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Daily implementation of health-protective behaviors and family life during the early months of the COVID-19 pandemic

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Abstract

The coronavirus disease (COVID-19) pandemic has necessitated the use of health-protective behaviors (HPB), such as social distancing, staying at home, frequent handwashing, and wearing facemasks to mitigate the transmission of disease. An investigation of interpersonal costs associated with the use of HPB can help inform strategies to promote their sustained implementation. This study examined the daily associations between the implementation of HPB and family functioning and assessed moderation by coparenting quality, economic strain, and the number of days that state-level stay-at-home policies had been in effect, during the early days of the pandemic. Mothers and fathers from 155 families with children who were 9 years old, on average, completed daily reports of HPB, parental stress, and family relationship quality over eight consecutive days in April or May of 2020. Hierarchal linear models showed that HPB was associated with increased levels of parental stress and interparental conflict. Negative coparenting relations exacerbated the next-day association between HPB and interparental conflict. HPB was also associated with increased levels of parent–child and interparental closeness, but these linkages dissipated for families who had spent more days under state-level stay-at-home policies. Although crucial for public health, the implementation of HPB may have detrimental short-term effects on daily family life. Family support and interventions are necessary to minimize the psychosocial burden of these important public health measures and increase their sustained adherence.

Keywords

Covid-19; daily diary; family relationships; health-protective behaviors

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CONFLICT OF INTEREST STATEMENT

No conflict of interest to report.

INTRODUCTION

The coronavirus disease (COVID-19) pandemic has had significant negative and positive impacts on family life, including increases in negative mood, stress, and caregiver burden among parents, as well as increases in family relationship quality and family time (Ayuso et al., 2020; Chu et al., 2021; Gadermann et al., 2021; Gassman-Pines et al., 2020). More importantly, in its first year, COVID-19 has infected over 31 million people and led to over 500,000 deaths in the United States (Centers for Disease Control, 2021a). Health-protective behaviors (HPB), such as social distancing, staying at home, frequent handwashing, and wearing facemasks, were effective prevention strategies to mitigate the transmission of the disease (Centers for Disease Control, 2021b). However, the implementation of HPB may have been burdensome for families with children. Specifically, the daily hassles of implementing HPB may have impacted their sustainment. Despite the importance of HPB to the prevention of COVID-19, no study to our knowledge has assessed the impact of their implementation on daily family life. To identify family-related costs and benefits of implementing HPB, the current study examined the links between daily HPB and parental stress and family relationship quality.

Whereas behaviors such as staying at home, social distancing, or wearing a mask may have been a matter of personal choice for some adults, the implementation of HPB was a family affair for those living with close others. In the early days of the pandemic, individuals may have perceived a greater need to regulate family members' health behaviors, as one person's lapse in adherence to HPB may have increased the health risks of all family members. Health-protective behaviors such as enforcing household rules about washing one's hands after spending time in crowded spaces, and decisions such as whether to bring a child to the grocery stores had family-wide implications. Family members may have disagreed over general principles or daily decisions regarding HPB. Parents of school-aged children were especially burdened with the task of coordinating their efforts with one another to implement and reinforce HPB adherence in their offspring. The frequent need to discuss and negotiate which HPB to implement and sustain may have been burdensome to parents and increased opportunities for conflict (Prikhidko et al., 2020). These changes could further impact a child's well-being, potentially contributing to internalizing and externalizing symptoms and emotion regulation difficulties (Brock & Laifer, 2020; Cohodes et al., 2021; Westrupp et al., 2021).

The COVID-19 pandemic impacted all levels of a family's ecology during its early months. In the macrosystem, states implemented policies mandating families to stay at home whenever possible. While some families likely benefited from the increased amount of family time and the decreased number of social obligations that resulted from the policy (Chu et al., 2021; Williamson, 2020), the increased amount of unstructured time also likely exacerbated tensions (Liu, Zhou, et al., 2021; Russell et al., 2020). Specifically, spending more days under state-level stay-at-home orders may have contributed to an accumulation of daily overload, defined as overwhelming and tiring demands related to employment, housework, family, and other responsibilities, and impacted the daily associations between HPB and family functioning (Chung et al., 2020; Griffith, 2020; Sears et al., 2016). Essential and front-line workers who continued working outside the home while state-level policies

were in effect also likely experienced greater levels of occupational stress, which may have contributed to fatigue, overload, and spillover of negative emotion from the work environment to home (Hibel et al., 2021; Ilies et al., 2007). As with any stressor, the daily overload and fatigue associated with the need to discuss, negotiate, implement, and enforce HPB may have accumulated over days when the state-level policies were in effect and may have increased family members' sensitivity to these demands.

Family characteristics may have also affected the ways that parents and children cope with stress related to HPB implementation. The overall quality of family relationships, such as cohesion, support, and cooperation may have mitigated stress related to making daily decisions regarding HPB (Liu et al., 2020; Pan et al., 2021). Coparenting relationship quality, which reflects how parents support and cooperate with each other (Feinberg et al., 2012), may have been particularly important for parents navigating the early days of the COVID-19 pandemic while caring for school-aged children. One online survey research study of over 1000 parents found that parents who reported higher levels of parental stress about finances and new demands secondary to COVID-19 (e.g., adjusting to new work conditions) at the start of the pandemic reported greater levels of coparenting conflict, which was associated with lower levels of family cohesion. Moreover, on weeks when parents reported more health-related stress (e.g., worries about ongoing exposure to COVID-19), parents reported greater levels of coparenting conflict, which was associated with lower levels of family cohesion (Peltz et al., 2021). During the early days of the COVID-19 pandemic, higher quality coparenting relationships may have facilitated decision-making around the implementation of HPB and reduced conflict (Feinberg et al., 2021).

