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Centering Parent Voice:
Exploring Parents' Needs and Preferences Using Online Parenting Information

By

Nehal Eldeeb

A dissertation submitted in partial satisfaction of the

requirements for the degree of

Doctor of Philosophy

in

Social Welfare

in the

Graduate Division

of the University of California, Berkeley

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Professor Valerie B. Shapiro, Chair

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Abstract

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Doctor of Philosophy in Social Welfare

University of California, Berkeley

Professor Valerie B. Shapiro, Chair

Parenting is the process of nurturing and fostering the physical, emotional, social, and cognitive development of a child to adulthood and across the lifespan (Brooks, 2012). Parental knowledge of parenting, parental skills, and parental self-efficacy are protective factors for reducing instances of child abuse and neglect (Ridings et al., 2017; Sanders et al., 2018) and promoting children's emotional, social, and cognitive competencies (National Academies of Science, Engineering, and Medicine [NASEM], 2016). Evidence-based parenting programs (EBPP) have been demonstrated to be effective for producing desired outcomes in well-controlled studies (Olds et al., 2003; Prinz et al., 2009). Program effectiveness in real-world conditions, however, does not achieve the same results. One of the primary challenges is low parental participation rates (Eisner & Meidert, 2011; Heinrichs et al., 2005). Parenting programs will not have their desired impact unless parents participate (Lundahl et al., 2006; Wagner et al., 2000). Potential solutions to enhance parent engagement include gender-specific parenting interventions, incorporating peer support components, and utilizing the internet for online dissemination of parenting interventions. Despite parents' low participation in parenting programs, parents seem motivated to receive information and support in their parenting roles, as indicated by their behavior on the internet (Baker et al., 2017; Duggan et al., 2015). One approach to explore enhancing parent engagement in parenting programs involves centering the perspective of users (i.e., parents). Specifically, it is possible to observe the nature of parent information seeking and sharing online. While extant studies have delved into parents' online discourse, their limitations, including sampling constraints and a narrow focus on researcher selected topics, hinder a comprehensive understanding of parents' diverse needs and interactions online.

Informed by human-centered design (HCD) principles, this multi-method dissertation project explored traces of parents' online behavior to understand their information needs and preferences for engaging with online parenting content utilizing two different approaches. Specifically, this dissertation explored a dataset of parenting posts from 2019-2022 using the computational approach of unsupervised machine learning to identify (a) the nature and prevalence of topics parents discuss online, (b) whether topics differed in mother-centric and father-centric forums, and (c) whether topics changed since the onset of the COVID-19

pandemic. Next, this dissertation examined a dataset of popularized posts and comments ($N=180$) using qualitative content analysis to explore (a) the content parents popularize on online parenting forums, (b) the types of interactions and emotions present, and (c) whether content and interactions differed in mother-centric and father-centric forums.

This project yielded several key findings across studies. Using computational unsupervised machine learning techniques, the aggregated topic model ($N=130,226$ posts) revealed the extent to which parent-centered topics, such as postpartum depression/ anxiety and work-family interface were common. Child-centered topics were predominantly related to perinatal care issues. Additionally, there was a modest overlap between the types of topics discussed by parents and those in parenting frameworks and established EBPP. Second, mother-centric and father-centric models produced similar topics related to early childcare and varying topics that might be rooted in gendered differences in parenting roles. Third, although there were similarities between the pre and post-COVID models, the latter highlighted topics, like challenges in parent mental health and child entertainment/education recommendations, that were potentially exacerbated by the pandemic. As for the qualitative content analysis portion of the study, parents shared a range of parenting challenges and successes with a preference for storytelling over explicit advice-seeking. Second, various positive interactions emerged in popularized comments and appear to be providing peer support. Third, users in audience-specific forums (mother-centric and father-centric) had distinct content and interaction styles, highlighting gendered differences in parenting roles.

Examining parents' discourse and interactions online has multiple implications for research, practice, and policy. Researchers can leverage the observations of parents' preferred topics and format for future phases of HCD to inform the development and testing of both mixed audience (i.e., tailored to all parents) and audience-specific interventions (i.e., tailored to mothers and fathers separately). Practical implications call for the expansion of services to meet the growing demand for online parenting information and support. Practitioners are encouraged to refine online interventions to focus on parents' preferred topics, supplement interventions with parent-centered services (i.e., focus on parents' well-being and capacity to parent), and adopt role-specific peer support models. Finally, policy implications suggest exploring family-friendly policies (e.g., flexible work hours, subsidies for early childcare), advocating for bills that provide child savings accounts for lower/moderate-income families, and improving the funding and access of perinatal education programs to better support expectant parents during the transition into parenthood. Ultimately, this work is intended to inform the development of parent-centered interventions that are engaging and accessible with the overarching goal of promoting child and family well-being.

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Dedication

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This six-chapter multi-method dissertation project presents background, theory, six research questions with their corresponding methods and results, and lastly, a discussion. Chapter 1 discusses the practice problem of low parental engagement in evidence-based parenting programs, the potential to derive inspiration for solutions by using a bottom-up parent-centered approach, and the extant evidence and gaps in studies exploring parents' online discourse. Chapter 2 delves into the specific computational unsupervised machine learning methods employed, focusing on the use of topic modeling – an exploratory and inductive approach that learns the data's inherent structure and uncovers latent topics in a set of documents. Chapter 3 presents the findings from five estimated topic models, analyzing the nature, content, and prevalence of parenting topics across different audiences (i.e., mother-centric and father-centric forums) and time frames (i.e., pre-COVID and since the onset of COVID). Chapter 4 outlines the qualitative methods used, employing content analysis to explore salient themes and interactions in posts and comments. Chapter 5 provides insights into seven themes related to the content and interactions present in popularized posts and comments collectively and by audience. Lastly, Chapter 6 engages in a discussion of the key findings, limitations, and implications for research, practice, and policy.

I. Background

Chapter 1 presents the practice problem of low parent engagement in well-studied and widely disseminated parenting interventions. It offers potential solutions using the bottom-up approach of human-centered design.

Parenting Matters for Child Outcomes

Parents play a pivotal role in the lives of young children (National Academies of Sciences Engineering and Medicine [NASEM], 2016). Bornstein (1991, p. 6) explains that the “particular and continuing task of parents and other caregivers is to enculturate children...to prepare them for socially accepted physical, economic, and psychological situations that are characteristic of the culture in which they are to survive and thrive.” Thus, parents are expected to prepare their children to seize opportunities and meet the demands of their environments (NASEM, 2016) while providing support, guidance, warmth, and love to promote children's healthy development and well-being (Kalil & DeLeire, 2004; Maccoby & Martin, 1983).

Research suggests a strong association between parenting practices and child outcomes, particularly on children's health and safety (Aune et al., 2014), emotional and behavioral competence (Ainsworth et al., 1974; Osofsky & Fitzgerald, 2000), social competence (Durlak et al., 2011), and cognitive competence (Duursma et al., 2008; Malin et al., 2014). First, parents or primary caregivers facilitate their children's safety and physical health to ensure healthy development. For example, parents can impact their children's health and safety through prenatal care, recommended vaccinations (Aune et al., 2014), breastfeeding, nutrition, and injury prevention (Institute of Medicine and National Research Council, 2015). Second, parents are critical resources for children learning to manage their emotions and behavior, which can minimize the risk of internalizing behaviors (e.g., anxiety, depression) (Osofsky & Fitzgerald, 2000). Parents' emotional responsiveness or responding to their children's needs in a timely and appropriate manner is correlated with several positive development outcomes for children (e.g., emotional security, verbal ability, intellectual achievement; Ainsworth et al., 1974). Parents can

also model positive relationships and experiences to encourage their children to develop these skills (e.g., chores and taking care of siblings; Weisner, 2002). Third, parents can promote children's social competence by teaching prosocial behaviors such as empathy, cooperation, sharing, and perspective-taking, which are all positively associated with children's success in school and other settings (Durlak et al., 2011). Finally, parents, as their children's first teachers, play a crucial role in their children's cognitive competence, including language development and literacy skills. For example, the frequency of shared reading time between parents and young children is tied to skills and knowledge in reading and writing (Duursma et al., 2008; Malin et al., 2014). Given the influence of parents on child outcomes, scholars have developed a multitude of theories and frameworks to understand parenting.

Parenting Frameworks (Select)

A plethora of parenting theories and frameworks exist. Although many span prevention and treatment functions, fewer incorporate a promotion function (Kyriazos & Stalikas, 2018), which increases their relevance to the general population and is oriented toward the flourishing of children. Two exemplar frameworks that cover the spectrum of promotion, prevention, and treatment are (a) Positive Psychology Parenting and (b) Positive Parenting.

Positive Psychology Parenting

This promotion framework developed by Seligman (2002) adopts principles of the Positive Psychology Movement, striving to promote human flourishing at a personal and community level (Seligman & Csikszentmihalyi, 2000; Seligman, 2011). The parenting of positive psychology focuses on two pillars. The first pillar is Positive Emotions, which is when children experience emotions like joy, interest, hope, contentment, and love (as defined by the Broaden and Build framework; Fredrickson, 1998; 2001). Experiencing positive emotions promotes children's secure attachment, and therefore, they are more willing to explore their environment and develop skills. The second pillar is Character Strengths, which is when parents identify, name, and praise children's character strengths as they appear, motivating children to repeat and enhance them. Character strengths include wisdom/knowledge, courage, humanity, justice, temperance, and transcendence (Seligman & Csikszentmihalyi, 2000; Peterson & Seligman, 2004). This parenting model aims to increase the well-being of both parents and children by nurturing positive emotions and discovering and fostering character strengths.

Positive Parenting

This framework focuses on both prevention and treatment and is centered around promoting parental competence of non-punitive parenting practices for both the general population and parents of children with particular challenges (Sanders, 1999). The five core parenting principles are ensuring a safe and engaging environment, creating a positive learning environment, using assertive discipline, having realistic expectations, and taking care of oneself as a parent. This framework is generally implemented by the Positive Parenting Program (i.e., Triple P), which is one of the most well-supported evidence-based parenting programs and has undergone 43 controlled trials, including several independent replications examining its efficacy, effectiveness, dissemination, and 22 service-based field evaluations (Heinrichs et al., 2005; Nowak & Heinrichs, 2008; Prinz et al., 2009; Sanders et al., 2014). Ultimately, the goal of

positive parenting is to stop child maltreatment, enhance the parent-child relationship, and treat children with social, emotional, and behavioral problems.

