et al., 2012). We adapt this approach to the study of economic hardship beginning from the onset of the COVID-19 pandemic, examining the sum total of months in which individuals were exposed to hardship across the early months of the pandemic. A higher sum indicates more chronic exposure to hardship during the pandemic. From a social causation perspective, then, a greater *accumulation* of periods of hardship will create more wear on the individual, reflected in greater psychological distress and lower self-rated health at the end of the study.

An alternative to the social causation perspective is the social selection perspective. The social selection perspective is illustrated by paths b and c in Fig. 1, in which both health and individual economic conditions during the pandemic are determined by *prior health statuses* (Mossakowski, 2014). These effects can occur in part because people
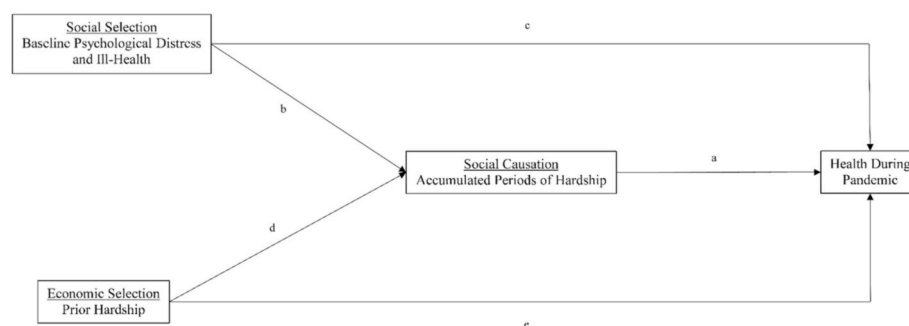

Fig. 1. Conceptual model of the social causation, social selection, and economic selection pathways between economic hardship and health during the COVID-19 pandemic.

with better physical and mental health are more able to obtain and maintain favorable economic positions (Haas, 2006; Hoffmann et al., 2018). Impaired health can lead to reduced economic productivity and greater health expenditures, as well as increased risk of loss of employment opportunities and social stigma (Lund et al., 2010; Lund and Cois, 2018). Moreover, impaired health is likely to impact individual ability to perform in interpersonal relationships (Chai et al., 2020), and this loss of social capital may also impact economic standing (Portes and Vickstrom, 2011). From a social selection perspective, then, poor physical and mental health at the beginning of the pandemic will lead to more chronic exposure to economic hardship during the pandemic, which will be reflected in greater accrual of periods of economic hardship during the pandemic. By extension, the social selection perspective suggests that association between accrual of periods of economic hardship over several months of the study and health outcomes will arise because psychological distress and worse self-rated health at the beginning of the study is predictive of more continual exposure to hardship.

The question of whether a social causation or social selection pattern is better supported in empirical evidence remains contentious. In terms of mental health, the body of evidence indicates that mental health conditions that are less subject to inheritable traits, such as generalized internalizing symptoms of anxiety and depression, are both a cause and a consequence of economic burdens (Cerigo and Quesnel-Vallée, 2017). For example, Callander and Schofield (2015) found in a longitudinal study that baseline levels of distress were associated with increased risk of subsequently falling into poverty, but Hanandita and Tampubolon (2014) used evidence from a natural experiment to show that poverty is a causal determinant of mental health. Similarly, longitudinal evidence indicates that depressive symptoms are both affected by and a cause of poor economic status (Lund and Cois, 2018).

In terms of physical health, a systematic review and meta-analysis indicates equivocal evidence for both perspectives, but on balance the evidence suggests a stronger influence of social causation particularly for more holistic indicators of socioeconomic standing (Kröger et al., 2015). These findings cohere with additional research showing that financial strains are associated with clear indications of subsequent risk to health in terms of mortality, even when income and physical infirmities are taken into account (Szanton et al., 2008; Tucker-Seeley et al., 2009). Moreover, evidence also suggests that social causation forces are particularly predominant among working-age adults, whereas social selection and social causation appear to be more equivalently influential earlier in the life-course (Hoffmann et al., 2019).

Despite evidence supporting the causation perspective, the question of whether economic hardship will be the cause or consequence of impaired health during a sharp economic downturn like one caused by the COVID-19 pandemic is unresolved. Forces of selection due to pre-existing health statuses may be accentuated by rapidly worsening economic conditions, such as the abrupt economic contraction that occurred in the wake of the pandemic. Health-based selection forces increase in potency during an economic contraction in part because workers with physical or mental infirmities are particularly vulnerable to curtailed employment (Heggebø, 2015). These curtailments occur because workers who are less productive or more absent prior to the pandemic due to health issues are likely to be marked for elimination or reduced work hours as businesses look to cut costs during an economic slowdown (Virtanen et al., 2013). Moreover, economic contractions can also exacerbate the degree to which health problems constrain new labour market opportunities (van Der Wel et al., 2010). In addition, impaired health may be indicative of compromised coping capabilities that leave individuals less able to manage the sudden change of macro-level economic conditions (Horwitz et al., 2011), leading to increased risk of hardships during the pandemic. Consequently, although periods of economic hardship accumulated during the pandemic may be adversely associated with psychological distress and self-rated health, it is also possible that this association is largely illusory

and due to selection factors.