Whereas positive coparenting relationship quality may have facilitated parents' coping with the additional health-related demands during the pandemic, economic strain may have exacerbated the detrimental effects of HPB on parental stress and family relationship quality. In general, economic strain increases parental psychological distress, which is associated with greater levels of interparental conflict and poorer quality parenting (Masarik & Conger, 2017). The COVID-19 pandemic has had a substantial negative impact on household finances (Falk et al., 2021), and the resulting experience of economic strain has been linked to negative psychological outcomes in adults (Hibel et al., 2021; Witteveen & Velthorst, 2020). The elevated levels of distress experienced by parents with economic strain may have compromised their ability to cope with other daily hassles, such as supervising children's schoolwork or negotiating HPB with partners. In addition to having to manage the stress of economic strain, these parents likely have access to fewer coping resources, such as funds to afford support for in-home childcare that could have enabled parents to better adapt to the demands of the COVID-19 pandemic during its early days (Tolan & Grant, 2009). Economic strain likely exacerbated the associations between HPB and parental stress and interparental conflict while reducing any positive effects of HPB on family closeness.

Since its outbreak in early 2020, there have been numerous studies conducted on the effect of the COVID-19 pandemic on families. Studies have often relied on cross-sectional assessments of various aspects of family functioning during the pandemic (Gadermann et al., 2021; Liu, Zhou, et al., 2021) or prospectively examined changes in family functioning from before the pandemic to its early months (Westrupp et al., 2021; Williamson, 2020).

However, during the early months of the pandemic, individuals received new information that impacted their decisions around the implementation of HPB and their perceived threat of the pandemic, nearly every day. An examination of the associations between HPB and daily parental stress and the quality of family relationships with the use of daily report methods would provide more information about how family members adapted during these early months.

Current research

To better identify challenges associated with sustaining HPB during the early days of the COVID-19 pandemic, we first examined the same-day and next-day associations between HPB and four indicators of daily family functioning: parental stress, parent–child closeness, interparental closeness, and interparental conflict. We conceptualized the family as a system with multiple relationships (i.e., "subsystems"; Minuchin, 1985). Two important relationships within the system are the parent–child and interparental relationships, and both influence child development over the long term (Cox et al., 2001). We examined the role of HPB on positive and negative facets of parenting and the interparental relationship, given prior research suggesting that families report benefits and detriments associated with the COVID-19 pandemic during its early days. We hypothesized that HPB would be associated with greater parental stress, greater interparental conflict, and lower parent–child and interparental closeness. Second, we assessed whether the associations between HPB and daily family functioning became stronger, the longer state-level stay-at-home policies had been in effect. We predicted that the links between HPB and daily parental stress and family relationship quality would be exacerbated, the longer the policies had been in effect. Third, we evaluated whether the daily associations between HPB and family functioning varied by the quality of the coparenting relationship and levels of economic strain. We hypothesized that the detrimental impacts of HPB would be buffered by high-quality coparenting relations and exacerbated by greater economic strain. We additionally explored whether the effects of poor coparenting and greater economic strain would be intensified in parents who had been under state orders to stay-at-home for longer.

METHODS

Participants and procedures

Participants in the current study were recruited from central Pennsylvania, Delaware, and Texas, between 2008 and 2012 for a randomized trial of *Family Foundations*, a transition to parenthood prevention program (Feinberg & Kan, 2008). Parents were eligible for the trial if they were at least 18 years of age and resided together. Three hundred and ninety-nine primiparous mothers and fathers enrolled and participated in follow-ups extending to 2020. In April and May 2020, participants were invited to complete an online questionnaire and provide daily reports about their adjustments during the pandemic. From 155 families, 146 mothers and 102 fathers provided at least one daily report about HPB. Families had an average of 2.3 children (SD = 0.91; range = 1–5). The oldest child in each family was, on average, 9.5 years old (SD = 1.2; 49% assigned female at birth), and mothers and fathers were 40.9 (SD = 5.5) and 40.7 years (SD = 4.8) of age, respectively. Median income was in the $100,000 to $124,000 range. Parents completed an average of 15.7 years of

education (SD = 1.4). Ninety-five percent of participants reported still residing with the same partner/co-parent since study enrollment. The majority lived in Pennsylvania (54.4%), Texas (19.8%), Delaware (7.7%), and Maryland (6.5%). Reflecting the original recruitment area, 92.7% of parents were non-Hispanic white. Of the 248 parents, 146 (58.9%) had been randomized to the intervention condition at enrollment.

Participants completed online questionnaires about their coparenting relationship quality and level of economic strain before the start of the daily reporting period. Next, for eight consecutive days, participants completed online daily reports about HPB, health, mood, stress, and family relationship quality once a day between 6 PM and midnight. The start date of the daily reports ranged from April 18 to May 17, 2020,[1] with the majority of participants (51.2%) starting them on a Thursday. The average rate of compliance was 83.3% (SD = 23.9%) and the average parent completed 6.7 (SD = 1.9) out of eight possible diaries. The analytical sample included a maximum of 1579 surveys, completed by 248 participants in 155 families. Compliance rates did not differ by parent gender or intervention status.