Such parenting frameworks can be operationalized by increasing parenting knowledge, improving parent attitudes and self-efficacy, and influencing parent behavior/use of practices (i.e., The Theory of Planned Behavior; Azjen, 1991).

Intervention Efforts: Evidence-Based Parenting Programs and The Problem of Parent Engagement

Parenting programs have been well-studied and have a strong evidence base for improving parenting as a mechanism to reduce risk factors of child maltreatment (e.g., parental stress, parents' mental health) and increase protective factors (e.g., knowledge of parenting practices, parental self-efficacy; Baydar et al., 2003; Olds et al., 1986; Prinz et al., 2009). Parenting education and training program outcomes can be parsed into both proximal and distal goals. Proximal goals focus on increasing parental knowledge, skills, and confidence in parenting and improving the parent-child relationship (Temcheff et al., 2018). Distal goals are intended to prevent maltreatment (Temcheff et al., 2018) and reduce the prevalence of mental, emotional, and behavioral problems in children and adolescents (Sanders et al., 2008). These programs address many topics, including child development and positive parenting strategies (Andrews & McMillan, 2013). In a scoping review of four databases of evidence-based programs, the most common topics (i.e., in more than 70% of programs) identified across 14 well-studied parenting programs (e.g., The Incredible Years, Triple-P, Parent-Child Interaction Therapy) were positive reinforcement, child discipline, family communication and interactions, and regulating emotions (Temcheff et al., 2018). However, it is not documented if parents were involved in the selection and development of these topics, and therefore, it is difficult to speculate about the extent to which these topics reflect parent preferences or needs for parenting information.

Although evidence-based parenting programs (EBPP) have demonstrated *efficacy* (i.e., evidence of positive outcomes from well-controlled trials), their *effectiveness* (i.e., evidence of positive outcomes in real-world conditions; Flay et al., 2005) is less conclusive. One particular threat to effectiveness is low parental engagement, which is the active participation of individuals who stand to benefit from the intervention. Several studies have found that enrollment in parenting programs by eligible or targeted participants is low, ranging from only 20-30% (Eisner & Meidert, 2011; Heinrichs et al., 2005; Spoth & Redmond, 2000). Of those who enroll, only 50% fully complete the intervention (Morawska & Sanders, 2006). Several studies have sought to uncover barriers and predictors to parent engagement (Axford et al., 2012; Chacko et al., 2016; Finan et al., 2018; Gonzalez et al., 2018; Haggerty et al., 2002; Heinrichs et al., 2005; Ingoldsby, 2010; Mytton et al., 2014), yet, given the variable definitions of engagement (i.e., intent to enroll, enrollment, attendance, participation, etc.), and assortment of study designs, it is challenging to ascertain consistent or generalizable barriers (See Eldeeb et al., Unpublished Manuscript). Still, programs will not have their desired effect if parents are not retained or they do not receive the number of recommended sessions (Guastaferrero et al., 2020; Lundahl et al., 2006; Wagner et al., 2000). Not only is engagement in interventions critical to achieving positive outcomes for individual participants (Asgary-Eden & Lee, 2012; Dadds et al., 2019; Staudt, 2007), but program reach (i.e., broad participation within the population and meaningful sub-populations) is required to achieve a public health impact (Glasgow et al., 2003).

Potential Solutions for Overcoming Problems of Parent Engagement

The challenges related to parent engagement prompt us to explore alternative options for program design and delivery. Three potential solutions to consider are gender-specific parenting interventions, incorporating peer support components, and utilizing the internet for online dissemination to meet parents where they are. In the following sections, I will delve into the rationale for considering these solutions.

Enhancing Parent Engagement: The Role of Gender-Specific Parenting

The first potential solution to ponder is gender-specific¹ parenting interventions. Widespread and well-supported EBPP (e.g., Triple P, Parent-Child Interaction Therapy Incredible Years, SafeCare) fail to consider the gendered nature of contemporary parenting (California Evidence-based Clearinghouse for Child Welfare [CEBC], n.d.). Parenting programs tend to treat parents as gender agnostic/neutral. Although there are commonalities in the ideals, values, goals, and behaviors of parents related to parenting - parenting can be a highly gendered experience (Arendell, 2000; Chin & Daiches, 2011; Newland et al., 2013; Palkovitz et al., 2014). Parents worldwide have goals of survival, protection, teaching, and fostering self-fulfillment in their children (LeVine, 1988); however, the ways in which parents enact these goals are through differentiated roles, styles, and types of involvement (Palkovitz, 2013). Societal values influence parenting, and over the last century in the United States, women have been assigned the primary caregiver of children despite their race, ethnicity, social class, or work status (Hill, 2008). Although there has been a move toward gender convergence in various facets of American social life and men have increased their involvement with their children over the last 20 years, still, political, social, and institutional contexts that men experience over their life course lead to parenting that is gendered in nature (Hill, 2008; Palkovitz et al., 2014).

Mothering is defined as a “socially constructed set of activities and relationships involved in nurturing and caring for people” (Glen et al., 1994, p. 357). It is often associated with women because motherhood is intertwined with notions of femininity, and women’s gender identity is reinforced by mothering (Arendell, 2000; McMahon, 1995). Alternatively, fatherhood is often thought of as the expectation of being a good provider, involved in the daily lives of their children, and helping and supporting mothers (Palkovitz et al., 2014). Due to gender differences in power (Ball et al., 1995) and societal expectations for appropriate role enactment (Howard & Hollander, 1997), mothers and fathers typically have different opinions regarding family rules or how to enact them. Furthermore, mothers and fathers differentiate between the essence of good parenting (Pedersen, 2012). In one study, for example, mothers defined good parenting as consisting of three interconnected components: reliability, structure, and disciplinary consistency, while fathers reported that good parenting is participating in family life and spending time with their children (Pedersen, 2012). Therefore, mothering and fathering are culturally constructed and distinct, and consequently, parents understand and prioritize family and childcare needs differently (Palkovitz et al., 2014; Pedersen, 2012).

Parenting’s gendered nature is also impacted by biology, particularly by a mother’s biological claim on pregnancy and breastfeeding. Research with expectant fathers has shown that

¹I acknowledge that gender exists on a continuum rather than a binary. Furthermore, there are many diverse family configurations, and people may parent collectively, in parallel, or in isolation from others parenting the same children regardless of gender. However, for the purposes of this project, I adopt the binary of the roles of parents (i.e., mother, father).

although fathers express a strong desire to actively participate with their children (Höfner et al., 2011; Reed, 2011), they report feeling excluded from prenatal appointments (Shirani & Henwood, 2011) and decision-making about processes related to pregnancy issues such as prenatal testing (Reed, 2011). Women's claim to breastfeeding also creates a distinctive situation for fathers. As a result of these biological processes, fathers are limited to indirect participation. For example, fathers can encourage healthy behaviors during pregnancy, refrain from unhealthy behaviors themselves, assist mothers in accessing prenatal care, and offer emotional support during delivery (Palkovitz et al., 2014). This lack of direct inclusion can lead to a sense of unpreparedness for parenthood compared to mothers (Chin & Daiches, 2011), influencing how men perceive their role as fathers and the expectations placed upon them as parents (Palkovitz et al., 2014), further contributing to the discourse that fathers are secondary to mothers.

Extant research has indicated that mothers and fathers are essentially different because they engage in different configurations of rules and roles. Lamb & Lewis (2013) found that fathers and mothers interact differently with their children from early infancy, where father interactions tend to be more "distal" and mothers more "proximal." Studies suggest that interactions between mothers and children often involve didactic and nurturing exchanges, where maternal warmth and sensitivity are linked to positive child outcomes. In contrast, interactions between fathers and children are frequently characterized by playful exchanges, including teasing, rough-and-tumble play, and encouraging risk-taking (Ainsworth & Bowlby, 1991; Fletcher, 2011; Grossmann et al., 2002; Lamb & Lewis, 2013; Milkie et al., 2010; Roopnarine & Mounts, 1985). Fathers have also been noted to be more assertive yet nondirective compared to mothers, who tend to be more responsive, structured, and regimented (Baumrind, 1982). Additionally, although both parents struggle with work-family balance, fathers have been more likely to be viewed as the main breadwinners and more likely to work longer hours than mothers, resulting in limited time for certain parenting tasks that mothers remain connected to (Miller, 2010). However, these perspectives overlook the challenges faced by single parents, particularly the majority of whom are mothers (Jones et al., 2022) who juggle extended work hours while providing proximal care. Nonetheless, the diverse roles and interactions of mothers and fathers underscore the nuanced dynamics within parenting.

Considering the biological claims and social constructions of motherhood and fatherhood, there is a need to explore both mothers' and fathers' parenting needs and interactions. As a result of their "secondary" role, fathers commonly report receiving insufficient information and support from institutions (e.g., workplaces), organizations (e.g., hospitals, birthing centers), individuals (e.g., family members, healthcare professionals), despite their aspiration to be involved (Deslauriers et al., 2012; Reed, 2011). Thus, it is possible that moving beyond maternal templates (i.e., conceptions of caregiving around maternal parenting; Marsiglio et al., 2000) in the understanding of parenting and the provision of parenting information to better support and include fathers could improve parent engagement.

Enhancing Parent Engagement: The Role of Peer Support Components

The second potential solution is the inclusion of peer support components in parenting interventions. Mutual or peer support is defined as "the process by which persons voluntarily come together to help each other address common problems or shared concerns" (Davidson et al., 1999, p. 168). Peer support has been commonly used across interventions for families with children with physical and mental health challenges (Ainbender et al., 1998; Finfgeld-Connett, 2005). Previous research has found an association between 'opportunities for peer support' and

more positive parent and family outcomes (i.e., emotional, and physical well-being; Kane et al., 2007; McConnell et al., 2012). Despite the evidence of success associated with peer support, well-studied and widely used EBPP lack a peer support component. When reviewing the California Evidence-based Clearinghouse for Child Welfare (CEBC) - a registry that rates the quality of evidence supporting programs' benefits to guide practitioners in program selection - I found that none of the well-studied and widely utilized parenting education or training programs include a peer support component. Peer support, however, is emphasized in programs on the CEBC for navigating foster/kinship care and parents with substance use issues (CEBC, n.d.).