2.2. An alternative process: economic selection

We also propose a third perspective to explain the association between health and economic hardship accrued during the pandemic. Paths d and e in Fig. 1 illustrate this additional perspective. As this figure shows, *economic hardship prior to the pandemic* may condition greater exposure to economic hardship during the pandemic; pre-pandemic hardship may also continue to affect health during the pandemic. Notably, as Fig. 1 shows, both the social causation and economic selection arguments emphasize the force of economic hardship, and in this way the two perspectives share conceptual overlap. Yet, the economic selection argument is distinct from the social causation argument because the economic selection argument suggests that hardships prior to the pandemic *select* people into hardships during the pandemic and, *independent of pandemic hardships*, hardships prior to the pandemic also continue to affect physical and mental health during the pandemic. Essentially, then, the economic selection perspective suggests that economic hardship and health during the pandemic are two dual and independent tracks with origins in pre-pandemic hardship, leading to a spurious association between hardship and health during the pandemic if pre-pandemic hardships are not taken into account.

The economic selection hypothesis is based in sociological perspectives on social stratification and human development which emphasize that initial disadvantages often lead to the creation of subsequent disadvantages in a process of "cumulative disadvantage" (Dannefer, 2003; Ferraro and Shippee, 2009). These perspectives delineate a process of "path dependence," in which "life course trajectories become 'locked in' by some *critical preceding condition*" (Bernardi, 2014, p. 74, emphasis added). An economic selection perspective in turn positions pre-pandemic economic hardship as a critical preceding condition that has numerous consequences for health and economic well-being during the pandemic. Consequently, pre-pandemic economic hardship creates *independent* path dependencies of greater economic hardship and worse mental and physical health during the pandemic.

Processes of path dependency are especially relevant in the study of hardship during the COVID-19 pandemic. Macro-economic contractions are more likely to initiate exposure to new economic problems among individuals experiencing economic privation *prior* to a downturn (Danziger et al., 2012), serving as the catalyst for further accumulation of disadvantage to unfold. Similarly, baseline levels of hardship may continue to influence health during the pandemic, irrespective of hardships experienced during the pandemic. Pre-pandemic economic hardship is likely reflective of a long process of path-dependent accumulation of deprivations and privations over the life-course (McEwen and McEwen, 2017). The experience of economic privations earlier in the life course can continue to affect health and well-being long after initial exposures (Ferraro, Schaefer and Wilkinson, 2016), especially through "scarring" effects that limit social, psychological and physical capacities that especially come into play when individuals face additional challenges over the life course (Evans and Kim, 2013; Mousteri et al., 2018; O'Rand, 2006; Strandh et al., 2014). Consequently, pre-pandemic economic hardship may not only lead to subsequent hardship during the pandemic, but may also be reflective of a number of earlier experiences of economic shortfalls that exert an ongoing influence on well-being during the pandemic. In contrast to the social causation perspective, insights from the economic selection perspective suggest that failing to take pre-pandemic hardship into account could create a spurious appearance that economic hardship experienced during the pandemic influences health during the pandemic. We therefore consider not only evidence for social causation and social selection in the association between periods of economic hardship and health in the early months of the COVID-19 pandemic, we also examine evidence for economic selection prior to the pandemic and its subsequent influence on health during the first months of the pandemic.

3. Method

3.1. Data

The data analyzed in the present study are derived from the *Canadian Quality of Work and Economic Life Study (C-QWELS)*. The C-QWELS was intended to examine social conditions and well-being among Canadians who were currently employed, but respondents were retained in the sample in subsequent waves if they became unemployed, and we control for unemployment in our analyses. Data were gathered by the study authors in cooperation with the Angus Reid Forum, a Canadian national survey research firm that maintains an ongoing national panel of Canadian respondents. The baseline data used in this survey were gathered from March 17th to March 23rd, 2020 using an online survey of 2528 working Canadians. The response rate was 43%, but results were statistically weighted according to the most current education, age, gender and region Census data to ensure a sample representative of working Canadians. Subsequently, 44 respondents were removed because they did not have a clear source of employment at baseline, reducing the sample size to 2484; another 28 respondents were removed because they preferred to self-describe gender, and this was too small of a response size to analyze as a separate category, resulting in a final baseline sample size of 2456. An attempt was made to recontact these respondents using similar online surveys that were administered in April, May, and June (all on the 17th to the 23rd of the respective months). Of the original 2456 respondents, 1990 were retained in the April survey (an 81% retention rate), 1835 in the May survey (a 75% retention rate), and 1809 respondents in June (a 74% retention rate). Methods used to address survey attrition are described in the analysis section.