Measures

Daily report measures—*Health-protective behaviors (HPB)* evaluated how different a parent's behavior on a given day was in comparison with before the COVID-19 pandemic in the following five ways: staying at home, avoiding going out; keeping 6 feet away from others; washing hands and using hand sanitizer; wearing gloves or facemask; and other. The five items, which were averaged together to create a scale score, were scored from 1 (*not different at all today compared to before the pandemic*) to 10 (*extremely different today compared to before the pandemic*). Internal reliability, accounting for the repeated nature of the assessments, was 0.86 (Hox et al., 2017).

Parental stress was assessed with two items asking how stressful it was for the parent to help their child focus on their schoolwork and take care of their children in other ways during the past 24 h. The two item scores, ranging from 1 (*not at all*) to 10 (*extremely*) were averaged. In the current study, the internal reliability of the two-item scale was 0.66.

Parent–child closeness was measured with the single item, "How emotionally close and connected did you feel with your oldest child today," rated on a 10-point scale: 1 (*not at all*) to 10 (*a great deal*). Previous daily survey research has successfully used single-item measures to assess daily experiences (Chung et al., 2009).

Interparental closeness was measured with the item, "How emotionally close and connected did you feel with your partner today," on a 1 (*not at all*) to 10 (*a great deal*) scale.

Interparental conflict was computed as the mean of seven items on a 1 (*not at all*) to 10 (*a great deal*) scale, each covering a topic over which the participant and partner may have had tension or disagreement that day: sharing household tasks; sharing parenting duties; disciplining the child; their child's education or schoolwork; money or financial issues; sex

[1]The World Health Organization declared COVID-19 a pandemic on March 11, 2020, and the president of the US declared a nationwide emergency on March 13, 2020. At the start of data collection, 27,661 new cases were identified in the US and a total of 40,459 people in the US had died (Center for Disease Control, 2021). All states had active stay-at-home policies.

or physical affection; or emotional affection or support. The internal reliability in the current study was 0.88. Of the participants, 74.5% endorsed some conflict on at least one of the days and the mean number of topics that participants argued about on a given day was 2.77 (SD = 2.26).

Moderators

Stay-at-home policies—We identified the date when stay-at-home orders were put into effect for each state (Mervosh et al., 2020) and computed the number of days families had been under this policy when they started their 8-day-long daily report procedures. Participants started their daily reports between 17 and 54 days after state-level stay-at-home policies were initiated.

Coparenting relationship quality was assessed with a 16-item scale consisting of all 14 items of the Coparenting Relationship Scale – short form (Feinberg et al., 2012) and two additional items that more specifically probed division of labor: “My partner helps out with parenting whenever possible,” and “My partner shares the burden of keeping our child safe”. The 16 items, which were averaged together to create a scale score, had scores ranging from 0 (*not true of us*) to 6 (*very true of us*). Possible scores ranged from 0 to 6, and higher scores indicated better coparenting relationship quality. This scale has exhibited good psychometric properties, including high internal consistency, and convergent and discriminant validity (Feinberg et al., 2012). The 16 items utilized in the current study had high internal reliability ($\alpha = 0.88$).

Economic Strain was measured with four items: “in the past month, did you borrow money to help pay bills?”; “in the past month, did you miss payments on bills?”; “in the next two months, how much do you anticipate that you and your family will experience hardships such as inadequate housing, food, or medical attention?”; and “how difficult is it for you to live on your total household income right now?” (Howe et al., 1995; Kessler et al., 1988). The first three items were rated on a 1 (*not at all*) to 4 (*a great deal*) scale, and the fourth one was from 1 (*not at all difficult*) to 5 (*extremely difficult or impossible*). Items were summed, such that higher scores on a 4–17 scale indicated greater levels of hardship. In the current study, $\alpha = 0.73$.

Data analysis

The first aim of the study was to examine the same-day and next-day associations between HPB and parental stress and family relationship quality. Because days were nested in persons, and persons nested in families, we fitted a series of three-level hierarchical linear models using restricted maximum likelihood that tested the associations between HPB and the following dependent variables: parental stress, parent–child closeness, interparental closeness, and interparental conflict (PROC Mixed in SAS 9.4 software). We conducted two sets of models, each examining same-day and next-day associations. Each model included person-mean and person-centered levels of HPB as independent variables to represent between-person and within-person effects, respectively. A person-mean level of HPB represented the person’s mean score on the HPB scale across the eight daily reports. Person-centered level of HPB represented the difference between a person’s HPB score on

a specific day and that same person's mean score. In addition to random intercepts at the person and family levels, models included a first-order autoregressive covariance structure for the residuals to account for time dependencies between adjacent daily reports, and whenever significant, the random slope effect of HPB. Covariates included parent gender (males = 0), intervention status (control = 0), and the day of daily report (range = 0–7). When examining the next-day association between HPB on day i and family functioning on day $i + 1$, we controlled for the person-mean centered HPB score on day $i + 1$.

