Impact of the COVID-19 Pandemic on Canadian Social Connections: A Thematic Analysis

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Abstract

Background: On March 11, 2020, the World Health Organization declared COVID-19 a worldwide pandemic. Responses to the pandemic response disrupted Canadian social connections in complex ways; because social connections are determinants of health and well-being, their disruption could adversely affect health and well-being. Moreover, understanding how pandemics and public health responses affect social connections could inform pandemic recovery strategy and public health approaches designed for future pandemics. The purpose of this study is to understand experiences of pandemic impact on social connections over the pandemic.

Methods: A sample of 343 Canadian adults was recruited through Athabasca University and social media. Participants were predominantly White (81%) and female (88%). After the pandemic onset, participants responded to open-ended questions about the impact of the pandemic on and any changes to social connections at three time points (baseline, and three- and 6 months from study entry). Responses were categorized into epochs by date (April-June 2020 [Spring]; July-August 2020 [Summer]; September 2020-January 2021 [Fall/Winter]). Qualitative thematic analysis was used to code themes for each epoch.
**Results:** Negative impact of the pandemic (37–45%), loss of social connections (32–36%), and alternative means of connection (26–32%) were prominent themes across the epochs. Restrictions to face-to-face connections were largest in spring (9%) and lowest in the Summer (4%). Conversely, participants increasingly reported limited contact or communication into the Fall and Winter (6–12%) as pandemic restrictions in Canada were reinstated.

**Conclusions:** The COVID-19 pandemic threatens social connections, with negative impacts that fluctuated with COVID-19 case rates and subsequent pandemic restrictions. These findings could be used to identify targets for social supports during the pandemic recovery, and to adjust public health strategies for future pandemics that minimize impact on social connections.

**Keywords**
COVID-19, social connection, public health, thematic analysis, pandemic impact, health psychology

On March 11, 2020, the World Health Organization (WHO) declared a global COVID-19 pandemic, which prompted the implementation of pandemic response protocols including social distancing policies intended to curb the spread of infection (Cucinotta & Vaneli, 2020; World Health Organization, n. d.; World Health Organization, 2020). As a result, individuals face disruptions to social connections or access to friends, family members and co-workers. Although these policies effectively slowed the rate of infection, disruptions to social connections could have adverse consequences on health and well-being, such as increased experiences of depressive and anxiety symptoms, adverse mental health effects, and dysfunctional immune reactivity (Kawachi & Berkman, 2001; Prime et al., 2020; Santini et al., 2020). Therefore, consideration of both physiological infection threat and possible unintended consequences of public health pandemic response protocols must be balanced to implement the best public health care response and practices.

Social connections are important predictors of well-being and health (Cohen & Wills, 1985), and are considered a basic human need and a core human motivation for emotional and physical security (Pietromonaco et al., 2013). Social connections are broadly defined as the existence and quality of relationships with people in one’s social network, and stress theory is one approach used to conceptualize social connections in the context of public health and health and well-being research. Stress theory posits that factors that cause stress (such as a global pandemic) adversely affect health and well-being through diverse behavioural, psychological and physiological pathways; factors that promote coping in the context of stress act as buffers that protect health and well-being (Schneiderman et al., 2005). As such, stress theory considers social connection factors such as access to social connections (e.g., social integration, social isolation, loneliness), access to stress-buffering resources through social connections (e.g., social support), and presence of stressors in close relationships (e.g., social conflict) (Cohen,
Lack of social connections, both in general and in a pandemic context, has broad implications, impacting individual neurological functioning and negatively affecting mental health and well-being (Cohen, 2004; Hagerty & Williams, 2020). This impact may be because lack of access to social connections changes access to resources and influences health behaviours (Levula et al., 2016; Smith & Victor, 2019). Social connections include social support, access to resources, influencing health and risk behaviours, influencing coping behaviours, and positive and negative experiences in close relationships, all of which facilitate effective immune functioning and mental well-being (Cohen 2004; Cohen & Wills, 1985; Rook, 2015). Being socially integrated or having access to social support is associated with better mental health overall (Ibarra-Rovillard & Kuiper, 2011) and better coping in the context of chronic stressors or recovery from mental health crises (Garverich et al., 2020). Similarly, loneliness and social conflict are associated with poor mental health overall (Santini et al., 2020) and could compromise an individual’s ability to cope with additional chronic stress (Birmingham & Holt-Lunstad, 2018; Cohen & Wills, 1985). The COVID-19 pandemic is a public health crisis, therefore a health approach based on stress theory has been the predominant approach to studying pandemic-related social connections. Given the critical role that social connections play in mental health, and the societal-level stressors created by the pandemic and subsequent public health responses, it is possible that pandemic-related disruptions to social connections could have severe implications for an individual’s ability to cope with the pandemic (Prime et al., 2020). As such, the disruptions to social connections may potentially adversely affect health and well-being through a lack of access to social resources, emotional support, and feelings of connection and social integration.

Consequently, there is interest in understanding how the pandemic and public health responses affect social connections, in order to understand the effect of those disruptions on stress, coping, health and well-being, and how to tailor public health responses in a way that conserves access to social connections as a coping resource. To date, many quantitative analyses have examined the impact of previous pandemics or the COVID-19 pandemic on aspects of social connections and implications for health and well-being outcomes, in which studies reported dramatic increases in mental health concerns such as the experience of depressive and anxiety symptoms (Benke et al., 2020; Brooks et al., 2020; Bu et al., 2020; Grey et al., 2020; Landmann & Rohmann 2022; Lowe et al., 2022; Luchetti, et al., 2020; Szkody et al., 2021; Tull et al., 2020). Most of these studies, however, do not describe how pandemic responses affected social connections specifically or treat social connections as an outcome (Benke et al., 2020; Daly et al., 2021; Hawryluck et al., 2004; Ingram et al., 2021; Labrague & De los Santos, 2020; Li et al., 2020; Mergel & Schützwohl, 2021; Riehm et al., 2021; Zheng et al., 2021). The two exceptions found that more time in isolation was associated with more perceived social support (Szkody et al., 2021), and higher perceived impact of the pandemic was associated with higher perceived social support (Tull et al., 2020). One rapid review of 24 studies focused specifically on the effect of quarantine on aspects of social connections. The review, which included studies from across previous pandemics, found that quarantine restrictions caused reduced contact with others, resulting in...
boredom, frustration, and isolation. Moreover, quarantine restrictions affected daily routines that included opportunities to connect with others (i.e., grocery shopping) and not having alternative ways to connect (i.e., telephone or internet) which exacerbated frustration and social connection impacts (Brooks et al., 2020). However, it is not clear how quarantine-related impacts generalize to broader public measures, such as social distancing, school closures and cancelling mass gatherings.