3.2. Focal measures

Economic hardship. We used each wave of data to assess exposure to economic hardship. The baseline March survey assessed outstanding levels of hardship in the previous year, thereby facilitating assessment of hardship prior to the pandemic. Conversely, the measure of economic hardship for April, May, and June surveys asked about hardship experienced in the previous month. As a result, the measure of economic hardship in April specified hardship experienced since shortly after the start of the pandemic, and the combination of the measures of hardship between April and June facilitated a measure of chronicity of exposure specifically during the pandemic.

Economic hardship was measured using three questions adapted from previous surveys (Kahn and Pearlin, 2006; Mirowsky and Ross, 1999), with the same questions asked in April, May, and June: (1) "How often in the past month did you have trouble paying the bills?" (2) "How often in the past month did you not have enough money to buy food, clothes or other things your household needed?" and (3) How did your finances work out in the past month?" Responses to the first two questions were "very often," "often," "sometimes," "rarely," and "never"; responses to the third question were "not enough to make ends meet," "barely enough to get by," "just enough to make ends meet," "a little money left over," and "a lot of money left over." To indicate whether a respondent experienced hardship during a specific month, dichotomous variables for each month were created in which a value of "1" indicated that at least one frequent experience of hardship (often or very often for the either of the first two questions, or less than just enough for the third question). The measure of periods of economic hardship during the pandemic was the sum of these three indicators, resulting in a measure of chronicity of exposure that ranged from 0 (no experiences of hardship) to 3 (consistently exposed to hardship during the pandemic). Economic hardship prior to the pandemic was measured similarly, with the time scale of the first two questions referring to the past year, and the third question asking how one's finances "usually work out by the end of the month." Response choices were the same as listed previously, and responses were similarly dichotomized for an indicator of economic

hardship at the start of the pandemic.

Health. Because previous research demonstrates that the chronicity of hardship is critical for its potential influence on health, we do not examine health at each wave. Rather, we examine psychological distress and self-rated health in June at the end of the study period, which facilitates an understanding of the degree to which varying levels of chronic exposure to economic hardship during the pandemic took a cumulative toll on health. We also examine psychological distress and self-rated health at baseline to assess the role that baseline health played as a risk factor for exposure to economic hardship during the recession, as well as the role that baseline health played in explaining the associations between accumulation of periods of hardship and health at the end of the study period.

Health in March and June is measured through self-rated health and psychological distress. Symptoms of psychological distress are generally indicative of underlying levels of internalization and can be represented by a short set of primary symptoms of distress derived from the K6 scale (Kessler et al., 2002): feel anxious or tense; feel nervous; feel restless or fidgety; feel sad or depressed; feel hopeless. Each symptom was reported on a scale of "all of the time," "most of the time," "some of the time," "a little of the time," and "none of the time," with a timeframe of the previous month. This measure on which these items are based has been found to accurately discriminate between community and non-cases of DSM and SCID mental disorders (Kessler et al., 2002). Moreover, research in the sociology of mental health underscores the importance of considering everyday experience of distress as indicative of impairments in daily functioning, regardless of whether these indications of distress directly correspond to psychiatric disorders (Mirowsky and Ross, 2003). Responses were coded so that higher values indicated more frequent symptoms and the mean of responses was used as the indication of distress.

Overall health status was measured with a commonly employed survey question which asked, "Overall, how would you describe your current state of health?" with response categories of (1) "Excellent," (2) "Very good," (3) "Good," (4) "Fair," (5) "Poor," and (6) "Very Poor." As a low number of respondents indicated "very poor," responses to poor and very poor were combined. Self-rated health was treated as a continuous variable in all analyses, and responses were reverse coded so that higher values indicated better self-assessed health.

3.3. Control measures

Background social and work statuses that are predictive of health and economic stress exposure were assessed at baseline and incorporated as controls. Age was measured in years. Gender was coded as 0 = men, 1 = women. A common way of measuring minority race and ethnicity in Canada is through a "visible minority" categorization (Little, 2016). This "visible minority" category is relied-upon by Statistics Canada as the primary indicator of minority race and ethnicity and survey research in Canada typically follows the standard set by Statistics Canada. For this reason, as a part of the Angus Reid panel, participants were asked, "Would you say you are a member of a visible minority here in Canada (in terms of your ethnicity/race)?" A dichotomous variable is coded as 0 = not visible minority, 1 = visible minority. Education was operationalized as a set of categories, in which individuals with a university degree were compared to categories of high school degree, some college/trade school/university, and college/trade school; less than 2% of weighted sample had less than a high school degree, and these respondents were grouped with those with a high school degree. Income was measured as a set of categories in which "$150,000 or more" in household income was compared to "less than $25,000," "$25,000 to less than $50,000," "$50,000 to less than $100,000," and "$100,000 to less than $150,000." Furthermore, because baseline data focused on a working sample, we controlled for baseline work statuses with a set of dichotomous variables in which business owners or the self-employed were compared to part-time and full-time workers who were

employed by others. We further control for subsequent unemployment using a dichotomous indicator in which a value of 1 indicated that the respondent reported unemployment in any of the subsequent waves. Family statuses were also assessed at baseline and taken into account with a dichotomous variable in which the higher value indicated that the respondent did not live with a romantic partner, and a second dichotomous variable in which the higher value indicated that the respondent did not live with a child.