The second aim of the study was to examine whether the associations between HPB and family functioning changed across the number of days under state-level stay-at-home policies. We built on the analyses described for Aim 1, by including days under stay-at-home orders and its interaction terms with person-mean and person-centered levels of HPB. The number of days under stay-at-home was centered at 17 days, the minimum value in this dataset. We reported the region of significance (Bauer & Curran, 2005; Preacher et al., 2006) and simple slopes at the minimum (i.e., 17.0 days), mean (i.e., 28.3 days), and mean + 1 SD number of days (i.e., 36.4 days) for significant interactions. Parallel analyses were conducted with the moderator variables, coparenting relationship quality, and economic strain. When an interaction was statistically significant, we computed simple slopes at the mean, mean + 1 SD, and mean − 1 SD levels of coparenting relationship quality (i.e., 4.1, 5.0, 5.9) and economic strain (i.e., 3.4, 4.8, 6.2).

Finally, to test for invariance across parent gender and intervention condition, we examined their interactions with HPB in the prediction of the four outcome variables. Effects did not differ by parent gender or intervention status.

RESULTS

Descriptive statistics

As shown in Table 1, intraclass coefficients (ICCs) indicated that about half of the variability in HPB, parental stress, parent–child closeness, and interparental conflict, and a third of the variability in interparental closeness were explained by day-to-day differences in self-reports. Parents reported differences in their implementation of HPBs as compared to before the pandemic ($M = 6.42$, Range = 1–10). Mean levels of parent–child and interparental closeness were high, and levels of parental stress and interparental conflict were low. Participants started the study, mean 28 days after state-level policies were put into effect. Mean levels of coparenting relationship were high and economic strain, low.

Associations between HPB and daily family functioning

Parents who implemented more HPB during the daily reporting period experienced greater levels of parental stress ($B = 0.14$, $SE = 0.05$, $p = 0.008$) and interparental conflict ($B = 0.15$, $SE = 0.05$, $p = 0.001$). At the day level, when parents implemented more HPB than their mean, they reported higher levels of parent–child closeness on the same day ($B = 0.08$, $SE = 0.03$, $p = 0.027$) and more interparental conflict on the next day ($B = 0.06$, $SE = 0.03$, $p = 0.041$), over and above the control of next-day HPB. There were

no same-day or next-day links between HPB and parental stress or interparental closeness (see Table 2).

Moderation by days under state-level stay-at-home orders

As shown in Table 2, eight separate models tested whether the same-day and next-day associations between HPB and daily family functioning were moderated by the number of days parents had been under stay-at-home policies at the start of the daily reporting period. A number of days significantly moderated the person-level associations between HPB and parent–child and interparental closeness ($B = -0.02$, $SE = 0.01$, $p = 0.031$; $B = -0.02$, $SE = 0.01$, $p = 0.023$). Parents who were implementing more HPB reported greater levels of parent–child closeness if the policy had been in effect for <18 days ($N_{parents} = 7$), and greater levels of interparental closeness, if the policy had been in effect for <22 days ($N_{parents} = 41$) (see Figure 1).

The number of days under stay-at-home orders also moderated the within-person association between HPB and interparental conflict ($B = 0.01$, $SE < 0.00$, $p = 0.034$). Although simple slopes were not statistically significant, a post-hoc region of significance test showed that parents who had been under these policies for ≥38 days (i.e., mean + 1.2 SD) reported greater levels of conflict on days when they implemented more HPB.

Moderation by coparenting

Next, we examined the effect of the coparenting relationship quality on the associations between HPB and daily family functioning in eight separate models. As shown in Table 2, the interaction between daily HPB and the quality of the coparenting relationship was significantly associated with next-day levels of parent–child closeness ($B = -0.10$, $SE = 0.04$, $p = 0.018$) and the same-day association between HPB and interparental conflict ($B = 0.06$, $SE = 0.03$, $p = 0.046$). However, the simple slopes were not statistically significant. The next-day association between HPB and interparental conflict was also moderated by coparenting relationship quality ($B = -0.09$, $SE = 0.04$, $p = 0.014$). For parents in low-quality coparenting relationships, days when they implemented more HPB were followed by higher levels of interparental conflict (see Figure 2). The associations between HPB and parental stress and interparental closeness were not moderated by coparenting.

We also explored whether the effect of coparenting would be intensified in families who have been under stay-at-home orders for longer. The days x coparenting x HPB interaction was not significant in the prediction of any of our outcomes on the same or the next day.

Moderation by economic strain

Economic strain did not moderate the same-day and next-day associations between HPB and parental stress, parent–child closeness, interparental closeness, and interparental tension in eight models (see Table 2). We explored whether economic strain would only affect families who had spent more days under stay-at-home policies. The days x economic strain x HPB interaction was statistically significant in the prediction of interparental conflict ($b = 0.006$, $SE = 0.003$, $p = 0.022$) on the same day. Among parents who reported

high levels of economic strain, HPB was associated with less same-day interparental conflict for families who had been under stay-at-home orders for the fewest number of days ($b = -0.19$, $SE = 0.08$, $p = 0.017$), and more same-day interparental conflict for families who had been under stay-at-home orders for longer ($b = 0.11$, $SE = 0.05$, $p = 0.023$).