Although the existing quantitative studies provide insight into how aspects of pandemic public health responses could affect social connections, a weakness of this approach is that, by definition, researchers need to make a priori assumptions about how pandemic and public health responses will affect social connections when selecting what constructs to measure. As a result, it is possible that important consequences of the pandemic on social connections are not being captured. Qualitative studies, that allow participants to describe the pandemic’s impact on social connections in their own words, would address this gap. Existing qualitative studies indicate that during the COVID-19 pandemic, significant disruptions to social connections occurred (Schneiders et al., 2022), and individuals reported experiencing loneliness or isolation (McKenna-Plumley et al., 2021; Vaterlaus et al., 2021) with adverse consequences on wellbeing for autistic populations (Pellicano et al., 2022) and both positive and negative impacts of the shift to reliance on digital social connections (Mikal et al., 2021). However, to our knowledge, no studies have yet conducted a qualitative thematic analysis of longitudinal Canadian participant-reported impacts or lived experiences of the pandemic on social connections and how these changed over time. As such, the purpose of this study is to examine participant-reported experiences of the pandemic on their social connections from a grounded theory perspective (Tie et al., 2019), by using thematic analysis to identify prominent themes reported by participants (Braun & Clarke, 2006; Nowell et al., 2017), by conducting a qualitative analysis of open-ended responses to questions on how the pandemic affected social connections over 10 months from April 2020 through to January 2021.

**Methods**

**Participants**

Canadian adults were recruited through an online university (Athabasca University) and social media (i.e., Twitter) using online ads and snowball sampling. Inclusion criteria were being at least 18 years of age, English-speaking, and a Canadian resident. Recruitment occurred from April 2020 to July 2020 with study follow-ups every 2 weeks through to January 2021. A total of 396 participants consented to participate, of which 343 went on to complete baseline questionnaires. Participants provided informed consent prior to participating. Participants were given a $20 Tim Horton’s gift card for completing at least one full survey via email. The Athabasca University Research Ethics Board approved all procedures.
Sample characteristics are presented in Table 1. Participants were recruited from every province and territory within Canada, with the majority residing in Alberta (61%) and Ontario (20%). Participants were primarily White (81%) and female (88%) and approximately 88% identified as cisgender women, 11% as cisgender men, and

| Variable                                           | Mean +/- SD or % (N)                                      |
|----------------------------------------------------|---------------------------------------------------------|
| **Table 1. Sample Characteristics (N = 343).**     |                                                         |
| Age (year)                                         | 36.8 (mean) +/- 11.7 (SD)                               |
|                                                   | 35–44 (median) (21–70)                                  |
| Sex                                                |                                                         |
| Female                                             | 88% (303)                                               |
| Male                                               | 12% (37)                                                |
| Gender                                             |                                                         |
| Man                                                | 10.9% (37)                                              |
| Woman                                              | 87.6% (263)                                             |
| Gender variant/non-conforming                       | 1.2% (4)                                                |
| Prefer not to answer                               | 0.3% (1)                                                |
| Race/ethnicity                                     |                                                         |
| White                                              | 81.4% (276)                                             |
| Asian                                              | 6.2% (21)                                               |
| Black                                              | 2.1% (7)                                                |
| Filipino                                           | 0.6% (2)                                                |
| Latin American                                     | 1.5% (5)                                                |
| Aboriginal, Indigenous, or First Nations           | 3.5% (12)                                               |
| Multiracial                                        | 4.7% (16)                                               |
| Other response                                     | 0.9% (3)                                                |
| Per capita household income ($1000/person)         | 28 +/- 19.4 (2.86–87.5)                                 |
| Change in household income                         |                                                         |
| Loss                                               | 38% (130)                                               |
| No change                                          | 55% (188)                                               |
| Gain                                               | 6% (19)                                                 |
| Living alone                                       | 10% (35)                                                |
| Family/Friend COVID-19 diagnosis                   | 10% (33)                                                |
| Self-isolating                                     | 26% (89)                                                |
| Pre-COVID-19 physical activity (days)              | 3.23 +/- 1.98 (0.00–6.00)                               |
| Pandemic-related physical activity change (days)   | -0.57 +/- 2.35 (−6.00–6.00)                             |
| Mental health condition                            | 7% (25)                                                 |
| COVID-19 risk factor                               | 40% (138)                                               |
| Children in the household                          | 43% (147)                                               |
| Student status                                     | 19% (65)                                                |
| Region                                             |                                                         |
| Alberta                                            | 61% (209)                                               |

(continued)
1% as gender non-conforming. Median pre-pandemic household income was $28,000CAD, with 38% reporting a pandemic-related loss in income. 19% of the sample reported they were a student, and the mean age was 36.8 years +/- 11.7, and 43% reported having children in the home. At study entry, 97% of the participants reported following social distancing guidelines or self-isolating.