3.4. Methods of analysis

All analyses are conducted using Stata version 16.1. Multiple imputation through chained equations (MICE) is used to address item non-response and sample attrition, with the MICE approach useful for retaining the level of measurement of several key measures, including periods of economic hardship (White et al., 2011). Additional work, social, and well-being measures at multiple waves were included in the multiple imputation procedure as "auxiliary variables" which instead served to improve multiple imputation estimates (Enders, 2010). A full list of these measures is available from the lead study author upon request. We imputed 50 datasets, with a conservative burn-in rate of 30 (Manly and Wells, 2015). Table 1 reports the sample descriptives for all measures following multiple imputation.

Analyses are conducted in three stages. In the first stage, a multinomial logistic regression model is used to examine how baseline health statuses and economic hardship are associated with accumulation of subsequent periods of economic hardship. For the multinomial logistic

Table 1
Sample descriptives.

Focal Measures	
June Psychological Distress	*2.377*
June Self-Rated Health	*3.526*
Periods of Economic Hardship During Pandemic	
No Periods	0.643
One Period	0.171
Two Periods	0.100
Three Periods	0.087
Prior Economic Hardship	0.303
Baseline Psychological Distress	*2.404*
Baseline Self-Rated Health	*3.709*
Control Measures	
Age	*41.939*
Women	0.486
Visible Minority	0.137
Education	
High School	0.122
Some University or College/Trade School	0.217
College/Trade School	0.230
University Degree	0.432
Income	
Under $25,000	0.082
$25,000 to Less than $50,000	0.156
$50,000 to Less than $100,000	0.336
$100,000 to Less than $150,000	0.250
$150,000 and Over	0.176
Occupational Class	
Professional	0.404
Administrative	0.124
Sales	0.195
Clerical	0.170
Laborer	0.107
Work Status	
Full-Time Employed	0.655
Part-Time Employed	0.184
Business Owner or Self-Employed	0.162
Subsequent Unemployment	0.230
No Romantic Partner	0.353
No Child at Home	0.618

Means are shown for continous measures and proportions are shown for categorical measures. Means are italicized.

regression model, both natural log coefficients and relative risk ratios (RRRs) are presented. The RRRs are odds ratios indicating how a one-unit increase in a predictor is associated with a relative in change in the odds of exposure to a specific accumulation of hardship, as compared to no exposure (Hoffmann, 2016).

In the second stage of analyses, OLS regression models are used to examine predictors of psychological distress. Three models are employed. The first examines the association between periods of economic hardship and psychological distress in June, while holding background controls constant. In these analyses, periods of economic hardship are entered as a series of dichotomous predictors, with no exposure as the reference group, which serves to demonstrate the extent to which each level of chronicity is associated with the health outcome. In a second model, baseline economic hardship is controlled to demonstrate the extent to which path dependence due to prior economic hardship explains the association between hardship during the pandemic and psychological distress. In a third model, baseline distress and self-rated health are taken into account to demonstrate the extent to which social selection explains the association between exposure to periods of economic hardship and psychological distress.

In the final stage of analyses, the OLS regression models in the second stage of analyses are repeated, except this time using self-rated health in June as the health outcome. We use an OLS regression model for self-rated health to facilitate clearer comparisons with the results for psychological distress, but results similar to those shown in the final estimation model for self-rated health were established in alternative analyses using ordinal logistic regression models. Because procedures for standardized regression coefficients and a coefficient of determination (R^2) are not commonly established when multiple imputation is employed (van Ginkel, 2020), only metric coefficients are presented in the OLS regression analyses.

4. Results

4.1. Predictors of exposure to economic hardship

Table 2 displays the results of the multinomial logistic regression model in which risk of each number of periods of economic hardship during the pandemic is compared to a category of no exposure during the pandemic. For one period of exposure, Table 2 shows that both baseline economic hardship and psychological distress are significant predictors. Baseline economic hardship is substantially associated with an increased risk of one period of hardship, with a RRR of over 4, while distress is more weakly associated, with a RRR of 1.248. Baseline self-rated health is not, however, significantly associated with relative risk of one period of exposure. For two periods of exposure, both baseline economic hardship and distress are associated with increased risk. Both associations evidence larger RRRs as well, with an RRR of over 10 for baseline economic hardship and an RRR of 1.42 for psychological distress. Baseline health is again not significantly associated with risk of exposure. For exposure to three periods of hardship, which indicates consistent exposure across the months of pandemic observed in this study, baseline economic hardship, distress, and self-rated health were all associated with increased risk of exposure. The RRR for baseline economic hardship is particularly notable at over 30, indicating clear evidence of path dependency in pre-existing hardship and hardship experienced during the pandemic. Independent of this, the RRR for baseline psychological distress is 1.799, and the RRR for self-rated health is 0.717. The RRR for self-rated health can also be understood as a relative increase in the odds of three periods of hardship of (1/.717) 1.395 for every unit decrease in self-rated health. Thus, we observe evidence of economic selection and health selection in exposure to economic burdens during the segment of pandemic under study, with selection due to both health and economic factors particularly potent for consistent exposure to economic hardship during the pandemic. These findings therefore support questioning whether processes of social and