DISCUSSION

To identify family-related costs and benefits of implementing HPB during the early months of the COVID-19 pandemic, the current study examined their daily associations with parental stress and family relationship quality. Overall, parents who implemented more HPB reported higher levels of parental stress and interparental conflict over the daily reporting period. Following days when parents implemented more HPB than their mean levels, they reported higher levels of interparental conflict. The COVID-19 pandemic has had a significant negative impact on family life. In the context of the pandemic, the need to discuss, negotiate, implement, and enforce HPB in themselves and family members to prevent disease transmission may contribute to parents' daily overload and fatigue. Indeed, the effects of daily overload on interparental conflict and parent–child relations, in part via increased levels of negative emotions, are well documented in prior literature (Gassman-Pines, 2011; Sears et al., 2016). The task of implementing HPB may have also brought to light individual differences in perceptions about the threat of COVID-19 and the effectiveness of HPB within couples, further fueling disagreement and interpersonal stress (Liu, Lithopoulos, et al., 2021). While the number of tests conducted in the current study warrants caution in the interpretation of results, findings indicate that the added burden of implementing HPB incurred interpersonal costs and yielded relatively fewer interpersonal benefits.

Despite its associations with parental stress and interparental conflict, we found that on days when parents engaged in more HPB than their mean levels, they felt closer to their children. On a daily level, the choice to stay at home and work together to reduce a shared health threat may have had a positive impact on family life. Although staying at home and engaging in other HPB possibly increased daily overload, they also likely created opportunities for greater intimacy between parents and children. Before the pandemic, working from home was associated with more positive and involved parent–child interactions among mothers of toddlers and young children (Kim, 2020). However, the extension of state-level policies mandating that families stay at home counteracted positive associations between HPB and family functioning. Parents reported greater levels of interparental conflict on days when they implemented more HPB if they had been under stay-at-home orders for 38 days or longer. Moreover, parents who implemented more HPB across 8 days reported higher levels of parent–child and interparental closeness, only early on during the stay-at-home period. As state-level policies to stay at home had been in effect for less than 18 days for 2.8% of parents and less than 22 days for 16.5% of parents, this protective effect must be interpreted with caution pending replication. Spending more days under state-level mandates and managing prolonged disruptions in work and school may have led to an accumulation of parental stress and burnout, particularly as parents likely needed to supervise their children's schoolwork in a virtual environment (Griffith, 2020). In addition, spending more time with family members may have increased opportunities for

conflict, and uncertainty about impending policies may have incurred additional tolls on the well-being of family members. A parent's capacity to self-regulate may deplete over time, and with a diminished self-regulatory capacity, the task of implementing HPB may have more easily provoked distress and increased interparental conflict (Buck & Neff, 2012).

We found that the impacts of HPB varied by the quality of the coparenting relationship for interparental conflict. Whereas the average parent reported greater next-day interparental conflict following days when they implemented more HPB, this association was amplified in parents in poorer quality coparenting relationships. The next-day associations between HPB and interparental conflict were not detected in parents who reported high-quality coparenting. Coparenting relationship quality reflects similarities in parents' views on how to raise a child, parents' support of each other's caregiving, division of household labor, and collaboration in the management of family dynamics (Feinberg et al., 2012). Parents in high-quality coparenting relationships may share similar views about the implementation of HPB and be better able to work together to reinforce these habits in their offspring. They may also be better able to efficiently divide and manage the household and caregiving responsibilities during the early days of the COVID-19 pandemic, reducing the accumulation of daily overload. Our finding is consistent with prior research. High-quality coparenting is a protective factor for the family, associated with greater levels of relationship satisfaction and lower levels of parental stress (Eira Nunes et al., 2020). The shared views on HPB and disease prevention may be particularly protective for parents during periods of heightened demands when parents are balancing work, household, childrearing, and health-related responsibilities.

Contrary to our hypothesis, economic strain did not moderate the same-day and next-day associations between HPB and family functioning. The overall lack of moderation effects in the current study may be due to the relatively low levels of economic strain experienced by families before the pandemic. Given their pre-pandemic levels of socioeconomic resources, the moderate levels of economic strains faced by participants during the pandemic may have begun to adversely influence their ability to adhere to HPB while maintaining family harmony, only after stay-at-home policies have been put into effect for some time. Exploratory analysis indicated that at high levels of economic strain and when the state-mandated stay-at-home policies had been in effect longer, parents reported greater interparental conflict on days when they implemented greater levels of HPB. Parents with high levels of economic strain may have had access to fewer household resources (e.g., limited household space, fewer technological devices) to facilitate and sustain their coping with the added demands of HPB (Tolan & Grant, 2009).

This study adds to an emerging body of research on the impact of the COVID-19 pandemic on family functioning by demonstrating that the demand for HPB has negative short-term associations with daily family functioning, including greater levels of parenting stress, and interparental conflict. Although these negative impacts may be temporary, they are aversive and may further discourage parents from adhering to HPB recommendations. Although replication is needed, findings suggest that to successfully promote the sustained use of HPB during health crises, interventions must reduce the associated interpersonal costs by providing more support to parents who are balancing many responsibilities across multiple

domains. This may include screenings for family risks and resources, and the provision of referrals to online services that further provide strategies for coping with stress and family discord. Such interventions can emphasize the coparenting relationship quality, one protective factor that mitigates the potentially detrimental effects of HPB on daily family functioning.