Studies examining a range of interventions (e.g., child mental health, physical health, etc.) suggest that support from peers was found to overcome social isolation, lower perceptions of stigma, buffer stress levels, promote well-being, improve self-efficacy, and increase the utilization of interventions. For example, peer support groups of families of children with disabilities have been shown to reduce feelings of isolation and increase building connection (Ainbinder et al., 1998; Winch & Christoph, 1988) across a wide range of demographics (Kerr & McIntosh, 2000; McCabe, 2008; McConnell et al., 2012; Tadema & Vlaskamp, 2010). Similarly, birth parents in a family peer support services child welfare intervention reported a sense of community and comfort knowing other parents are having comparable experiences (Frame, 2006). Parents report an appreciation for the reciprocal nature of peer support and show eagerness to help each other with benefits perceived from both giving and receiving help (Ainbinder et al., 1998; McCabe, 2008). Such interventions lower perceptions of stigma and promote social integration (Frame, 2006; MacGeorge et al., 2011; Smith et al., 2022).

Interventions featuring Parent-to-Parent (i.e., peer-based interventions for parents with children born with a disability) support have also been found to have a stress-buffering influence on parents (Kerr & McIntosh, 1999). The presence of peer support has been shown to promote the well-being of parents (Yamashita et al., 2020) and their children (Ainbinder et al., 1998; Oakley, 2018) by reducing parent stress and increasing positive parent-child interactions and family functioning (McConnell et al., 2012). Furthermore, a cross-disciplinary meta-analysis of peer-model interventions addressing a range of problems (i.e., cancer, eating disorders, and substance abuse) found that the peer support experienced not only improved general well-being but was also linked to good long-term health outcomes (i.e., better immune function, lower blood pressure, reduced mortality; Hogan et al., 2002).

Alongside improving well-being and physical health, peer support models have been found to instill feelings of confidence (Fletcher et al., 2019), personal competence, empowerment, reassurance (Ainbinder et al., 1998; Finfgeld-Connett, 2005), and a sense of agency (Frame et al., 2006). Enhancing self-efficacy can encourage parents to use positive parenting strategies even when challenging to implement (Haslam et al., 2017). Furthermore, evidence indicates that peer support can increase the utilization of and engagement with interventions. As a result of shared experience, parent peer support partners tend to have greater credibility and trust among caregivers than traditional professionals, which in turn helps families become more actively engaged in the treatment process (Gopalan et al., 2014; Robbins et al., 2008). In a peer support model implemented in family service centers for child welfare involved parents, peer encouragement helped parents navigate the needed change process (i.e., get housing, qualify for welfare, substance use treatment) for reunification with their children (Frame et al., 2006). Helping families build networks of support promotes the maintenance of positive effects from professional interventions (Rzepnicki, 1991).

Although there are many benefits to peer support in interventions, there are logistical barriers impacting the implementation of peer support in the context of in-person interventions. For example, in the Parent to Parent program (i.e., an intervention for parents with children with special needs where a veteran parent supports a parent who has a child with a similar diagnosis), peer support was challenging to implement due to barriers such as long distances, difficulty paying the cost of phone conversations, and busy schedules (Ainbender et al., 1998). Recognizing the potential benefits of peer support in interventions, it appears worthwhile to address logistical barriers and incorporate peer support as a strategy to enhance parent engagement.

Enhancing Parent Engagement: The Role of the Internet

The third potential solution is to “meet parents where they are.” Despite the low parental engagement in EBPP, many parents seem to be engaging with parenting information online (Duggan et al., 2015). Research has revealed parental preferences for internet-based interventions for receiving parenting support (Metzler et al., 2012; Sanders et al., 2011). Internet use has intensified globally, with the estimated number of global internet users increasing from 4.1 billion in 2019 to 4.9 billion in 2021, which has been attributed to the COVID-19 pandemic’s “connectivity boost” (International Telecommunication Union [ITU], 2021). Data from the Pew Research Center (2021) reports that an average of 93% of American adults use the internet. Furthermore, adults viewed as “at-risk,” such as 86% of low-income adults (annual household income of <\$30,000), 71% of adults with less than high school graduation, and 90% of adults living in rural communities, are using the internet. Thus, the internet is now largely accessible to the vast majority of parents in the United States.

The emergence of social media platforms offers parents novel ways of seeking information, co-creating knowledge, and connecting with other parents. Parenting websites have existed since the 1990s and remain popular because they provide information and opportunities to communicate with other parents (Lupton et al., 2016). Parents are increasingly turning to the internet for information and support for a variety of reasons. Isolation in modern society is one of the reasons (Plantin & Daneback, 2009) as parents experience diminished support from their own social networks (i.e., parents, relatives, and friends; Beck-Gernsheim, 2002; Madge & O’Connor, 2006; O’Connor & Madge, 2004). Parents are also more likely to seek help from online communities when they find support from face-to-face sources incompatible with their needs (Finn & Kerman, 2005; O’Connor & Madge, 2004). Furthermore, internet-based support has additional advantages for parents: there is greater access to diverse populations/parents, it is inexpensive (Doty & Dworkin, 2014; Drentea & Moren-Cross, 2005), it overcomes geographical distance and time limitations - parents may access support anywhere and at any time (Doty & Dworkin, 2014; Hjälmhult & Lomborg, 2012; Moorhead et al., 2013; Niela-Vilén et al., 2014), and it can serve as an ongoing relevant source of support for parents ever-changing needs as their children experience different developmental stages (Rothbaum et al., 2008; Haslam et al., 2017).

Research suggests that parents use the internet and social media for informational and emotional support. In a study by Duggan and colleagues (2015), fifty-nine percent of parents using social media reported that they have come across useful parenting information in the last 30 days while looking at other social media content. Alongside seeking parenting information, the study found that 42% of these parents reported receiving social or emotional support about parenting from online networks in the previous 30 days (Duggan et al., 2015). Another study found that “high-risk families” (i.e., elevated child behavior problems, unemployment,

educational attainment of high school or less, financial hardship, and single-parent status) were just as likely to use the internet as “low-risk families” and were more likely to use social media as a source of parenting information (Baker et al., 2017). Research also indicates that parents are more likely to seek support from other parents (i.e., perceived experts; Haslam et al., 2017) as opposed to their partners or family because other parents who have experienced or are experiencing similar situations are able to provide more congruent support (Gundersen, 2011; Kingsnorth et al., 2011). Additionally, studies have found that parents with high levels of parental self-efficacy are more likely to seek help from their traditional social network compared to those with low efficacy (Ortega, 2002; Suzuki et al., 2009), suggesting that parents with low parental efficacy may be more likely to access online support (Haslam et al., 2017). Therefore, the internet broadly, and social media specifically, are valuable platforms for disseminating parenting information and seeking peer support and have the potential to be accessible to hard-to-reach and diverse populations.

Embracing Pull Over Push: The Bottom-Up Paradigm of Human-Centered Design

One approach worth contemplating for investigating the potential solutions to improve parent engagement is to center users at different stages of program design and dissemination. A central critique of the dissemination, implementation, and scale-up literature is that it utilizes a “producer-push model” or top-down approach (Nutley et al., 2007; Tseng, 2012). In the producer-push model, researchers produce high-quality research to be pushed in a one-way channel to users without considering how end-users pull information (Nutley et al., 2007; Tseng, 2012). This producer-push model can be dismissive of the end users’ preferences, patterns, and constraints. Instead, we could consider using principles of Human-Centered Design (HCD) to understand how parents prefer to “pull in” parenting information using a bottom-up parent-centered approach for program design and delivery. HCD is used to respond to people’s needs, question assumptions, and experiment to advance their solutions (Cooley, 2000). The HCD process can be divided into three distinct phases: inspiration, ideation, and implementation (IDEO.org, 2015). The inspiration phase aims to understand users and draw inspiration from them (Chen et al., 2020), which can be carried out through observations, surveys, focus groups, and interviews (Sleezer et al., 2014). Next, in the ideation phase, program developers should generate ideas based on the user’s thoughts, feelings, and experiences (IDEO.org, 2015). Finally, in the implementation phase, program developers should “prototype” different ideas and seek immediate feedback from users (IDEO.org, 2015). The three phases are repeated iteratively with end-users as collaborators. Adopting a bottom-up HCD approach offers a promising avenue for understanding what and how parents engage with parenting information online.

Relevant Literature: Online Parenting Discourse

A preliminary step in applying HCD involves reviewing relevant literature where researchers have sought to explore parents’ online discourse. Given the prevalence of the internet and social media use for parenting information, several researchers have investigated specific parenting topics on platforms like Facebook, Twitter, Reddit, Parenting blogs, and BabyCenter. In my review of the literature, I found nine studies that delved into parents’ online discourse, each narrowing its focus to a predetermined topic such as child feeding behaviors (Donelson et al., 2021; Sutter et al., 2021), breastfeeding support (Bridges et al., 2018), pumping (Yamada et al., 2019), vaccinations (Jenkins & Moreno, 2020; Tangherlini et al., 2016), parents’ spanking

beliefs (Lee et al., 2020), fathers' transition to fatherhood (Teague & Shatte, 2018), and second-time mothers pregnancy and postpartum concerns (Beyers-Carlson et al., 2022). While these studies shed light on various conversations and debates occurring in online parenting communities, their limitation lies in being narrowly focused on topics predetermined by scholars. This limitation inherently impedes the ability to inform the inspiration phase of HCD, which seeks to comprehensively understand the broad spectrum of parents' needs and preferences.