Table 2
Multinomial logistic regression analyses of periods of economic hardship during pandemic.

| | Number of Periods of Exposure (No Hardship is Reference) | | | | | | | | | | | |
| | One Period | | | | Two Periods | | | | Three Periods | | | |
	b	SE	RRR	p	b	SE	RRR	p	b	SE	RRR	p
Focal Predictors												
Prior Economic Hardship	1.504	0.155	4.498	***	2.337	0.198	10.345	***	3.444	0.255	31.301	***
Baseline Psychological Distress	0.221	0.097	1.248	*	0.350	0.113	1.420	**	0.587	0.134	1.799	***
Baseline Self-Rated Health	−0.113	0.080	0.894		−0.180	0.106	0.835		−0.333	0.110	0.717	**
Control Measures												
Age	0.004	0.006	1.004		0.015	0.008	1.016	*	0.029	0.009	1.030	**
Women	−0.179	0.150	0.836		−0.019	0.192	0.982		−0.165	0.210	0.848	
Visible Minority	−0.004	0.204	0.996		0.187	0.235	1.205		0.352	0.270	1.422	
Education[a]												
High School	−0.241	0.248	0.786		0.148	0.336	1.160		0.034	0.364	1.035	
Some University or College/Trade School	−0.070	0.239	0.933		0.087	0.327	1.091		0.197	0.348	1.217	
College/Trade School	−0.396	0.240	0.673		−0.004	0.326	0.996		0.031	0.346	1.031	
Income[b]												
Under $25,000	0.024	0.396	1.025		0.357	0.476	1.429		0.547	0.514	1.729	
$25,000 to Less than $50,000	0.021	0.298	1.021		0.018	0.380	1.019		0.463	0.410	1.588	
$50,000 to Less than $100,000	−0.177	0.221	0.838		−0.099	0.300	0.906		0.242	0.356	1.274	
$100,000 to Less than $150,000	−0.210	0.225	0.810		−0.267	0.317	0.766		−0.058	0.389	0.944	
Occupational Class[c]												
Administrative	−0.080	0.236	0.923		0.091	0.290	1.096		−0.341	0.363	0.711	
Sales	−0.035	0.203	0.965		0.215	0.276	1.239		−0.086	0.306	0.917	
Clerical	−0.058	0.226	0.943		0.595	0.276	1.813	*	0.519	0.292	1.681	
Laborer	−0.234	0.250	0.792		−0.032	0.320	0.968		−0.226	0.346	0.798	
Work Status[d]												
Full-Time Employed	−0.318	0.200	0.728		−0.554	0.238	0.575	*	−0.732	0.272	0.481	**
Part-Time Employed	−0.432	0.262	0.649		−0.632	0.296	0.531	*	−1.085	0.357	0.338	**
Subsequent Unemployment	0.345	0.187	1.413		0.383	0.224	1.467		0.387	0.256	1.472	
No Romantic Partner	0.037	0.168	1.038		−0.060	0.215	0.942		0.298	0.216	1.347	
No Child at Home	−0.084	0.154	0.920		−0.165	0.195	0.848		−0.153	0.228	0.858	
Constant	−1.293	0.664	0.275		−3.260	0.837	0.038	***	−5.049	0.982	0.006	***

$*p < 0.05$. $**p < 0.01$. $***p < 0.001$ (Two-tailed tests).
[a] "University degree" is reference.
[b] "$150,000 and over" is reference.
[c] "Professional" is reference.
[d] Business owner or self-employed is reference.

economic selection may explain the association between exposure to economic hardship and health during the pandemic, and we examine this question in the next set of analyses.

4.2. Associations between exposure to economic hardship and health

Table 4 displays the results of the OLS regression models of self-rated health in June. Model 1 shows that, independent of background controls, exposure to each number of periods of economic hardship was significantly associated with higher levels of psychological distress. Furthermore, mean levels of distress increased commensurately with more chronic exposure to hardship, as the difference in distress was larger with a greater number of periods of hardship.

Model 2 introduces a measure of economic hardship prior to the pandemic as a predictor of psychological distress, which serves to test for economic selection effects. Baseline levels of hardship are significantly associated with higher levels of psychological distress in June. Furthermore, although the coefficients for the indicators of periods of economic hardship remain statistically significant in Model 2, each coefficient is reduced approximately 20% from Model 1, indicating that prior economic hardship explains a substantial amount of the association between periods of economic hardship and psychological distress. Model 2 therefore shows that part of the association between economic hardship during the COVID-19 pandemic and psychological distress can be attributed to the consequences of economic hardship prior to the pandemic for subsequent psychological distress.