Study findings must be examined in the context of limitations. Given the multiple tests conducted to address our three aims, findings should be interpreted with caution pending replication. In addition, the majority of the study sample were White and highly educated, and all participants had volunteered to enroll in a trial of *Family Foundations*, a coparenting intervention at the transition to parenthood. These qualities may reduce the generalizability of the results. The COVID-19 pandemic has disproportionately impacted families of racial or ethnic minorities and those from low socioeconomic backgrounds (Ibrahimi et al., 2020; Vargas & Sanchez, 2020). Given the multiplicative disadvantages and inequities that they faced during the peak of the pandemic and the barriers they encountered to implementing some HPB, these underrepresented parents are likely more vulnerable to the day-to-day demands of disease prevention (Garcini et al., 2022). Furthermore, we only examined the associations between self-reports of HPB, parental stress, and family relationship quality rather than associations between self, partner, or child reports to limit the number of analyses conducted in this study. Thus, our results may be inflated by shared method variance. Moreover, some measures relied on single-item scales, which may be less precise than multi-item scales. We focused on parents' relationships with their oldest child, and it is unclear whether the findings generalize to parents' relationships with younger children. Because participants were not randomized to different HPB conditions, we cannot conclude that HPB causes the observed changes in daily family functioning. However, our methodological approach, including controlling for each person's mean level of HPB and controlling for current-day HPB in next-day models, supports our interpretation that HPB may impact the quality of family interactions in the short term. Furthermore, the threat of the COVID-19 pandemic, as well as policy-level responses to the virus has waxed and waned since its outbreak. The current study only captures a week during the early months of the pandemic, and, likely, the associations between HPBs and family functioning change just as dynamically and diversely as the general public's perceptions of the threat of COVID-19.

Despite these limitations, this study provides preliminary evidence that implementing HPB is associated with parental stress and interparental conflict. Although parents who implemented more HPBs reported greater levels of parent–child closeness at the outset of stay-at-home mandates, these associations dissipated over time. Poor coparenting relationship quality and high levels of economic strain exacerbated the same-day links between HPB and interparental conflict, suggesting that these parents are more vulnerable to the detrimental short-term effects of HPB. Researchers and practitioners should explore whether these short-term effects predict adherence to HPB over the long term, and support parents who are especially vulnerable to burnout from the added burdens of implementing HPB.

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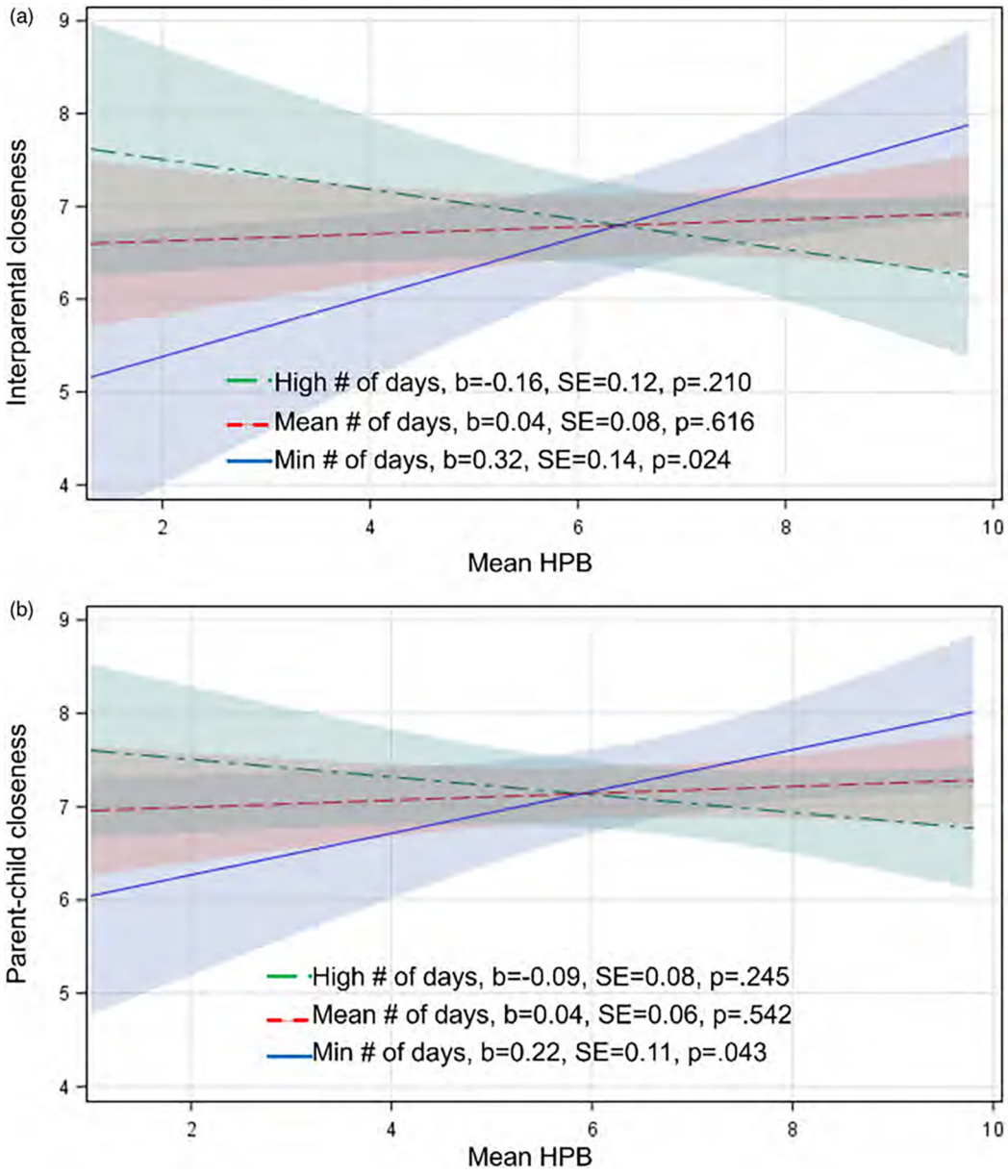

FIGURE 1.