Three additional studies used a somewhat broader exploratory approach to understand parenting topics discussed on social media. All three studies used topic modeling (i.e., a statistical modeling approach that discovers abstract topics in a collection of documents; Li, 2018) to understand parents' discussions. Although they did not specify a parenting topic of interest beforehand, each study had a particular goal guiding their exploration. Sepahpour-Fard and Quayle (2022) focused on gender stereotypes and audience effects by comparing comments from specific authors that used both a same-gender and mixed-gender audience forum (i.e., mom-specific and parenting forum, dad-specific and parenting forum). They found that mom-audience authors discussed basic needs, dad-audience authors shared more announcements and introductions about birth/pregnancy, and authors had the most overlapping topics in the mixed-gender forum. The second gender differences study similarly explored the influence of gender on parental roles by exploring if mother and father-specific forums overlapped on topics or if societal norms caused variation in their discourse (Ammari et al., 2018). Comparable topics were identified in the mother-specific and father-specific forums (e.g., posting to social media, preparing food, vaccinations), but there were also differences across role-specific forums. The mother-specific forum discussed child weight gain and maintaining the home, while the father-specific forum included topics about NICU experiences and legal custody experiences. Lastly, Westrupp and colleagues (2022) prioritized topics that describe "parenting situations" (i.e., where parents were giving or seeking advice for parents of children ages 0-18). Of the 31 topics they found, 24 met their inclusion criteria. Topics focused on basic childcare situations (e.g., eating, sleeping, routines, sickness, toilet training) or how to respond to children's negative emotions or difficult behavior (Westrupp et al., 2022). The inclusion criteria resulted in the omission of parent-centered topics, specifically those pertaining to parents' well-being and the capacity to parent. Since two of the studies focused on gender differences and the third excluded parent-centered topics, the studies are insufficient to comprehensively understand parents' diverse information needs and the prevalence of their topics of interest on social media.

Gaps in the Relevant Literature

The aforementioned 12 papers each have gaps as related to the current project. Nine sought to understand the discourse on a specific researcher-selected topic. Two explored gender dynamics in parenting discourse more broadly, and one identified child-centered parenting topics. While all three of the broader studies utilized rigorous computational methods, they have certain sampling limitations when aiming to derive inspiration for the improvement of parenting programs to increase parental engagement. The gaps can be divided into issues of *who*, *what*, and *when*. Sepahpour-Fard and Quayles' (2022) gap is limiting the *who*. The study exclusively examined repeat users who posted on both a same-gender and mixed-gender audience forum; thus, they only spotlighted avid users and may have missed topics discussed by more casual users. Westrupp and colleagues' (2022) gap pre-determined the *what*. Topics were solely included if they met the researchers' definition of a "parenting situation," and consequently, seven topics that may be pertinent to parents' information needs were excluded from their final

sample. Finally, all three studies have gaps related to *when*. Sepahpour-Fard and Quayle (2022) focused on posts exclusively published in 2020, a unique year given the emergence of a novel coronavirus and societal shutdowns to prevent viral transmission. Therefore, this study may not reflect parents' typical and ongoing needs. Westrupp et al. (2022) only analyzed 910 posts that spanned a four to six-week period (approximately mid-December 2019 to the beginning of February 2020), limiting the ability to draw broader findings and more representative topics that span across the year. Even though Ammari and colleagues (2018) had a broader sampling time frame by analyzing posts across seven years (from 2009 to 2016), the current study seeks to understand the needs and preferences of contemporary parents. In addition, none of the studies examined parent interactions or emotions online, nor did they investigate the influence of COVID-19 on parental information-seeking behaviors online. While all three studies contribute to the field by enhancing our understanding of parenting topics discussed online, it is notable that their sampling and scope might not have been extensive enough.

Current Project

This multi-method dissertation centers parent voice in the inspiration phase of a human-centered design project. It uses an innovative approach of observing traces of parents' behavior to understand their needs and preferences when seeking parenting information online. Specifically, the project is structured around two main aims, each comprising three research questions. Given the study's exploratory questions and bottom-up approach, I do not posit any hypotheses.

Aim 1. To explore the nature, content, and prevalence of general parenting topics found online using computational unsupervised machine learning by answering the following research questions:

1. What parenting topics are parents discussing online?
 - a. What topics are prevalent?
 - b. Are parents discussing common topics from evidence-based parenting programs (EBPP)?
2. What are the similarities and differences in parenting topics across mother-centric and father-centric online groups?
3. How have parenting topics discussed online changed with the onset of COVID-19?

Aim 2. To explore the content, interactions, and emotions present in popularized parenting content using qualitative content analysis by answering the subsequent research questions:

1. What parenting content do parents value/popularize in online parenting forums?
2. What interactions and emotions are present in popularized posts and comments across parenting forums?
3. What are the similarities and differences of parenting topics and interactions across popularized posts and comments in mother-centric and father-centric forums?

II. Computational Unsupervised Machine Learning Methods

Chapter 2 explores the overall setting, data collection, and the analytical, computational, unsupervised machine learning method of topic modeling.

Setting: Reddit - A Valuable Platform for Exploring Parent Voice

Founded in 2005, Reddit is a social news and web content discussion platform where members post content organized by topics. Reddit is an appropriate platform for answering my research questions due to its human-centered approach, high engagement, and broad reach. Each collection of posts around a similar topic or “subreddit” is user-created (Fiesler et al., 2018). As of December 2023, there were 2.1 billion monthly visits to Reddit and a little over a billion monthly active users worldwide (Statista, 2024). Alongside YouTube, Reddit was the only other social media platform that saw statistically significant growth since 2019 (Auxier & Anderson, 2021), reaching 25% of United States (US) online users (Statista, 2024).

Not only is Reddit a valuable platform to explore due to its high engagement and broad reach, but its functionality is advantageous in answering my research questions compared to alternative social media platforms. Reddit is used to share long-form content, allowing up to 40,000 characters for posts and 10,000 for comments/responses, facilitating user discussion. Controversial and stigmatized topics are more openly discussed on Reddit compared to other platforms because users post under pseudonyms and create throwaway accounts (Ammari et al., 2019). Thus, parents may feel more inclined to self-disclose, creating more honest responses about a topic primed for societal shaming or judgment. It is against Reddit’s content policy, “reddiquette,” to reveal personal information (Fiesler et al., 2018), protecting users’ identities. However, anonymity may also have adverse effects due to users’ “online disinhibition effect” (Suler, 2004), where users engage in behaviors like trolling (antagonizing others by posting disruptive content) or flaming (using profanity or offensive language; Hogan, 2013). Users may also promote or respond to their own posts, affecting their quality. Still, most subreddits have moderators and community guidelines to prevent such unwanted behaviors (Matias, 2019).

Reddit Users

Reddit use in the US is prevalent among younger male audiences and varies across its users’ racial and ethnic composition and educational attainment. The Pew Research Center conducted a nationally representative survey ($N=1502$) reporting on US adult use of online platforms and found that 36% of Reddit users were 18-29 years old, and 22% were between 30-49 years old (Auxier & Anderson, 2021). This age range aligns well with the mean age of parents of children ages 0-18, as the mean age of mothers at the birth of their first biological child is 24.2 years, and the mean age of fathers is 26.6 years (U.S. Department of Health and Human Services [HHS], 2019). Twenty-three percent of US male adults use Reddit, compared to 12% of their female counterparts (Auxier & Anderson, 2021), which might be because males value anonymity more than females, a central feature of Reddit (r/TheoryOfReddit, 2016). Although the population of adult Reddit users is skewed towards males compared to females, the platform overcomes a central limitation of earlier parent engagement studies that tend to be mother-centric and might allow us to capture fathers’ experiences. Furthermore, 17% of Black adult online platform users and 17% of White adult online platform users report using Reddit, with Hispanic adult online users closely following at 14% (Auxier & Anderson, 2021). This

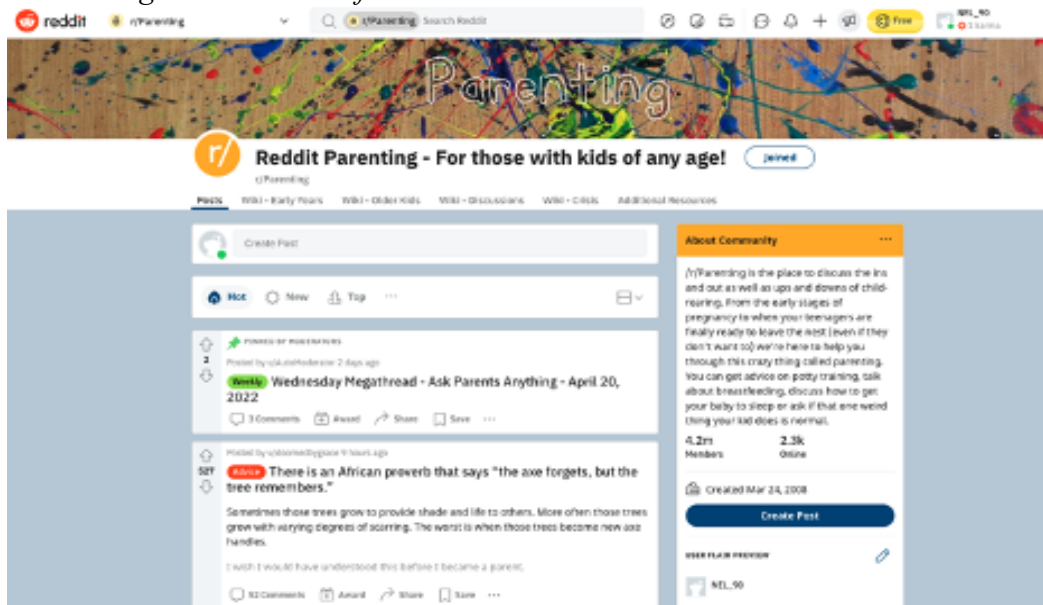
racial/ethnic diversity of Reddit users has the potential to access hard-to-reach populations. Finally, of those who use Reddit, 26% had a college degree or higher, 20% had some college education, and 9% had a high school diploma or less. These educational attainment demographics are comparable to the general US adult population (U.S. Census Bureau, 2023).