Model 3 introduces baseline psychological distress and self-rated health as additional predictors of psychological distress, and both measures of health are significantly associated with psychological distress in June; individuals with greater distress at baseline tended to report higher levels of distress in June, and, independent of this, individuals with better self-rated health at baseline reported lower levels of distress in June. With the introduction of the measures of baseline health, the coefficient for one period of hardship is reduced by about 60% from Model 2 and the association is no longer statistically significant; the coefficients for two and three periods of hardship are approximately halved, although these associations remain statistically significant. Model 3 therefore indicates that social selection plays a substantial role in explaining the association between exposure to economic hardship and psychological distress during the pandemic, although more chronic exposure to economic hardship in terms of two or three out of the three possible periods continues to be associated with elevated levels of distress.

Table 3 displays the results of the OLS regression models of self-rated health in June. Model 1 shows that, independent of background controls, exposure to each number of periods of economic hardship is associated with lower levels of self-rated health. Furthermore, more chronic exposure to hardship is associated with greater disadvantages in self-rated health, as the coefficients are larger for more periods of exposure. Model 2 shows, however, that including baseline hardship as an additional predictor partially explains these associations. Baseline hardship is significantly associated with lower levels of self-rated health in June, and the association between each category of periods of economic hardship and self-rated health is reduced approximately 30% from Model 1. Pre-existing economic hardship therefore explains a notable amount of the association between exposure to periods of economic hardship and self-rated health during the COVID-19 pandemic, but an association between periods of economic hardship and health remains even after economic selection is taken into account.

Model 3 includes baseline psychological distress and self-rated

Table 3

OLS regression analyses of psychological distress.

	Model 1			Model 2			Model 3		
	b	SE	p	b	SE	p	b	SE	p
Focal Predictors									
Periods of Economic Hardship During Pandemic[a]									
One Period	0.214	0.057	***	0.165	0.059	**	0.065	0.044	
Two Periods	0.403	0.064	***	0.320	0.067	***	0.158	0.054	**
Three Periods	0.653	0.080	***	0.537	0.086	***	0.251	0.070	***
Prior Economic Hardship				0.169	0.047	***	0.020	0.039	
Baseline Psychological Distress							0.649	0.021	***
Baseline Self-Rated Health							−0.073	0.018	***
Control Measures									
Age	−0.017	0.002	***	−0.017	0.002	***	−0.005	0.001	
Women	0.122	0.039	**	0.117	0.039	**	0.045	0.032	
Visible Minority	0.037	0.055		0.037	0.055		−0.005	0.045	
Education[b]									
High School	−0.081	0.072		−0.078	0.072		0.044	0.057	
Some University or College/Trade School	−0.080	0.071		−0.076	0.071		0.054	0.056	
College/Trade School	−0.057	0.069		−0.048	0.069		0.067	0.054	
Income[c]									
Under $25,000	0.182	0.106		0.150	0.105		0.084	0.085	
$25,000 to Less than $50,000	0.205	0.076	**	0.178	0.076	*	0.058	0.061	
$50,000 to Less than $100,000	0.022	0.058		0.002	0.058		0.010	0.048	
$100,000 to Less than $150,000	0.002	0.056		−0.003	0.056		−0.031	0.044	
Occupational Class[d]									
Administrative	0.039	0.058		0.038	0.058		−0.037	0.046	
Sales	0.058	0.055		0.056	0.055		−0.002	0.045	
Clerical	−0.096	0.059		−0.094	0.059		−0.067	0.047	
Laborer	0.068	0.066		0.063	0.066		0.001	0.050	
Work Status[e]									
Full-Time Employed	0.109	0.051	*	0.102	0.051	*	0.066	0.039	
Part-Time Employed	0.077	0.067		0.077	0.067		0.003	0.052	
Subsequent Unemployment	0.106	0.050	*	0.105	0.049		0.028	0.038	
No Romantic Partner	0.008	0.045		0.009	0.045		−0.003	0.036	
No Child at Home	0.020	0.041		0.033	0.041		−0.042	0.033	
Constant	2.773	0.122	***	2.756	0.122	***	1.159	0.146	***

*p < 0.05. **p < 0.01. ***p < 0.001 (Two-tailed tests).

[a] No hardship is reference.

[b] "University degree" is reference.

[c] "$150,000 and over" is reference.

[d] "Professional" is reference.

[e] Business owner or self-employed is reference.

health as predictors of self-rated health. Both measures of baseline health are significantly associated with self-rated health in June. Respondents with better self-rated health at baseline reported better self-rated health in June; independent of this, respondents with greater baseline psychological distress reported worse self-rated health in June. Furthermore, when baseline health statuses are controlled, the coefficients for periods of economic hardship and self-rated health are largely negated, with the result that none retain statistical significance. As opposed to psychological distress, which retained some plausibility for social causation, social selection appears to entirely explain the remaining association between periods of economic hardship and self-rated health during the segment of the pandemic under study.