Days Under Stay-at-home Mandates Moderate the Person-level Association between HPB and (a) Interparental and (b) Parent–child Closeness.

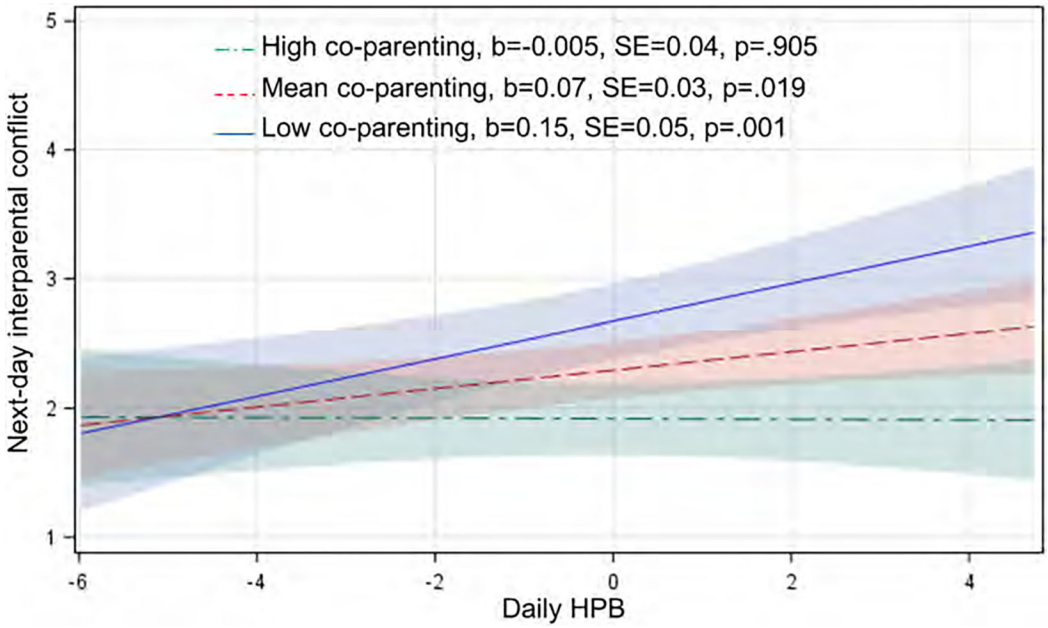

FIGURE 2.

Coparenting Relationship Quality Moderates the Within-Person Next-Day Link between HPB and Interparental Conflict. Daily HPB indicates the level of HPB for person j on day i, centered on person j's mean HPB score across the 8 days of daily diaries.

TABLE 1

Descriptive statistics of key variables at the person and day levels.

	Person level					Day level					
Variable	***N***	**Mean**	**SD**	**Min**	**Max**	***N***	**Mean**	**SD**	**Min**	**Max**	**ICC**
HPB	248	6.40	1.78	1	9.95	1599	6.42	2.11	1	10	0.56
Child-related stress	240	3.19	1.56	1	10	1313	3.17	1.95	1	10	0.49
Parent-child closeness	247	7.13	1.75	1	10	1586	7.70	1.69	1	10	0.54
Interparental closeness	235	6.64	1.97	2.04	10	1506	6.72	2.28	1	10	0.67
Interparental conflict	231	2.34	1.32	1	7.69	1194	2.33	1.63	1	10	0.51
Economic strain	245	4.80	1.41	4	13	--	--	--	--	--	--
Coparenting relationship quality	245	5.01	0.86	1.86	6	--	--	--	--	--	--
Days under stay at home	244	28.34	8.04	17	54	--	--	--	--	--	--
Female (*N*, %)	146 (58.9%)		--	--	--	--	--	--	--	--	--
Intervention Condition (*N*, %)	146 (58.9%)		--	--	--	--	--	--	--	--	--

Note: Higher scores indicate higher levels of described variables (e.g., higher levels of HPB and economic strain).

Abbreviations: HPB, Health-protective behaviors; ICC, intraclass correlation coefficient, describing the proportion of variance explained by between-person, as opposed to within-person, differences.

TABLE 2

Same-day associations between HPB and parental stress, parent–child closeness, interparental closeness, and interparental conflict, moderated by days under stay at home, coparenting relationship quality, and economic strain.