**Procedure**

Participants completed online surveys at study entry and every 2 weeks for 6 months (13 assessments total). For more detailed information on study design and methods, see Lowe et al. (2022). Open-ended questions querying social connections were given at three time points; at study entry, and again at three and 6 months. Given that study enrollment occurred between April and July 2020, with final assessments occurring up to January 2021, participant responses were aggregated and thematically analyzed based on the date of completion: Spring (April to June 2020; n = 341 participants and 300 responses for a response rate of 88%), Summer (July to August 2020, n = 91 and 66 responses for a response rate of 72%) and Fall/Winter (September 2020 to January 2021, n = 200 and 144 responses for a response rate of 73%). Epoch dates aligned with mental health trajectories observed in a previous study (Lowe et al., 2022) and were chosen to broadly map onto COVID-19 infection waves, during which the reported new cases of COVID-19 were elevated in the spring, saw a decrease in the summer, and a resurgence into the fall and winter (Dong et al., 2020) (Table 2). Consequently, public health responses and restrictions across Canada were implemented, rescinded, and reimplemented, as per recommendations set by Health Canada (Emergency Management and Civil Protection Act, 2020a, 2020b; Hinshaw, 2020a, 2020b, 2020c; Reopening Ontario (A Flexible Response to COVID-19) Act, 2020; Public Health Agency of Canada, 2021; Shahab, 2020a, 2020b, 2020c, 2020d; Strang, 2021).

**Table 1.** (continued)

| Variable                                      | Mean ± SD or % (N) |
|-----------------------------------------------|--------------------|
| Ontario                                       | 20% (68)           |
| Other                                         | 19% (66)           |
| Pre-pandemic occupational status (economically active) | 72% (248)        |
| Change in occupational status                 |                    |
| Loss                                          | 33% (114)          |
| No change                                     | 58% (199)          |
| Gain                                          | 7% (24)            |

1% as gender non-conforming. Median pre-pandemic household income was $28,000CAD, with 38% reporting a pandemic-related loss in income. 19% of the sample reported they were a student, and the mean age was 36.8 years +/- 11.7, and 43% reported having children in the home. At study entry, 97% of the participants reported following social distancing guidelines or self-isolating.
Participants who reported self-isolating or social distancing were asked open-ended questions on how these behaviours affected social connections. Specifically, participants were asked how self-isolating or social distancing “...impacted [their] connection to or relationships with [their] friends and family” and “what changes [did they make] to how [they] connect with friends and family?” There was no minimum or maximum character limit, and of those that responded, responses ranged from 1 to 15 sentences and an average length of 3.3 sentences. Response length varied between epochs ($F_{(2,507)} = 5.48, p = .004, \eta^2 = .021$), with statistically longer responses noted in the Spring with an average 3.35 statements relative to each 2.79 in the Summer and 2.85 in the Fall/Winter. Written responses to both questions were combined for thematic analysis coding.

### Thematic analysis

Utilizing an inductive approach, thematic analysis was applied to open-ended questions as per established practices (Braun & Clarke, 2006). An initial coding tree for the open-ended responses was generated by four coders based on a random selection of 70 responses from the Spring (April-June 2020) epoch. Coders created independent coding trees, a categorical hierarchy of interpreted themes from the sample responses, then met to discuss and integrate themes into a single tree. Two of the four coders went on to independently code the rest of the responses across the epochs using NVivo 12 coding.
software (QSR International Pty Ltd, 2018). Proposed changes or additions to the coding tree and responses that did not fit into the coding tree were separately recorded. Utilizing peer debriefing (Janesick, 2015), the two coders then met to compare coding and consult with the original team of four to discuss any proposed modifications to the coding tree and coding of ambiguous responses. Coders then repeated the coding analysis after confirming the revised coding tree and met following coding completion to discuss conflicts and reach a consensus.

A qualitative approach using frequency counts presented in the data was utilized to analyze the identified themes. To assess the overall prevalence of key themes and trends over time, proportions of each theme were calculated for each epoch by dividing the number of codes per theme by the total number of unique codes assigned for a given epoch. The final proportions were calculated by averaging the calculated proportions for each theme from each of the two final coders.

**Results**

A total of 31 themes and sub-themes were identified (Table 3), with 1310 unique codes assigned across 413 total responses and 343 participants in all three epochs. Although participants were asked about impacts or changes to how they connected with friends and family, respondents uniquely interpreted this question and responded broadly, demonstrating the wide range of impacts that social connections have on individuals. Therefore, responses were initially coded into one of two major categories: ‘no impact on social connections’ or ‘impact on social connections.’ All responses that did not fit into either category were coded as ‘other responses’ (not analyzed here). The proportion of themes reported per epoch are shown in Figure 1(a).

Participants overwhelmingly reported that the pandemic impacted or changed their social connections (82–91% of codes, Table 3). Also of note, a proportion of responses indicated no impact of the pandemic on social connections, even though all participants that were presented with these questions reported social isolating or distancing. No impact on social connections was reported more during the Summer compared to the Spring and Fall/Winter (Figure 1(a)). Each of the major and sub-themes and trends over epochs is described in more detail below.

**Impacts on social connections**

Participants profusely reported an impact of the COVID-19 pandemic on their social connections across the follow-up period (Table 3). This theme was slightly more predominant in the Spring (91% of responses), decreased slightly for the Summer (82%), and rebounded in Fall/Winter (89%) (Figure 1(a)). With respect to kind of impact, across epochs the most predominant theme was one of negative impact to social connections (>37%). Participants also discussed other impacts or adaptations that were necessary due to the pandemic, including finding other ways to connect with friends and family (>26%), the impact of public health guidelines on social connections (>7%), and – for a minority of responses – even a positive impact of the pandemic on social connections (>3%).
Negative impact on social connections due to the pandemic was the strongest theme across each of the three time points, spring, Summer, and Fall/Winter (Figure 1(b)). Negative impact was reported slightly more in the Spring (45%) compared to the Summer (37%) and Fall/Winter (38%). The superordinate category of negative impact encompassed loss of social connections which were weakened or adversely affected, and the consequences of that impact, including negative emotional consequences to the

Table 3. Themes and Sub-Themes for Impacts or Changes to the ways in which individuals connect.