One additional finding of note from the analyses of both psychological distress and self-rated health is that the association between baseline economic hardship and the health outcomes is reduced to non-significance when baselines health statuses are taken into account. This pattern of results may suggest that the consequences of baseline economic hardship for health during the COVID-19 pandemic are spurious and due to health-selection factors. This possibility will be addressed further in the discussion section.

5. Discussion

The economic downturn associated with the COVID-19 pandemic was an abrupt and substantial macro-economic contraction, leading to a population shift in risk of exposure to economic hardship. Our findings based on a national longitudinal study of Canadians across the first

months of the pandemic most clearly supported a social causation perspective for psychological distress because the association between exposure to hardship during the pandemic and distress remained, even after controls for prior hardship and baseline health. Conversely, a social selection perspective was most strongly supported for self-rated health because the association between hardship during the pandemic and self-rated health was largely negated with controls for baseline health. Evidence was least definitive for an economic selection perspective: Although analyses did indicate that prior economic hardship was a considerable risk factor for chronic exposure to hardship during the pandemic, prior bouts of hardship were not associated with different health outcomes once baseline health was taken into account.

The stronger evidence for the mental health effects of economic hardship during the pandemic likely reflects the immediate psychological distress that can result from a failure to afford basic needs. An individual's overall health may take longer periods of chronicity to degrade, but the "grinding life of uncertainty and fear" that composes economic hardship is likely to much more quickly lead to feelings of anxiety and unhappiness (Pearlin, 1999, p. 399). It is quite possible, then, that a study over a more extensive period of time may have more clearly revealed consequences for self-rated health. Moreover, self-rated health is a relatively holistic measure (Dumas et al., 2020), and it is possible that finer or more sensitive measures of physical dysfunction, such as stress hormones or other biological markers, may have shown clearer consequences for physical health during the time period under study as well. More broadly, though, the results of this research suggest that economic hardship experienced during the pandemic likely had

Table 4
OLS regression analyses of self-rated health.

	Model 1			Model 2			Model 3		
	b	SE	p	b	SE	p	b	SE	p
Focal Predictors									
Periods of Economic Hardship During Pandemic[a]									
One Period	−0.195	0.061	**	−0.139	0.062	*	−0.051	0.047	
Two Periods	−0.342	0.080	***	−0.245	0.085	**	−0.100	0.069	
Three Periods	−0.465	0.089	***	−0.328	0.096	**	−0.053	0.076	
Prior Economic Hardship				−0.198	0.055	***	−0.060	0.046	
Baseline Psychological Distress							−0.101	0.024	***
Baseline Self-Rated Health							0.638	0.021	***
Control Measures									
Age	−0.006	0.002	**	−0.006	0.002	**	−0.002	0.001	
Women	−0.006	0.044		0.000	0.044		0.045	0.035	
Visible Minority	0.034	0.060		0.034	0.060		0.072	0.047	
Education[b]									
High School	0.073	0.082		0.069	0.082		−0.057	0.068	
Some University or College/Trade School	0.042	0.081		0.038	0.081		−0.071	0.066	
College/Trade School	0.208	0.081	*	0.197	0.080	*	−0.005	0.066	
Income[c]									
Under $25,000	−0.327	0.119	**	−0.290	0.118	*	−0.114	0.100	
$25,000 to Less than $50,000	−0.194	0.081	*	−0.162	0.081	*	0.014	0.066	
$50,000 to Less than $100,000	−0.103	0.063		−0.079	0.063		0.003	0.052	
$100,000 to Less than $150,000	−0.090	0.064		−0.084	0.063		−0.007	0.050	
Occupational Class[d]									
Administrative	−0.122	0.069		−0.121	0.069		−0.020	0.055	
Sales	0.006	0.064		0.009	0.064		0.016	0.052	
Clerical	−0.021	0.068		−0.023	0.068		−0.062	0.055	
Laborer	0.033	0.079		0.039	0.078		0.044	0.060	
Work Status[e]									
Full-Time Employed	−0.003	0.064		0.005	0.064		0.021	0.051	
Part-Time Employed	−0.038	0.079		−0.038	0.079		0.042	0.064	
Subsequent Unemployment	−0.046	0.059		−0.045	0.058		−0.026	0.045	
No Romantic Partner	−0.070	0.051		−0.072	0.051		−0.050	0.041	
No Child at Home	−0.068	0.045		−0.084	0.045		−0.039	0.036	
Constant	3.965	0.144	***	3.986	0.144	***	1.588	0.171	***

*p < 0.05. **p < 0.01. ***p < 0.001 (Two-tailed tests).