	Main effects		Moderator effects					
	Same day	Next day	Same day			Next day		
Dependent variable			Days	Co-Par	Econ	Days	Co-Par	Econ
	B (SE)	B (SE)	B (SE)	B (SE)	B (SE)	B (SE)	B (SE)	B (SE)
Parental Stress[a]								
HPB_{Bp}	0.14 (0.05) **	0.17 (0.06) **	0.04 (0.10)	0.16 (0.05) **	0.16 (0.05) **	0.01 (0.10)	0.18 (0.06) **	0.18 (0.06) **
HPB_{Wp}	0.08 (0.04)	0.00 (0.04)	−0.04 (0.07)	0.08 (0.04) *	0.08 (0.04)	0.00 (0.07)	0.00 (0.04)	0.00 (0.04)
Mod.	--	--	−0.03 (0.05)	−0.25 (0.33)	0.02 (0.19)	−0.06 (0.05)	0.01 (0.41)	0.00 (0.20)
Mod. x HPB_{BP}	--	--	0.01 (0.01)	−0.01 (0.05)	0.03 (0.03)	0.01 (0.01)	−0.05 (0.06)	0.03 (0.03)
Mod. x HPB_{WP}	--	--	0.01 (0.01)	0.06 (0.05)	0.04 (0.03)	−0.00 (0.01)	0.02 (0.05)	−0.03 (0.03)
Parent-child Closeness[b]								
HPB_{BP}	0.02 (0.06)	0.03 (0.07)	0.22 (0.11) *	0.03 (0.06)	0.03 (0.06)	0.19 (0.13)	0.03 (0.07)	0.03 (0.07)
HPB_{WP}	0.08 (0.03) *	−0.01 (0.03)	−0.02 (0.06)	0.08 (0.03) *	0.08 (0.03) *	−0.05 (0.06)	0.00 (0.04)	−0.01 (0.04)
Mod.	--	--	0.10 (0.05)	0.06 (0.36)	0.17 (0.21)	0.07 (0.06)	0.61 (0.48)	0.10 (0.23)
Mod. x HPB_{BP}	--	--	−0.02 (0.01) *	0.08 (0.06)	−0.06 (0.03)	−0.01 (0.01)	0.01 (0.07)	−0.06 (0.04)
Mod. x HPB_{WP}	--	--	0.01 (0.00)	−0.04 (0.04)	−0.01 (0.02)	0.00 (0.00)	−0.10 (0.04) *	0.03 (0.03)
Interparental Closeness[b]								
HPB_{BP}	0.01 (0.07)	0.04 (0.08)	0.23 (0.13)	0.05 (0.06)	0.03 (0.07)	0.32 (0.14) *	0.07 (0.07)	0.04 (0.08)
HPB_{WP}	−0.01 (0.03)	0.01 (0.03)	0.03 (0.05)	−0.01 (0.03)	−0.01 (0.03)	0.01 (0.05)	0.01 (0.03)	0.01 (0.03)
Mod.	--	--	0.11 (0.07)	0.57 (0.45)	0.02 (0.25)	0.16 (0.08) *	0.72 (0.64)	−0.01 (0.27)
Mod. x HPB_{BP}	--	--	−0.02 (0.01)	0.10 (0.07)	−0.03 (0.04)	−0.02 (0.01) *	0.09 (0.09)	−0.03 (0.04)
Mod. x HPB_{WP}	--	--	−0.00 (0.00)	−0.04 (0.04)	0.02 (0.02)	−0.00 (0.00)	0.00 (0.04)	−0.01 (0.03)
Interparental Conflict[c]								
HPB_{BP}	0.15 (0.05) **	0.15 (0.05) **	0.02 (0.09)	0.15 (0.05) **	0.17 (0.05) ***	0.03 (0.10)	0.15 (0.05) **	0.17 (0.06) **
HPB_{WP}	0.01 (0.03)	0.06 (0.03) *	−0.08 (0.05)	0.01 (0.03)	0.01 (0.03)	0.10 (0.05)	0.07 (0.03) *	0.06 (0.03) *

	Main effects		Moderator effects					
	Same day	Next day	Same day			Next day		
Dependent variable			Days	Co-Par	Econ	Days	Co-Par	Econ
	B (SE)	B (SE)	B (SE)	B (SE)	B (SE)	B (SE)	B (SE)	B (SE)
Mod.	--	--	−0.06 (0.04)	0.02 (0.31)	0.17 (0.15)	−0.06 (0.05)	0.13 (0.44)	0.19 (0.17)
Mod. x HPB_{Bp}	--	--	0.01 (0.01)	−0.08 (0.05)	0.01 (0.02)	0.01 (0.01)	−0.09 (0.06)	0.00 (0.03)
Mod. x HPB_{WP}	--	--	0.01 (0.00) *	0.06 (0.03) *	0.01 (0.02)	−0.00 (0.00)	−0.09 (0.04) *	−0.01 (0.02)

Note: In addition to the inclusion of random slope effects of HPB as noted below, models include random intercepts at the person and family levels. Covariates include parent gender, intervention group, diary day, and in next-day models, next-day level of person-centered HPB.

* $p < 0.05$

** $p < 0.01$

*** $p < 0.001$.

Abbreviations: BP, between-person level; Co-par, coparenting relationship quality; Days, days spent under stay-at-home orders at the start of the daily reporting period; Econ, economic strain; HPB, health-protective behaviors; Mod., Moderator (days spent under stay-at-home orders, coparenting relationship quality, or economic strain); WP, within-person level.

[a] Same-day and next-day models estimating these variables include the random slope effect of person-centered HPB.

[b] Same-day models, but not next-day models estimating these variables include the random slope effect of person-centered HPB.

[c] Same-day and next-day models estimating these variables do not include the random slope effect of person-centered HPB.