Data Collection

Data were collected from forums dedicated to a particular topic (i.e., subreddits) on Reddit. Data were extracted from the three major parenting subreddits between February 1st, 2019, and July 1st, 2022, to capture differences across subreddits and topics across time. Particularly, the sample came from the three most prominent parenting subreddits: r/Parenting (created in 2008 with 5.9 million members), r/Mommit² (created in 2010 with 1.2 million members), and r/Daddit³ (created in 2010 with 886,000 members) (at the time of writing 11/2023). Although specific subreddit users are unknown, having no identifiable information is beneficial to protecting users' identities, and the key disadvantage is the inability to describe the sample in terms of socio-demographic characteristics. Still, each subreddit has rules for its intended audience. For example, r/Parenting is meant for parents/guardians who are defined as "any person who has substantial decision-making authority in a child's life," r/Mommit is "a subreddit for mothers, not about mothers," and r/Daddit is "a sub for dads helping dads." The sample from r/Parenting was over three times larger than those from r/Mommit and r/Daddit; however, the samples from r/Mommit and r/Daddit were comparable. The chosen timeframe was selected as it encompasses content from before the COVID-19 pandemic (pre-March 2020) and posts since the onset. Notably, the samples were uneven between the pre-COVID and since the onset of COVID-19, reflecting a prioritization of recency to gain insights into parents' most current needs.

Figure 1

r/Parenting Subreddit Interface



² The terms r/Mommit, mommit, and mother-centric forum are used interchangeably.

³ The terms r/Daddit, daddit, and father-centric forum are used interchangeably.

Procedure

Inclusion and Exclusion Criteria

Data extracted included posts, author (usernames/pseudonyms), link_flair_text (text labels assigned by moderators to categorize or label posts based on their content), number of comments, scores, URLs, and timestamps with no identifying information. Only the original posts (the first post on a thread), not their responses (i.e., comments), were included. Exclusion criteria included deleted and removed posts, non-English language posts, non-textual posts (e.g., images, videos), posts with only a URL (web page address), promotional posts or advertisements, duplicate posts, and posts with less than ten characters.

Data Scraping

Data were prepared for analysis using two steps: data scraping and preprocessing. Data scraping is a procedure that uses a computer program to extract data from a website. There are two main ways to scrape data from Reddit: the Reddit API or the Pushshift.io API; I used the latter. Pushshift is “a social media data collection, analysis, and archiving platform that since 2015 has collected Reddit data and made it available to researchers” (Baumgartner et al., 2020, p. 830). The Pushshift dataset contains a copy of Reddit’s posts and comments. Its API is advantageous over Reddit’s for two reasons. First, it can pull historical data as opposed to Reddit’s API, which only allows users to retrieve a limited number of recent posts from a few streams for each subreddit (e.g., “hot,” “new,” “top”). Second, the Pushshift.io API can create large datasets (i.e., between 50,000 - 500,000 items), whereas Reddit’s API is more limited (Podolak, 2021). I used the Python programming wrapper Pushshift Multithread API Wrapper (PMAW) to search and extract Reddit posts from the Pushshift.io API. A wrapper is designed to simplify passing search parameters via the API, for example, filtering for the date and the subreddits of interest (Marx, 2020). I specified the dates (2/1/2019 – 7/1/2022) and subreddits (r/Parenting, r/Mommit, and r/Daddit) to scrape the Reddit posts and stored the data as CSV files. The extraction from r/Parenting resulted in 164,893 posts, while r/Mommit produced 46,790 posts, and r/Daddit generated 55,056 posts before undergoing data cleaning (See Figures 2, 3, and 4 below).

Data Cleaning and Preprocessing

Figures 2 to 4 demonstrate the data cleaning procedure for the three subreddits. Text cleaning and preprocessing are essential because they seek to eliminate or minimize noise in textual data, making it more uniform and structured. This, in turn, enables analytical models to focus on meaningful information within the text, enhancing their efficiency and effectiveness (Open Data Analytics, 2023). To clean the data, I removed posts that had been “deleted” or “removed” by Reddit users. I then dropped missing posts, repeated posts (duplicates), and posts that were less than ten characters. Next, I preprocessed the data using Python programming, which transforms the text to optimize the performance of machine learning algorithms. It typically includes three main components: tokenization, normalization, and noise removal (Weng, 2019). Tokenization splits sentences known as strings of texts into words or “tokens.” Normalization seeks to put all text “on a level playing field,” for example, by converting text to the same case (all lower case) and through lemmatization (reducing a word to its root word, e.g., played, playing, play all become the token “play”). Finally, noise removal cleans up the text by

removing extra whitespaces (Mayo, 2017). I preprocessed the data by removing emojis (i.e., a small digital image used to express an emotion, tone, or idea), line breaks, URLs, stop words (e.g., the, an, a), all punctuation, numeric and special characters, extra whitespaces, lemmatized words, transformed all text to lowercase, and tokenized the text. Moreover, after running an initial model, I added certain words that were not meaningful to the list of stop words to increase interpretability (e.g., “like,” “thing,” and “whilst”).

Figure 2
r/Parenting Cleaning Process for Final Sample

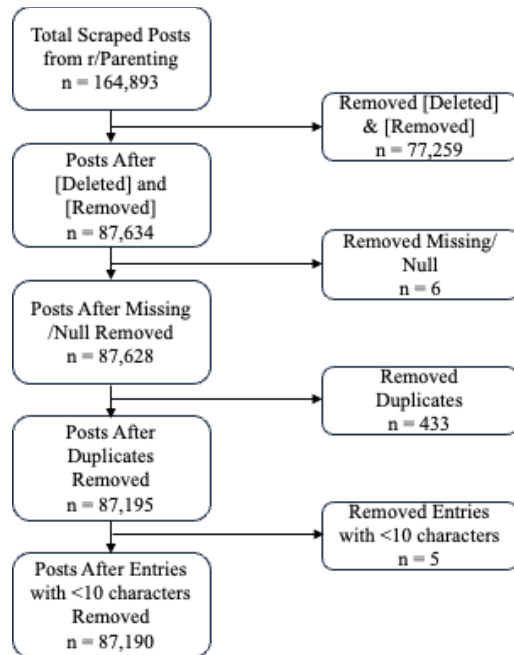


Figure 3

r/Mommit Cleaning Process for Final Sample

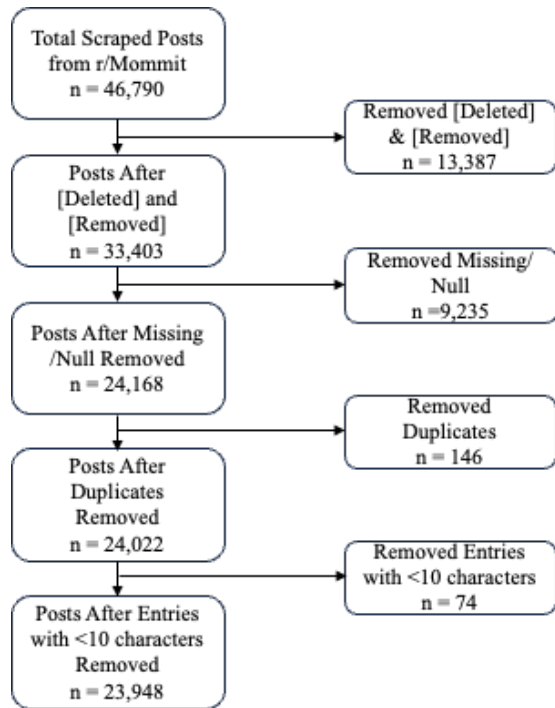
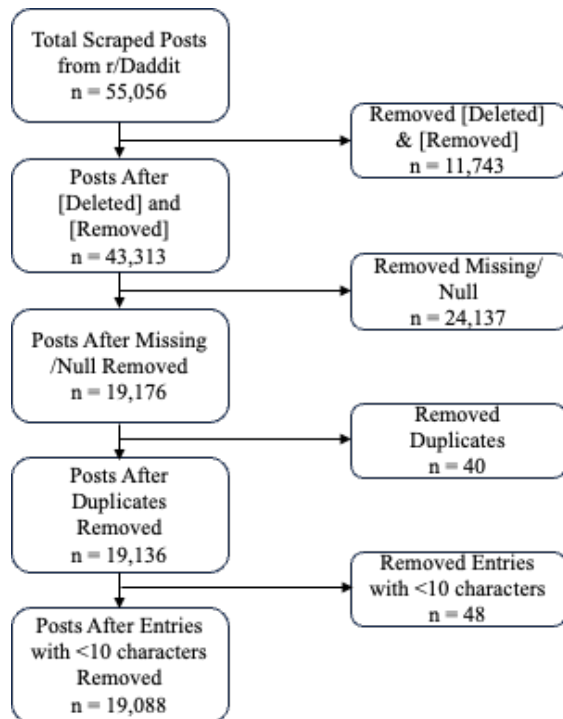


Figure 4

r/Daddit Cleaning Process for Final Sample



Following the data cleaning and preprocessing steps, both the r/Parenting and r/Mommit datasets were approximately halved, with around 53 and 51% of the posts remaining, respectively. However, the r/Daddit dataset remained with 35% of its original posts after data scraping, which may be due to r/Daddit having the highest number of posts with solely images. I prepared five datasets for analysis: (a) an aggregated dataset with posts from all three subreddits (r/Parenting, r/Mommit, r/Daddit), (b) a dataset with mother-centric posts, (c) a dataset with father-centric posts, (d) a dataset with pre-COVID pandemic (posted before 03/11/2020)⁴ posts from all three subreddits, and (e) a dataset with since COVID pandemic posts (posted on and after 03/11/2020; hereafter referred to as post-COVID) from all three subreddits.

Table 1 contains the descriptive information of the final analysis samples. The pre-COVID dataset had the highest average number of words per post after pre-processing (~75). At the same time, r/Mommit and r/Daddit were comparable (~56 and 54 words, respectively), and the aggregated dataset and post-COVID were similar (~69 and ~68 words, respectively). Unsurprisingly, the aggregated dataset had the highest number of unique users (73,548), the post with the highest number of comments (8917), and the highest number of posts attributed to one user (155). The mother-centric and father-centric forums had comparable macro-level patterns, with the mother-centric forum having slightly higher numbers across all of the aforementioned sample characteristics except for the highest number of posts attributed to one user. Pre-COVID and post-COVID macro-level patterns were vastly different because the post-COVID dataset is much larger, covering a wider timeframe of over two years compared to pre-COVID, which only included one year of posts.