| Variable                                         | Proportion per epoch (%) |
|--------------------------------------------------|---------------------------|
|                                                  | Spring | Summer | Fall/Winter |
| No impact on social connections                  | 7      | 13     | 9           |
| Impact on social connections                     | 91     | 82     | 89          |
| - Negative impact on social connections          |        |        |             |
| o Loss of social connection                      | 45     | 37     | 38          |
| o Decreased contact or communication             | 36     | 33     | 32          |
| o Restrictions to face-to-face contact           | 9      | 4      | 7           |
| o Loss of physical contact (i.e., hugs)          | 4      | 8      | 3           |
| o Loss of group leisure activities               | 5      | 7      | 4           |
| o Loss of individual leisure activities          | 5      | 3      | 1           |
| o Loss of travel                                 | 1      | 3      | 1           |
| o Weakened relationships                         | 4      | 3      | 3           |
| o Negative interactions (i.e., conflict)         | 2      | 3      | 3           |
| o Negative emotional consequences                | 5      | 3      | 4           |
| o Lifestyle disruptions                          | 2      | 0      | 1           |
| o Worry about or consequences for others         | 2      | 0      | 1           |
| - Alternative ways to connect                    | 32     | 26     | 28          |
| o Communication technology                       | 28     | 21     | 23          |
| o Outdoor gatherings                              | 2      | 5      | 3           |
| o Pro-social activities                          | 1      | 0      | 0           |
| o Window or porch visits                         | 1      | 0      | 0           |
| - Following public health guidelines             | 7      | 15     | 14          |
| o Mask use                                       | 2      | 6      | 3           |
| o Social distancing                              | 2      | 4      | 3           |
| o Self-isolation or quarantine                    | 2      | 1      | 3           |
| o Close cohort                                   | 1      | 2      | 2           |
| - Positive impact                                | 4      | 3      | 4           |
| o Strengthened relationships                      | 2      | 1      | 1           |
| o Increased communication or contact             | 1      | 0      | 1           |
| o Benefits of loss of social connection          | 0      | 1      | 1           |
| Other                                            | 2      | 5      | 2           |

**Negative impact on social connections**

Negative impact on social connections due to the pandemic was the strongest theme across each of the three time points, spring, Summer, and Fall/Winter (Figure 1(b)). Negative impact was reported slightly more in the Spring (45%) compared to the Summer (37%) and Fall/Winter (38%). The superordinate category of negative impact encompassed loss of social connections which were weakened or adversely affected, and the consequences of that impact, including negative emotional consequences to the
Figure 1. (a) Impacts on social connection. Participants reported the impact on social connections if they reported practicing social distancing or isolating. Participants were categorized into either their social connections were impacted, or they were not, or other which captured neither an impact nor no impact. (b) Reported impacts on social connections. Participants who reported an impact on social connections reported either a negative impact on social connections, using alternative ways to connect, following public health guidelines, or a positive impact on their social connections. (c) Negative impacts on social connections. Participants reported several types of negative impacts on social connections, predominantly a loss of social connections. Other negative impacts included emotional consequences, disruptions to lifestyle, and consequences to others. (d) Loss of social connections. Participants reported loss of social connections as a result of...
the pandemic in several different ways. Primarily, decreased contact or communication, restricted access to face-to-face interactions, a loss of group and/or individual activities, loss of physical contact, weakened relationships, and negative interactions. (e) Reported alternative ways to connect. Participants reported several means of maintaining social connection through alternative means such as the use of communication technology, outdoor gatherings, prosocial activities (i.e., delivering groceries), and participating in window or porch visits. (f) Positive impacts on social connections. Participants also reported positive impacts on social connections as a result of the pandemic response. Reported positive impacts include strengthened relationships, increased communication or contact, and benefits of the loss of social connection. (g) Public health guidelines and social connections. Following public-health guidelines and social connections. Participants spontaneously reported public health guidelines in relation to their impact on social connections including mask use, social distancing, establishing a close cohort, self-isolation, and to avoid transmission or other reasons.

participant, disruptions to lifestyle, and worry about consequences of the pandemic for others (Figure 1(c)).

Loss of social connections was the most commonly reported negative impact on social connections, accounting for >32% of codes across the follow-up period (Table 3). Participants reported several different ways that social connections were lost (decreased contact or communication, restrictions to face-to-face contact, and loss of leisure activities [group and individual]). Additionally, consequences of that loss of contact (i.e., loss of physical contact, weakened relationships, and negative interactions) were also reported among participants (Figure 1(d)). Participants particularly noted that the pandemic resulted in decreased contact or communication with friends and family members. Decreased contact was similarly prevalent in the Spring (7%) and Summer (6%) but increased during the Fall/Winter (12%). For example, responses such as the following from the Fall/Winter were frequent “less contact. When we meet it’s for more important occasions” (Participant 224, aged 25–34 female from Ontario). In addition to decreased contact, the inability to see friends and family face-to-face specifically was particularly distressing. This was the principal ‘loss of social connection’ sub-theme reported in the Spring (9%):

“I only really see people if I happen to bump into them when doing the needful (e.g. picking up groceries, running errands, walking the dog). I feel less connected than if I can socialize in person with people at will. Texting or emailing doesn’t take the edge off, only seeing someone and/or hearing their voice does.” (Participant 16, aged 45–54 female from Alberta; Spring)

Restrictions to face-to-face contact was mentioned less during the Summer (4%) but rebounded in the Fall/Winter (7%), “I see no one important to me in person now” (Participant 348, aged 25–34 female from British Columbia).