[a] No hardship is reference.
[b] "University degree" is reference.
[c] "$150,000 and over" is reference.
[d] "Professional" is reference.
[e] Business owner or self-employed is reference.

causal consequences for population mental health. The COVID-19 pandemic therefore not only had ramifications for population health due to the spread of the disease. The economic strife created by social distancing measures designed to combat the pandemic also appears to have led to an increase in distress for many individuals.

The evidence supporting a social selection effect for self-rated health also has additional implications by demonstrating that exposure to economic hardship during the early months of the pandemic was not random. Even when taking prior economic hardship into account, higher levels of psychological distress at the start of the pandemic were associated with increased risk of exposure to all levels of chronicity of economic hardship during the pandemic, whereas self-rated health was associated with consistent exposure to hardship across the months of the pandemic under study in the current research. Psychological distress likely acted as a consistent risk factor for economic hardship because individuals who were more distressed at the beginning of the pandemic were more likely to experience difficulty coping with the macro-economic downturn and been more liable for curtailments in work. Moreover, that impaired self-rated health was associated with consistent exposure to hardship during the recession independent of psychological distress underscores that individuals experiencing compromised physical health were particularly vulnerable to chronic immersion in economic deprivation during the pandemic. The results of this study therefore highlight the deep-seated economic vulnerability of individuals experiencing a combination of poor mental and physical health during times of economic crisis. Furthermore, regardless of the specific health effects of economic hardship, an inability to provide for

one's self is a degrading and demoralizing experience that can substantially debase quality of life. It was people experiencing physical and mental health difficulties at the start of the pandemic who were far more likely to be consistently exposed to these degradations, irrespective of pre-pandemic levels of hardship.

The chronicity of hardship during the pandemic was also tied to pre-pandemic levels of hardship. There was a clear and decisive association between reports of hardship prior to the pandemic and consistent exposure to periods of hardship during the pandemic. This pattern coheres with previous evidence showing that economic difficulties experienced during economic downturns are more likely to be experienced by individuals already mired in financial problems (Danziger et al., 2012). More importantly, this pattern again underscores that economic hardship during the COVID-19 pandemic was not random—it was those individuals already troubled by economic problems who continued to experience economic difficulties. The economic downturn associated with the COVID-19 pandemic therefore appears to in part have acted as a macro-level stratifying agent, reinforcing pre-pandemic economic inequalities.

Taking pre-pandemic hardship into account also appeared to partially explain the associations between accumulation of periods of economic hardship during the pandemic and subsequent levels of health, which would seem to provide evidence to support the economic selection perspective. However, taking health statuses at the start of the pandemic into account reduced associations between pre-pandemic hardship and the health outcomes to non-significance, which raises the question of whether selection due to health statuses at the beginning

of the pandemic are responsible for associations between pre-pandemic hardship and mental or physical health during the pandemic. Although the role of health selection cannot be ruled out, it is more likely that health at the beginning of the pandemic acted as a mediator for the effects of established levels of hardship on subsequent health. A mediation effect is more likely because initial questions with regards to hardship scanned the previous several months, whereas the baseline levels of health asked about recent or current health. The results of this study therefore present partial support for an economic selection perspective, especially in the sense that this research shows how economic hardship during the pandemic appeared to be part of a chain of dependencies that began prior to the pandemic. An economic selection perspective has not generally been considered in studies of economic hardship and health, though, and additional attention to this possibility over a longer period of time may provide clearer evidence for the health consequences of pre-pandemic hardship during the pandemic as well.

In addition to the limitations to this study that have already been mentioned, this study focused on individuals who were employed at the beginning of the pandemic. Concentrating on a working population centered these analyses on economic hardship among individuals with at least a nominal source of income at the start of the pandemic but left unaddressed the degree to which individuals who may have been without a clear source of income prior to the outbreak faired during the pandemic. It is possible that, among the subpopulation of individuals who were not employed at the beginning of the pandemic, economic hardship during the pandemic was even more pervasive. As a result, the forces of social causation may have been even clearer among these individuals, especially for self-rated health. Therefore, attention to how people who were most economically vulnerable faired in terms of physical and mental health during the recession is therefore also of critical importance.

In conclusion, this study suggests that economic hardship experienced during the COVID-19 pandemic degraded mental health, even when prior mental health and economic hardship was taken into account. Moreover, both psychological distress and worse self-rated health served as substantial risk factors for exposure to economic hardship during the pandemic. The hardships and consequent mental health costs of the pandemic were not random. Individuals most economically, mentally, and physically vulnerable were most likely to be exposed to these hardships and their psychological costs. Through these processes, the economic contraction that followed the pandemic served to reinforce the stratifying arrangements of society and afflict individuals least prepared to deal with new experiences of economic privation.

Credit author statement

Alex Bierman: Conceptualization, Methodology, Formal analysis, Writing – original draft. Laura Upenieks: Writing – reviewing and editing. Paul Glavin: Conceptualization, Writing – original draft, Writing – reviewing and editing. Scott Schieman: Funding aquisition; Led survey design and implementation; Writing - reviewing and editing.

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