Table 1
Descriptive Information of the Samples

	Aggregated ^a	r/Mommit	r/Daddit	Pre-COVID	Post-COVID
No. of posts in analysis	130,226	23,948	19,088	30,786	99,440
Average number of words per post before pre-processing	188.5	150.45	141.74	201.3	183.6
Average number of words per post after pre-processing	69.20	56.1	54.8	75.2	67.73
No. of unique users	73,548	12,614	11,498	21,214	56,833
Post with the highest number of comments	8917	2038	1895	2038	7072
Highest number of posts per user	155	65	71	38	155

^aThe aggregated sample included posts from r/Parenting, r/Mommit, and r/Daddit

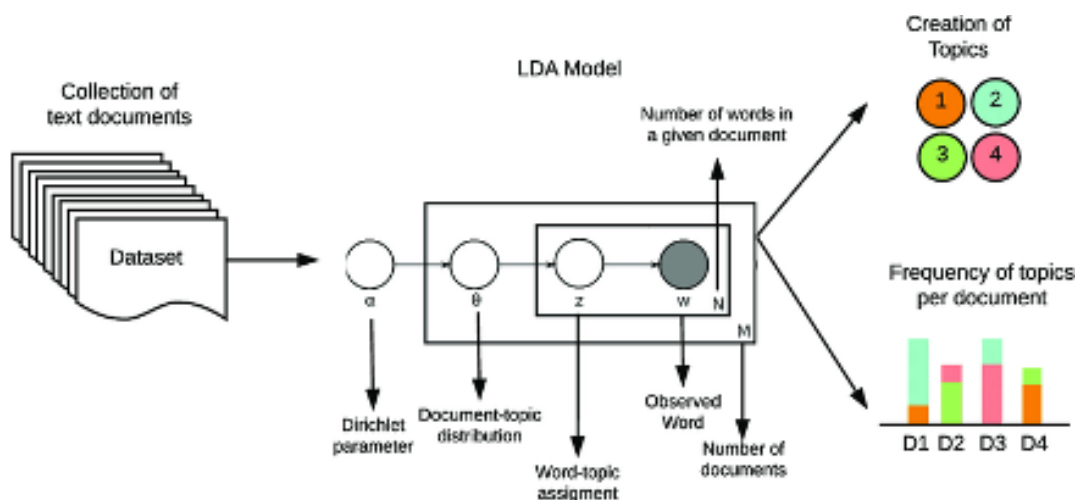
⁴ I selected March 11, 2020, as the commencement of the COVID-19 period, corresponding to the date when the Director-General of the World Health Organization (WHO) officially declared the outbreak of the novel coronavirus COVID-19 pandemic (WHO, 2020).

Topic Modeling and Latent Dirichlet Allocation

I utilized unsupervised machine learning because it is an exploratory and inductive approach that seeks to learn the data's inherent structure, without an explicitly defined output, through clustering and dimensionality reduction methods (Delua, 2021). Specifically, I employed topic modeling - a type of statistical modeling that discovers abstract “topics” occurring in a set of documents (Li, 2018) - to uncover topics in parenting forums on Reddit. One algorithm frequently used with topic modeling is Latent Dirichlet allocation (LDA). This Bayesian probabilistic modeling method generates distributions of probabilities to describe how words and documents are related to latent topics in a corpus or dataset (Blei et al., 2003). LDA has two fundamental principles. First, it treats every topic as a mixture of words (i.e., word-topic probabilities; Silge & Robinson, 2017). For example, a topic for “developmental milestones” might include “walk,” “crawl,” and “move.” Second, it treats every document (i.e., Reddit post) as a mixture of topics (i.e., document-topic probabilities). For example, one post may have 90% topic A and 10% topic B, while another has 30% topic A and 70% topic B (Silge & Robinson, 2017). Notably, words can be shared between topics. LDA estimates both these principles concurrently, finding the mixture of words associated with each topic and determining the mixture of topics that describe each document (Silge & Robinson, 2017). Examination of the highest word-topic and document-topic probabilities for each topic can help characterize the theme of each latent topic (Westrupp et al., 2022). Figure 5 helps visualize how the LDA algorithm functions; it “assumes that each document (M), which is composed of a number of words (N), can be represented as a probabilistic distribution of Dirichlet on latent topics. Where α represents Dirichlet prior weight of topic by the document; Z represents the assignment of a word to a given topic, and W represents the observed word in document M .” (Buenaño-Fernandez et al., 2020, p. 35322). LDA allows for the text analysis of vast datasets where more traditional qualitative approaches may not be feasible.

Figure 5

LDA Algorithm: Document to Topic Assignment



Source: Borrowed from Buenaño-Fernandez et al., 2020, p.35322

Analysis

Common topics discussed on Reddit parenting platforms were identified using LDA. Following the preprocessing steps, I used the *Gensim* package in Python to create a dictionary giving each word an integer identification. I then converted the documents⁵ (i.e., Reddit posts) into a bag-of-words format using the *doc2bow* (i.e., document to bag-of-words) function, representing each document by the number of unique words within it and the number of times each word occurs. Next, I calculated the coherence scores for models ranging from five to 50 topics, which are comparable to the number of topics explored in similar studies (Ammari et al., 2018; Sepahpour-Fard & Quayle, 2022; Westrupp et al., 2022). A coherence measure efficiently assesses a model's quality and human interpretability by measuring the semantic similarity between high-scoring words within each topic (Kapadia, 2019; Kumar, 2018). A higher coherence score indicates that the words in a topic are more semantically related and representative of a coherent and interpretable model (Vaj, 2023). I evaluated the *C_v* coherence scores to determine the optimal number of topics and chose the LDA model with the highest *C_v* score (Kapadia, 2019; Kumar, 2018; Islam, 2019). *C_v* coherence scores range from zero to one, where a higher score indicates better topic coherence and human interpretability (Röder et al., 2015).

I pursued the analysis of the topic model with the highest coherence scores and ran multiple models with different hyperparameters (i.e., chunk size, passes, iterations) to reach the highest coherence. *Chunk size* controls how many documents are processed in a single chunk when training the algorithm, *passes* specify how often we train the model on the entire corpus⁶, allowing the model to see the entire dataset multiple times, and *iterations* determine how often we repeat the algorithm over each document (Řehůrek & Sojka, 2010). Hyperparameter tuning is finding the optimum set of values for parameters to maximize the performance of the algorithm for the dataset (Zvornicanin, 2022). My decisions for hyperparameter tuning were based on trying to achieve an optimal model while maintaining computational efficiency. I tested several chunk sizes, passes, and iterations for the five models and selected ones that produced high model convergence while balancing computational efficiency. I decided on a chunk size of approximately 10% of the total number of posts/documents in the corpus. The final hyperparameters for the five models were:

- Aggregated: chunk size = 12,000, passes = 10, iterations = 2000;
- r/Mommit: chunk size = 2000, passes = 5, iterations = 1000;
- r/Daddit: chunk size = 2000, passes = 5, iterations = 1000;
- pre-COVID: chunk size = 3000, passes = 5, iterations = 2000;
- post-COVID: chunk size = 9000, passes = 5, iterations = 2000.

Next, I printed the most common or top 20 words with the highest probability for each topic in the model and qualitatively assigned them a label or theme. To check that I assigned appropriate labels to the topics, I examined the topic distribution for each document and extracted the top five contributing documents per topic for manual qualitative review. Additionally, I determined the prevalence of topics. Prevalence in an LDA model is the overall distribution of that topic across all the documents in the corpus (Blei et al., 2003). In *Gensim*, the prevalence of a topic is calculated by summing up the probability of that topic for each document in the corpus (Aravind, 2020). I repeated this process to answer my research questions and estimated five separate models: (a) the aggregated posts from all three subreddits (r/Parenting, r/Mommit, r/Daddit), (b) the mother-centric subreddit, (c) the father-centric subreddit, (d) the

⁵ The terms documents and Reddit posts and comments are used interchangeably.

⁶ The terms corpus and dataset are used interchangeably.

pre-COVID aggregated posts from all three subreddits, and (e) the post-COVID aggregated posts from all three subreddits.

Alongside LDA, one may consider using structural topic modeling (STM) to incorporate metadata (i.e., subreddit, timeframe) into the model as an approach to answering questions that seek to compare topics across subreddits and time (Roberts et al., 2016). However, I attempted using STM with the R library “stm,” and the topics produced were incoherent. The key issue producing the incoherence was related to the inexplicit assumptions of the R package, where preprocessing occurs automatically with the code “textProcessor,” limiting my ability to preprocess the data according to the unique needs and idiosyncrasies of the corpus. Furthermore, there was no option to finetune hyperparameters such as chunk size and passes to produce the best LDA model. As a result of these limitations, I decided to estimate five separate LDA models using Python’s *Gensim* package and compare across models to determine similarities and differences across subreddits and time.

III. Identifying Common Parenting Topics Using Big Data

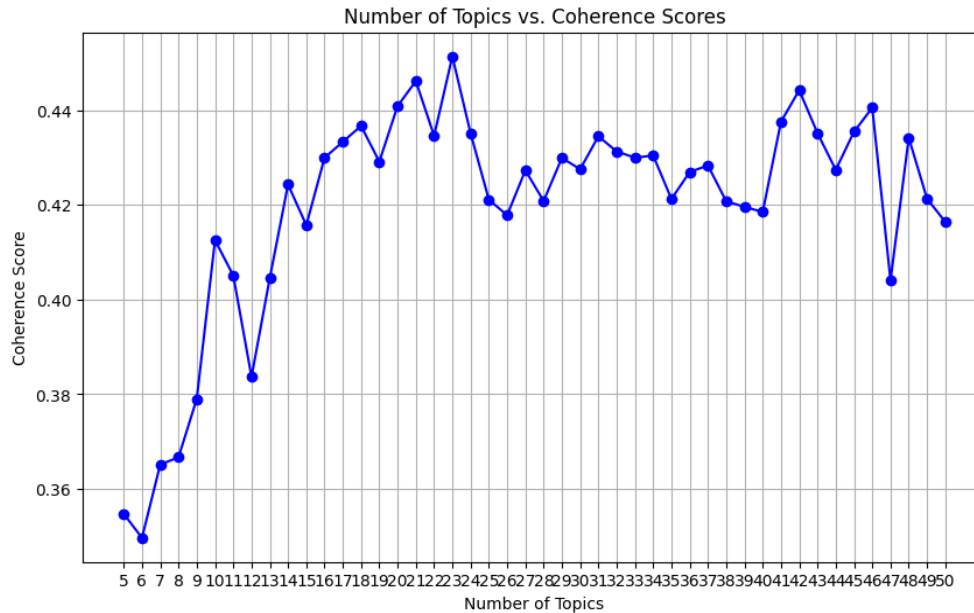
Chapter 3 explores the research questions about the nature, content, and prevalence of general parenting topics found online. Additionally, it examines whether there are similarities or differences across distinct audiences (i.e., mother-centric versus father-centric) and timeframes (i.e., pre-COVID and post-COVID). Below, I present the key findings in response to the research questions.