Participants also commented on the ways through which they had lost social connections due to the pandemic. Loss of group leisure activities, including lack of access to exercise and physical activities, was noted: “I miss meeting up with friends, walking and exercising with friends” (Participant 5, aged 55–64, female from Alberta; Spring); “We no
longer meet for weekly restaurant dates” (Participant 116, aged 35–44 female from Saskatchewan; Summer); “All of my regular/scheduled events with other people have either stopped or gone online.” (Participant 274, aged 55–64 female from Alberta; Fall/Winter). Loss of individual leisure activities was also noted, particularly shopping and loss of travel to visit family: “I had to cancel a flight to visit my family on the other side of the country” (Participant 141, aged 25–34 female from Alberta; Spring); “annual flights and regular drives to see siblings and friends are cancelled” (Participant 49, aged 65–74 female from Alberta; Summer); “Cannot visit with family in another province” (Participant 361, aged 25–34 female from Alberta; Fall/Winter).

In addition to how the pandemic resulted in the loss of social connection, participants also described the consequences of that loss of connection. Loss of physical contact, such as hugs, emerged as a key theme: “I miss my family and friends very much especially hugging” (Participant 137, aged 55–64 female from Alberta; Spring); “We don’t see each other as much and when we do, we aren’t able to hug or feel that closeness of connection” (Participant 43, aged 45–54 female from Alberta; Summer); and “I feel very starved for physical connection – hugs, etc.” (Participant 335, aged 25–34 female from Alberta; Fall/Winter). Interestingly, loss of physical contact increased slightly from the spring (4%) into the Summer (8%) – despite the introduction of masks and easing of some public health restrictions - before decreasing again into the Fall/Winter (3%).

Another reported consequence of loss of social connections was a perceived weakening of relationships, which remained an ongoing concern across epochs, 3–4%; “I miss seeing my friends. I think some of my friendships won’t last through this” (Participant 86, aged 35–44 male from the Yukon; Spring), “Some stress has caused a rift between some family members” (Participant 43, aged 45–54 female from Alberta; Summer), “it’s strained my relationship with my boyfriend’s family a little because they don’t take it as seriously” (Participant 321, aged 18–24 female from Alberta; Fall/Winter). Some participants noted that loss of contact resulted in more negative, or conflictual, interactions when they were in contact with family and friends. Annoyance due to differing perspectives on public health guidelines and the necessity of adhering to those guidelines was noted, “Myself and the family I live with have started to get very easily irritated with each other and try and find any excuse to spend time away from each other” (Participant 129, aged 18–24 female from Saskatchewan; Spring), “It is difficult as some family members are not taking the risks of Covid as seriously as we are and are offended when we don’t want to attend family gatherings/meals” (Participant 238, aged 35–44 female from Alberta; Summer), and “… causes friction with differing views” (Participant 185, aged 25–34 female from Ontario; Fall/Winter).

In addition to loss of social connections, another negative impact of the pandemic on social connections was reported negative emotional consequences to the participant. Distress and loneliness as a result of social connection loss were frequently reported, “I feel very isolated and alone, almost disconnected from the rest of the world” (Participant, 153, aged 18–24 female from Alberta; Spring), “Loss of a number of social activities and friendships, lonely and sad at times” (Participant 52, aged 55–64 female from Alberta; Summer), and “…not being able to connect definitely makes me sad” (Participant 11, aged 65–74 female from Ontario; Fall/Winter).
Lastly, although reported less by participants (<2% across epochs), two other consequences of the negative impact of the pandemic on social connections were *lifestyle disruptions* (particularly having to work from home or inability to do work or volunteering activities) and *worry about consequences on others*: “*Missing social connections while working from home (work friends)*” (Participant 36, aged 25–34 female from Alberta; Fall/Winter), and “*Most of my in person contact with friends, acquaintances, and people in general was through work and volunteer, so I have almost no contact now*” (Participant, 73, aged 35–44 female from Alberta; Spring).

**Alternative ways to connect**

Consistent with widespread reports of serious disruption to and loss of social connections, the next most predominant theme was identifying alternative ways to connect (Figure 1(e)). Alternative ways to connect were reported slightly more in the Spring (32%) compared to the Summer (26%) and Fall/Winter (28%) epochs. Participants particularly mentioned the use of communication technology, outdoor gatherings, pro-social activities (i.e., delivering groceries to friends or family), and window or porch visits as a way to maintain connections during the pandemic (Table 3; Figure 1(e)).

*Communication technology use* was the most reported sub-theme among alternative ways to connect that were discussed. A typical mention of communication technology in the context of social connections was:

“*Celebrations such as birthdays have changed; interaction has gone to video/phone vs face to face.*” (Participant 31, aged 45–54 female from Alberta; Spring)

Communication technology use was the most mentioned during the Spring (28%), declining slightly during the Summer (21%) and the Fall/Winter (23%). It is possible that other ways to connect became more available during the Summer; indeed, outdoor gatherings as a way to connect increased slightly during this period (Table 3). Additionally, communication technology fatigue, specifically video conferencing fatigue were reflected in the Summer:

“... now it has been going on so long nobody wants to video chat anymore because everybody is just tired” (Participant 181, aged 35–44 female from Ontario; Summer).

“I *miss the direct face-to-face connection. I use virtual means everyday, which are good, but as I also use them for work, it’s tiring and challenging to spend all day on a screen.*” (Participant 11, aged 65–74 female from Ontario; Fall/Winter)

The prevalence of communication technology as a theme demonstrated a decline, however, was still a common means of maintaining social connections:

“As numbers of positive cases have increased in my area, I have kept my visiting to nil. However, still texting, chatting and videocalling” (Participant 277, aged 45–54 female from Alberta; Fall/Winter).
Non-technology ways to maintain social connections were also mentioned, although not to the same extent. Outdoor gatherings (2–5%), pro-social activities, such as bringing someone groceries (<1%) and window or porch visits (<1%) also emerged (Table 3). Interestingly, these strategies were not broadly endorsed by participants and did not seem to be widely reported as a means to connect with people, perhaps due to external limitations such as the weather as seen in this response from Participant 15 (aged 25–34 female from Alberta) in the Summer: “We can only connect when the weather is good, because we only meet outside.”