Parenting Topics and Prevalence Across Three Forums

First, I explored research question one: What parenting topics are parents discussing online? I present the topics identified from the LDA model trained on the aggregated corpus of three parenting-related subreddits (r/Parenting, r/Mommit, r/Daddit). After modeling 5-50 potential LDA topics, I selected the model with the highest coherence score (See Figure 6). The model with 23 topics was identified as the best-performing model with a coherence score of 0.451, which is considered moderate coherence. Table 3 displays the 23 topics, the top 10 most probable words per topic, and an exemplary post from the top five contributing posts per topic.

Figure 6

Model Coherence Scores for Number of Topics Estimated in Aggregated Corpus



The 23 topics can be divided into child-centered or parent-centered issues. Fifteen topics were child-centered (i.e., focused on issues directly relating to a child) including child externalized behavior, sleep training, picky eating, breast/bottle feeding, potty training, technology concerns/parental control, speech delays, developmental milestones, school concerns, child COVID exposure, child diverse expressions of identities (e.g., gender, religion, race, culture), eccentric child responses, birthdays/celebrations and gifts, car seat/stroller recommendations, and play/leisure activities. The eight parent-centered topics (i.e., focused on issues directly relating to the parent and the capacity to parent) consisted of postpartum depression/anxiety, work-family interface, co-parenting/custody, maintaining the home, financial considerations, family planning, and general parenting resources/advice.

Table 3*Summary of Aggregated Model Topic Labels, Topic Prevalence, Top Words, and Exemplar Post*

Topic Label	Topic Prevalence (%)	Topic Words	Example Excerpts from Posts
Postpartum Depression/ Postpartum Anxiety	19.96	"feel", "know", "time", "want", "love", "baby", "get", "help", "need", "hard"	I haven't felt that connection with my newborn. I worry about his wellbeing. I worry so I feel like I'm trying to convince myself that's love. But it doesn't feel like it. I have always wanted to be a mother but I feel like maybe I wasn't ready and that's why I don't have that connection. I'm on medication for postpartum depression, but I don't seem to be sad all the time. Sometimes I feel great and I want to workout and be involved and do things but I still don't feel love. And then other times I feel horrible and sad and I still don't feel love. I've been on depression medication for a week but I'm so worried that I'm just not meant to be a mom and that it won't work. I want so badly to love him, more than anything in the world. Has anyone else felt this and gotten over it?
Diverse Expressions of Identities	16.98	"girl", "boy", "want", "kid", "think", "people", "talk", "know", "love", "say"	My 8 year old will occasionally ask to have his nails painted if his 10 and 14 year old sisters are doing theirs. I don't see a big problem with it, but my husband (their stepfather) does. He was raised with all boys and had very little female influence in his life. He's a very "manly man" so he finds this odd. My brother is the youngest and has 3 older sisters, so he would always let us put make up on him and dress him up and he didn't mind, so I don't think my son painting his nails blue or black is weird. I'm curious as to what your thoughts are.
Child Externalized Behavior	15.94	"try", "time", "want", "tell", "behavior", "hit", "talk", "throw", "bad", "scream"	My almost 2 year old has been hitting, biting, scratching and pinching. He doesn't take timeout seriously, and even when he does get "sad" about it he gets up and starts doing it all over again. When timeout is over, I do get on his level and talk to him about how it isn't nice to hurt people. We don't spank, and even if we did I don't think it's a good idea to solve violence with violence.

			What have you done that has worked besides timeout for naughty toddlers?
Sleep Training	14.03	"sleep", "night", "bed", "wake", "time", "cry", "nap", "try", "crib", "bedtime"	My almost 10 month old is not sleeping well overnight. She started sleeping 10-12 hours from 3 months to 7 months then all of a sudden she started waking up in the middle of the night. Now she wakes up every hour almost 4-5 times per night...Please give me advice on how to get her to sleep through the night. I am at my wits end. At this age should I just let her cry it out? She can be quite persistent. At times, as soon as you put her down in the crib, she wakes up! Is it because she is teething? Her bedtime is around 8-9pm and on a good night which is rare she will wake up around 6-7am. We are exhausted and frustrated.
Work-Family Interface	12.68	"work", "home", "time", "daycare", "wife", "stay", "husband", "leave", "job", "need"	Hello everyone I may have the opportunity to start a work-from-home job that *seems* fairly easy. I am a FTM [Full-time mom] and currently a SAHM [Stay-at-home mom]. My LO [Little one] is 6 months and is a pretty chill guy for the most part. I don't have anyone to rely on at help if I need it during the day as my family lives 6 hours away & my husband works from 6 am to 5 pm. I guess I just need some input on other working parents on how hard it is to work from home and care for a baby at the same time.
Co-parenting and Custody	11.28	"son", "father", "mother", "ex", "relationship", "live", "step", "daughter", "custody", "divorce"	Keeping this short, and sweet - Single fathers of reddit - if you're in a custody battle keep at it! I was just awarded PPR [primary parental rights] for my (almost) 3 year old son. My ex tried everything against me - false: 2x RSO [restraining order], criminal charges. Dyfus [Division of Youth and Family Services], you name it - but in the end, in my arbitration decision I have prevailed. With that said it is equally as important even if you get PPR [primary parental rights] that you keep their mother involved as an uninvolved mother can equally be detrimental. Stay well, and keep fighting!
General Parenting Resources/	9.87	"thank", "read", "book", "look", "find", "advice", "help",	I have a three year old, and I'm looking to dive into some good books on parenting. For the parents out there that has read a bunch in this

Advice		"suggestion", "share", "tip"	area, would you mind recommending the book that was most helpful for you? Nothing focused on infants or expecting; 3+. Thank you in advance!
Picky Eating	8.32	"eat", "food", "meal", "dinner", "try", "snack", "want", "healthy", "cook", "refuse"	My 19 mo has been eating less and less for the past week. She's my first so I'm not sure if this is just a phase or? The only thing she wants to eat is pineapple, crackers, and water. For example, she LOVES Mac and cheese, strawberries, cheese sticks, beans...and she's been refusing to eat all of them. Is she getting tired of eating her favorite foods? I've been trying to expand but she's still 50/50 on whether or not she'll eat new stuff. Is this just a phase? I'm worried 1: she's not getting enough nutrients and 2: we can't spend more on groceries and she keeps wasting food.
Family Planning	7.25	"child", "parent", "issue", "think", "experience", "kid", "situation", "age", "family", "concern"	Hoping to get thoughts on pros and cons of bigger vs smaller age gap between siblings, from any perspective. E.g, in terms of career/ financial considerations, ease of parenting (if there's such a thing), relationship between the siblings, relationship between the parents, etc.
Eccentric Child Responses	7.07	"say", "tell", "ask", "go", "know", "daughter", "talk", "son", "come", "get"	Everytime I talk to my 7 year old son about past pets or animals or even people sometimes he always asks if they are dead. It has been going on for about a year now and everytime it makes him very sad and I'm not sure what to do or say about it?
Birthdays, Celebrations, and Gifts	6.42	"kid", "friend", "family", "want", "parent", "birthday", "know", "party", "people", "child"	My son turns 2 years old soon and I can't decide what to get him. We had planned on a special outing, but with the pandemic and closures we can't do what we'd planned. I want to get him a special "big gift," especially since we aren't having a birthday party. I can't decide what to do. Any suggestions?
Developmental Milestones	6.29	"hair", "hand", "head", "face", "tooth", "hold", "walk", "pull" "sit", "roll"	He will be 5 months on June 20th and hasn't rolled from tummy to back yet. He rolled from back to tummy once. He hates tummy time because he's a fatty. I use a baby pillow so it doesn't make his tummy uncomfortable, but he can't roll that way. Should I start doing tummy time on my bed? I'm worried that he isn't

			reaching the proper milestones.
Maintaining the Home	5.83	"room", "house", "clean", "door", "dog", "get", "floor", "leave", "come", "bedroom"	My son isn't even walking and he just completely destroys the place. Almost literally have to walk behind him picking stuff up, or he'll crawl behind me and make a mess!
Car Seat/Stroller Recommendations	4.70	"car", "seat", "buy", "baby", "drive", "ride", "stroller", "size", "need", "fit"	So my giant little one is in need of a booster seat for the car. I say giant little because she is only 4 but is definitely my child and is very tall. She is about 45 pounds and 43 ish inches tall. So she is just too tall for her car seat. So I'm looking for insight in what car booster seat other people are using and liking. If you don't really like yours why not? What features are really nice.
Play/Leisure activities	4.09	"kid", "sport", "activity", "team", "good", "practice", "want", "learn", "lesson", "coach"	... These days all the kids are computer focused my kids too. I would like to focus my kids on more sports activities. How can I do this naturally? Is so hard..
School Academic Concerns	4.04	"school", "teacher", "kid", "class", "grade", "start", "home", "work", "help", "student"	My son is not doing very well in 10th grade in public school. His grades are all C or below. One of them is F. I am concerned about his getting admission into any college...Please suggest what else can we do as parents?
Pregnancy Concerns	3.89	"doctor", "baby", "hospital", "go", "wife", "birth", "pregnancy", "appointment", "test", "pain"	I'll be 14 weeks tomorrow but for the past 10 days I've been experiencing pretty consistent headaches. My blood pressure is fine and even my eye doctor said the pressure is fine so I have to assume this is a result of increasing hormones. I never had headaches w [with] my first pregnancy but just wondering if anyone else dealt with this in their first trimester. Did it get better? Thanks!
Financial Considerations	3.66	"pay", "money", "job", "live", "work", "college", "buy", "save", "afford", "cost"	What bank did you choose, and why? Trust fund, college fund, what do you use it for? If you have multiple kids, do they each get their own or is it one umbrella account? I want to start putting away money for my kids but I'm not too sure how to go about it.
Child COVID Exposure	3.29	"sick", "covid", "cold", "fever", "cough", "mask", "quarantine",	My daughter was just exposed to two people that may have covid. All three of them are sick. All the symptoms. Anyone on here have had a toddler