Positive impact on social connections

Finally, although the negative impact of the pandemic on social connections was most reported, some participants reported a positive impact of the pandemic on social connections (3–5% across epochs; Table 3) (Figure 1(f)). For some participants, there were benefits of loss of social connections. Particularly, lack of contact with family or friends was welcome, providing an excuse to avoid unpleasant contacts, “I actually feel less stress to be honest. It is wonderful to focus on myself and my studies and children/homeschooling and have no demands/scheduled meetings” (Participant 139, aged 35–44 female from Alberta; Spring). Others reported that the pandemic benefited social connections, forcing participants to increase communication or contact with their friends and family, “More phone calls to parents used to be every 2 weeks now 2-3 times per week...Feel closer to parents...” (Participant 33, aged 45–54 female from Nova Scotia; Fall/Winter), and even resulting in strengthened relationships, “My partner and I have deepened our connection and strengthened our relationship” (Participant 21, aged 45–54 female from Ontario; Summer) and increased connections, “...making an effort to reach out to people who you might not always ‘have’ time for (e.g., grandparents)” (Participant 181, aged 35–44 female from Ontario; Spring).

Public health guidelines and social connections

Consequences of following public health guidelines were also a most prevalent way that the pandemic affected social connections (Figure 1(b)), specifically the consequences of mask use, social distancing, forming a close cohort, and consequences of self-isolation or quarantine (Table 3; Figure 1(g)). Unlike the other themes, the impact of public health guidelines was more noted by participants later, during the Summer (15%) and Fall/Winter (14%), compared to the Spring (7%; Table 3). “We are only seeing a small family cohort and are maintaining physical distancing with everyone outside our small cohort” (Participant 238, aged 35–44 female from Alberta during the Summer). For the Fall/Winter epoch, continued mention of cohorts and social distancing, “Keep family very close, see only close friends and I am careful about how I see the friends (outside, safe distance)” (Participant 52, aged 55–64 female from Alberta), and an increase in mention of self-isolation contributed to the continued prevalence of this theme.
Discussion

The purpose of this study was to use qualitative analysis of written responses to open-ended questions to determine how the COVID-19 pandemic broadly affected social connections between April 2020 and January 2021. Written responses ranged from one to 15 statements and were collected at three time-points for each participant throughout the early stages of the COVID-19 pandemic (April 2020-January 2021) and amalgamated into three epochs to assess trends over time. Participants overwhelmingly reported that the social distancing or social isolation due to the pandemic impacted social connections. Broadly, themes related to changes to social integration and loneliness emerged, as well as consequences for participant reported distress. Interestingly, less access to social resources or support was not reported by participants. Instead, participants’ reports were more focused on how pandemic-related restrictions impacted ability to maintain social connections, lack of face-to-face or physical contact with social connections, how that impacted the strength and quality of those social connections (for better and worse), and identifying coping or resilience strategies, such as through communication technology use. Strengths of the current study are the use of a longitudinal qualitative approach to determine how the pandemic and public health responses are affecting social connections, and how these themes changed over time in a Canadian population. Although existing qualitative research has demonstrated widely reported experiences of social connection disruption, loneliness, and adverse consequences to wellbeing in populations in the UK, the US, and among autistic families (McKenna-Plumley et al., 2021; Pellicano et al., 2022; Schneiders et al., 2022; Vaterlaus et al., 2021), the current study uniquely offered a perspective from Canadian adults and how their experiences changed over time. This approach captured the myriad ways that the COVID-19 pandemic and resulting public health responses affected social connections and highlights the value of using qualitative approaches that allow the participant to frame the response. Over and above findings from quantitative studies, qualitative thematic analysis provides opportunities for participants to inform research without bias, and thus, a more meaningful representation of important issues to the population involved.

Impacts on social connections

In general, participant reports of the impact of the pandemic on social connections broadly mapped onto changes in COVID-19 case numbers and introduction or removal of public health responses. For example, mention of negative impacts of the pandemic on social connections slightly decreased from Spring to Summer and rebounded into Fall/Winter. Similarly, more participants reported no impact of the pandemic on social connections during the Summer, as compared to the Spring and Fall/Winter. Additionally, alternative ways to connect and restrictions to face-to-face contact, and communication technology use followed the same pattern. This roughly coincided with lower COVID-19 cases and easing of restrictions during the Summer (Emergency Management and Civil Protection Act, 2020a, 2020b; Hinshaw, 2020a, 2020b, 2020c; Reopening Ontario (A Flexible Response to COVID-19) Act, 2020; Shahab, 2020a, 2020b, 2020c, 2020d; Strang, 2021).
However, patterns among specific themes were more subtle, suggesting that the pandemic’s effect on social connections over time is complex and varied.

**Negative impact on social connections**

Throughout the initial stages of the pandemic, lack of access to social connections was the largest theme discussed by participants, echoing existing literature (Mckenna-Plumley et al., 2021; Pellicano et al., 2022; Schneiders et al., 2022; Vaterlaus et al., 2021). Pandemic-related changes to quality of relationships, such as increased conflict or weakening of relationships, were less commonly discussed. When conflict in relationships was mentioned, the increase in conflict was frequently due to differences in opinion on the seriousness of the pandemic or the correct way to follow public health guidelines—suggesting that the pandemic itself was a potential source of conflict for some families perhaps due to communication patterns (Johnson et al., 2021). Themes related to social support did not consistently emerge. This is possibly because pandemic restrictions would most likely have affected tangible social support (i.e., help with groceries, or shared caregiving responsibilities), which tend to require physical contact. Emotional and informational kinds of support are still somewhat possible at a distance or through communication technology use (although several participants noted that lack of physical contact or hugs was distressing). Of note, engaging in pro-social activities, or providing others with tangible social support, was not a common theme. Existing literature points to an association between pro-social behaviours and improved mental well-being, as well as an overall protective method of preserving social connections through a strengthened sense of community identity (Tekin et al., 2021). The lack of responses indicating pro-social behaviours tracks with the loss of social connections through a loss of community identity throughout the pandemic. Nonetheless, these findings suggest that social integration or lack of social connection is the predominant impact of the pandemic on close relationships.

Mention of loss of physical contact peaked during the Summer, despite the warmer weather and relaxation of some public health restrictions during this period. Although the strictest of public health restrictions were eased during this time with the re-opening of some non-essential businesses (Emergency Management and Civil Protection Act, 2020a, 2020b; Hinshaw, 2020a, 2020b, 2020c; Reopening Ontario (A Flexible Response to COVID-19) Act, 2020; Shahab, 2020a, 2020b, 2020c, 2020d; Strang, 2021), emphasis on adhering to public health guidance regarding mask use and social distancing when gathering may have made the absence of physical contact more salient for participants at this time. It is noteworthy that the absence of physical contact through touch deprivation emerged as an area of concern in COVID-19 research in multiple populations (Burleson et al., 2022; Field et al., 2020). Thematic trends regarding physical contact suggest that being close to friends and family, but still not able to touch them is worse for some individuals than not being able to see friends or family at all.

Counter to expectations, mentions of mental health impacts did not emerge as a prominent theme in the current study at any of the time points. Although social connections have a large role in mental health outcomes (Cohen 2004; Ibarra-Rovillard &
Kuiper, 2011; Kawachi & Berkman, 2001; Prime et al., 2020; Rook, 2015; Santini et al., 2020), and during the COVID-19 pandemic in particular (Bu et al., 2020; Brooks et al., 2020; Grey et al., 2020; Landmann & Rohmann, 2022; Lowe et al., 2022; Luchetti et al., 2020; Szkody et al., 2021; Tull et al., 2020) participants may not have inherently connected their loss of social connections with reports of adverse mental health effects. However, existing research indicates similar patterns with elevated symptoms of adverse mental health that track with the reported fluctuations in social connection loss for loneliness, anxiety, and depressive symptoms (Lowe et al., 2022), indicating that although this is an area of concern, it is not the most prominent concern for the participants it effects.

Work disruptions, interestingly, did not emerge as a major theme, despite being a major topic of discussion in the media. It is possible that participants generally do not consider their work colleagues to be part of their family and friend group. However, work-related issues did emerge as a topic in other open-ended questions (data not reported here). This also may suggest that participants who were laid off or working from home during the pandemic acclimated to the change in work-environment and did not experience a disruption to their work-related social connections. Perhaps this lack of reporting was due to intentional use of communication necessary to maintain their employment tasks. This suggests that work-related disruptions to social connections might be considered a separate issue by participants and could be differentially interpreted – and potentially affect outcomes – compared to more central social connections (friends/family).

**Positive impact on social connections**

Although the themes were predominately negative overtime, there were indicators of coping strategies and resilience. For example, early into the pandemic, most participants mentioned some way that they attempted to adapt to the pandemic and maintain their social connections. Reports declined slightly into the Summer months, however, experienced a reported uptick into the Fall/Winter period demonstrating an intentionality in seeking out adaptive behaviours that coincided with restricted activities and socialization (Emergency Management and Civil Protection Act, 2020a, 2020b; Hinshaw, 2020a, 2020b, 2020c; Reopening Ontario (A Flexible Response to COVID-19) Act, 2020; Public Health Agency of Canada, 2021; Shahab, 2020a, 2020b, 2020c, 2020d; Strang, 2021). Some participants even went so far as to list positive impact of the pandemic on social connections, including increased effort to connect with people, strengthening of relationships, and having less contact with abrasive social connections. Understanding these sources of coping or resilience, or the individual differences among those who more effectively cope, would be important in planning future pandemic responses and better supporting how the public weather those responses. Although not a prevalent theme, mention of positive impact on social connections suggests that some individuals were highly adaptive and resilient to the pandemic and that outcomes were not uniformly adverse.
Alternative ways to connect

It should be noted that not all coping strategies seemed to be equally effective over time. In particular, there was evidence of communication technology exhaustion as the pandemic progressed, and especially as COVID-19 cases increased and public health restrictions were re-implemented into the Fall/Winter. This suggests that participants attempted to maintain social connections through technology-based means to buffer or minimize disruptions to their social connections. It is also possible, however, that the decline in communication technology use reflected technology fatigue, specifically video conferencing fatigue. It is interesting that the communication technology theme did not rebound to Spring levels during the Fall/Winter (Table 3), despite the re-introduction of public health measures as COVID-19 case numbers began to rise again across Canada, and despite participants noting the impact on social connections. It is possible that communication technology use had become so normal by the Fall/Winter that participants no longer felt it was an “impact” or “change” in the context of the new status quo.

This sentiment of early use of communication technology with changes over time is similar to the qualitative findings in a UK population (Mikal et al., 2021). Some participants noted that it was difficult to connect with friends and family by phone or screen after spending all day at work on a phone or computer. Others reported that phone or screen time was not the same or as satisfying as face-to-face interactions. This suggests that, although communication technology use can buffer the negative impact of the pandemic on social connections to a certain extent (Juvonen et al., 2021; Shufford et al., 2021), it is not a replacement or long-term solution for these issues. Concurrent research noted similar effects in which the use of communication technology both positively and negatively mediated effects of loneliness and well-being (Choi & Choung, 2021).

Similarly, although porch and outdoor visits were suggested as ways to cope with pandemic-related interruptions to social connections, relatively few participants actually reported using these strategies. It is possible that this is a consequence of Canada’s northern climate, where outdoor visits during the Spring and Fall/Winter months are not always feasible or convenient, and where many homes may not have porches. Indeed, there was a slight increase in outdoor visits mentioned during the Summer, as compared to Spring and Fall/Winter. It is also possible that outdoor visits are not possible with friends or family who do not live close by, and that require travel to see. Consistent with this, not being able to travel to see family and friends was mentioned slightly more as a negative impact of the pandemic during the Summer months, as compared to the Spring and Fall/Winter months. All in all, communication technology fatigue coupled with relatively little mention of other ways to maintain social connections demonstrate a clear failure to buffer the loss of social connections during COVID-19. These findings suggest that future pandemic responses would benefit from increased focus on these issues and the provision of alternative social connection options to mitigate losses.
Public health guidelines and social connections

Public health guidelines also had complex impacts on social connections. As discussed above, differences in opinion on pandemic-related issues could be sources of conflict with friends and family. Participants reported adhering to public health guidelines during in-person interactions, some noted the explicit change in behaviours such as intentional social distancing, mask use, or limiting social connections to consistent small cohorts, and the rate of reporting changed over time with a particular increase in the Summer. This could have been because public health restrictions and guidelines changed during the Summer and Fall/Winter months to set contact boundaries and potentially allow more frequent, face-to-face contact with friends and family. To support this possibility, Summer also coincided with an increase in mention of masks, social distancing, and the development of cohorts, all of which stemmed from public health guidelines that allowed for safer and thus more frequent contact with friends and family.

Although participants generally obliged with public health orders, many did express frustration with the compliance of others, which they found a limitation in maintaining connections. Alternatively, others indicated their social connections with select friends and family were unaffected due to the use of close cohorts or bubbles recommended by public health officials in the Summer (Emergency Management and Civil Protection Act, 2020a, 2020b; Hinshaw, 2020a, 2020b, 2020c; Reopening Ontario (A Flexible Response to COVID-19) Act, 2020; Shahab, 2020a, 2020b, 2020c, 2020d; Strang, 2021).

Limitations and future directions

There are important limitations to acknowledge. First, this was an online survey study, that utilized snowball recruitment with participants primarily recruited through Athabasca University and social media. The Athabasca University student body is unique compared to other universities in that students tend to be “non-traditional” (i.e., older, with established careers and family obligations) and are from across Canada, but it is possible that this did result in some bias. Particularly, an online survey would not have been accessible to individuals without smart phones or screens or who did not have internet access or data plans. Generalization of these findings to other populations should be done with caution due to the particular nature of participants recruited through a university with a snowball technique in that the sample may be more homogenous due to selection bias (Parker et al., 2019). It is not clear how generalizable these findings are, although this is an issue shared with most online research conducted during the COVID-19 pandemic. Second, not all participants chose to provide responses to open-answer questions, response rates ranged from 72-88% in each epoch. It is possible that there were systematic differences between responders and non-responders. For example, individuals who were more distressed or more impacted might have been more motivated to share their experiences. Third, and consistent with the limitations mentioned above, the sample was predominately female and White. Again, this is a limitation of most research, especially online research during the pandemic, in which the effect of participant self-selection into studies would be higher. Fourth, the sample consisted of strictly Canadian adults and the
experience of pandemic-related restrictions on social connections may have been specific to the regions within Canada, limiting the generalization of the experience to global populations. Regional differences from Canada to the rest of the world may have considerable unique experiences such as population density and seasonal weather patterns that further impact social connections. Fifth, the current study did not ask about sexual orientation or disability status. Information related to risk for severe COVID-19 outcomes was collected, however, there was no theoretical reason to assess sexual orientation or disability status in relation to COVID-19 outcomes and therefore it was not collected. Still, this limits the generalizability of the findings to the wider population and is, therefore, a limitation. Sixth, the use of written responses to open-ended questions in data collection limited opportunities for participants to expand on responses and provide a more in-depth analysis of social connection disruptions during the pandemic, unable to achieve data saturation which may impact content validity (Fusch & Ness, 2015). Seventh, participant responses may have been influenced by pandemic-related restrictions, but because this study was conducted across Canada, it is difficult to specifically determine their effects. Finally, the context in which the open-ended questions were asked may have influenced participant responses as the greater survey centred on questions of mental health impacts throughout the pandemic.

Conclusions and implications

In summary, the COVID-19 pandemic has posed a threat to social connections due to public health mitigations to reduce the spread of infection. During the initial period of the pandemic, several prominent themes emerged. Consistently, negative impact on social connections, loss of social connections, specifically declines in face-to-face interactions, and decreased contact or communication. Throughout the pandemic, participants in this sample utilized alternative means of connection, including communication technology, however, this theme indicated fluctuations over the pandemic and points to the need for available alternative social connection means during prolonged social distancing. The current study has demonstrated the complex way that social connection disruptions have been experienced by individuals and the widely negative impact of the pandemic for those participating in self-isolation or social distancing. As unpredictable variants emerge and pandemic responses continue to threaten social connections, the ways in which social connection disruption is experienced needs to be a research priority to better provide necessary mitigations to buffer detrimental effects.

Collectively, the breadth of topics mentioned by participants underscores that pandemic research focusing on single aspects of social connections (i.e., loneliness, isolation, social support, communication technology use) will likely miss other important parts of the larger picture. Additionally, that the themes and importance to participants were not static; rather changed over time. The diversity of themes discussed by participants also highlights the need to use multi-faceted approaches to capturing how a pandemic affects social connections and relationships, with implications for mental health and other outcomes. Qualitative research on social connections could be a valuable tool to identify
larger patterns and broader constructs affected by pandemics and pandemic-related public health responses.

Results from the current study indicate the need to understand the nuanced way in which Canadians experienced disruptions to their social connections during the COVID-19 pandemic. As the pandemic continues and new variants emerge that threaten the ways in which individuals socially connect, future research is required to understand the consequences and extent of those disruptions, which is beyond the scope of the current study. Additionally, targeted mitigations that buffer the effects of these widely reported social connection disruptions should be created to preserve social connections and overall health and wellbeing. Implications from this study indicate that intentional efforts to preserve social connections in the face of physical distancing or self-isolation may be protective for adverse effects and as such, the use of communication technology and alternative means of connection or exploration of new hobbies when encumbered by public health restrictions may be protective for Canadians during the COVID-19 pandemic.

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