		"test", "bug", "virus"	that got covid?
Breast/Bottle Feeding	3.19	"baby", "fed", "bottle", "milk", "breastfeed", "formula", "try", "feeding", "pump", "drink"	Help! I'm trying to get my 6 month old breast fed baby to transition to formula. I tried to introduce one bottle a day and even mixing formula plus breast milk together. She HATES it!!!! She refuses to drink formula. She presses her lips together and cries. She's been drinking enfamil A + formula. I'm worried she won't ever transition to formula. Any tips or tricks ?
Potty Training	2.88	"potty", "diaper", "pee", "poop", "try", "toilet", "change", "training", "bathroom", "accident"	Daughter is almost 3 and has been pushing back on potty training. We have had a laid back approach. She goes pee in the potty fine but asks for a diaper when she poops. We have been giving it to her thinking she will poo in the toilet when she's ready. Now she's asking for a diaper to poo, but only pees. She doesn't want to use the potty at all now. I have told her we are going cold turkey with no diapers but I'm worried she will try to hold her poo. She's done that in the past. Any advice or words of encouragement?
Technology Concerns/ Parental Control	2.57	"play", "watch", "game", "toy", "time", "tv", "video", "want", "phone", "screen"	So I have noticed just about every toddler has a tablet... I don't turn on the TV at all and I don't allow or give my toddlers phones or tablets to watch at any time. Not even in the car. I am curious though, what are your thoughts on screen time for kids?
Speech Delays	1.96	"word", "speak", "speech", "language", "learn", "sound", "delay", "talk", "english", "autism"	My 18mo [month old] doesn't speak. He babbles a lot and is super vocal but no actual words are coming out. He does babble specific phrases through the day but it's still not very clear. I'm not too worried about it because he can hear us and he understands what we're saying he just doesn't want to speak. But his pediatrician is saying if he doesn't have x amount of words by his next birthday she'll have to recommend he be tested. Should I be concerned?

Note. Hyperparameters - chunk size = 12,000, passes = 10, iterations = 2000, random state = 1

In addition to identifying the topics parents discussed across the three subreddits, I determined the prevalence of each topic. I will describe the top five most prevalent topics. The most prevalent or dominant topic across all documents in the corpus was *postpartum depression/postpartum anxiety*. On average, according to the LDA model, approximately 20% of each document's content is attributed to this particular topic. Posts on this topic describe parents

feeling overwhelmed with emotion, not feeling connected with their child, not appreciating their child, and struggling with intrusive thoughts. Parents either share their feelings or seek support and advice from fellow parents. The second most prevalent topic (~17%) was *diverse expressions of identities* (i.e., gender, religion, race). This topic includes posts of parents detailing questions about the appropriateness of how their children choose to express themselves or how they would like to be perceived religiously, racially, and by gender. For example, little boys interested in “girl things” (i.e., nail polish), a child wanting to wear a cross, or a non-Black child wanting to dress up as a Black Disney character. *Child externalized behavior* was the third most prevalent topic (~16%) and seemed to be related to concerns about children’s behaviors that harm others (i.e., the parent, siblings, or peers), including acts of kicking, hitting, biting, pinching, and so on. Across these posts, parents are seeking advice on how to discipline their children to stop this behavior. The fourth most dominant topic was *sleep training* (14%), which is tied to parents’ frustrations about their child’s inability to sleep when they are expected to (i.e., in the evening or nap time). Parents detail their children’s sleep schedules and processes to help their children sleep (i.e., picking them up, sleeping next to them) in search of recommendations from others. *Work-family interface* was the fifth most prevalent topic in the aggregated model (~13%). Posts across this topic discuss fears and challenges of transitioning to work, daycare considerations, and staying at home due to financial concerns.

(Mis)alignment with Common Topics from Evidence-Based Parenting Programs

A secondary goal of this study was to determine whether topics parents discuss online involve common topics covered in rigorously evaluated evidence-based parenting programs (EBPP). To ascertain this goal, I used the four most common topics according to Temcheff and colleagues’ (2018) scoping review of 14 well-studied parenting programs (e.g., The Incredible Years, Triple-P, Parent-Child Interaction Therapy). The four topics are family communication, regulation of emotions, child discipline, and reinforcement. Across the 23 topics identified by the LDA model, only one topic was closely aligned with common topics covered in EBPP: *Child externalized behavior*. This topic describes children’s behaviors marked by emotion dysregulation and approaches that parents have attempted to use to modify their child’s behavior. Thus, the LDA topic is compatible with two common EBPP topics: regulation of emotions and child discipline.

Comparing Topics Across r/Mommit and r/Daddit

To answer my second research question: What are the similarities and differences in parenting topics across mother-centric and father-centric online groups? I compared the types of topics and their prevalence from r/Mommit and r/Daddit. Like the aggregated model, I modeled 5-50 potential LDA topics to determine the model with the highest coherence score. The best-performing models for r/Mommit and r/Daddit had comparable moderate coherence scores of 0.463 and 0.464, respectively (See Figures 7 & 8).

Figure 7

Model Coherence Scores for Number of Topics Estimated in r/Mommit

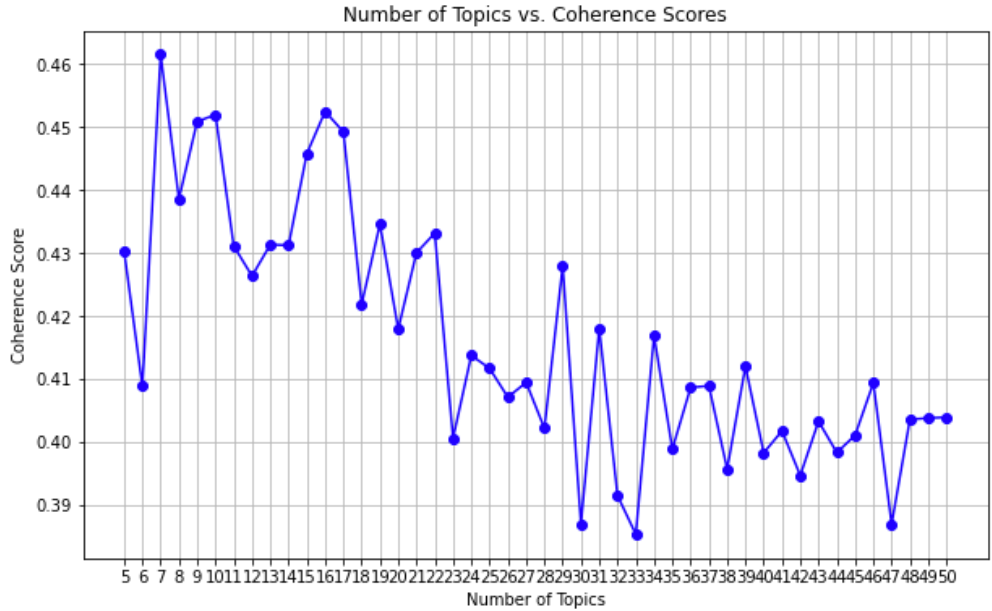
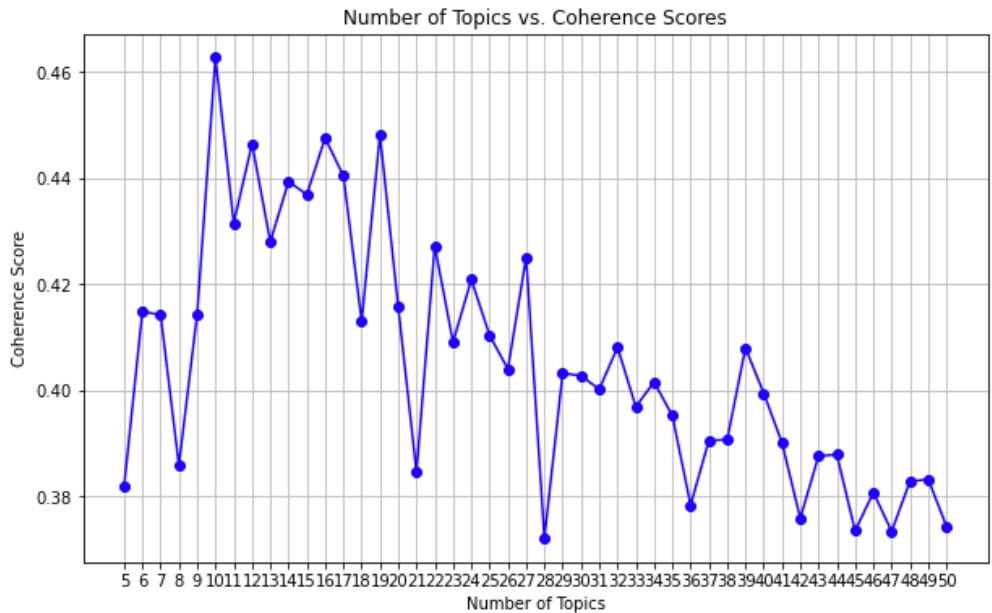


Figure 8
Model Coherence Scores for Number of Topics Estimated in r/Daddit



The top-performing mother-centric model identified seven topics (See Table 4) and the top-performing father-centric model identified 10 topics (See Table 5). There were similarities and differences between the mother-centric model and father-centric model. Both models discussed topics related to *sleep training* (i.e., frustrations with the child’s inability to sleep), *birthing parent and child health* (i.e., medical concerns related to the birthing parent pregnancy/labor process and infant health), *picky eating* (i.e., child unwillingness to eat certain foods), and *recommended purchases* (i.e., recommendations for child items such as strollers, gifts, clothes, books), albeit with different proportions of prevalence. The topics of birthing parent/child health (30%) and picky eating (20%) in the father-centric model had higher percentages of prevalence compared to birthing parent/child health (19%) and picky eating

(14%) in the mother-centric model. In contrast, topics of sleep training and recommended purchases were slightly more prevalent for the mother-centric model (22%; 13%) as opposed to the father-centric model (17%; 12%). It is worth noting that the father-centric model identified two topics related to recommended purchases. One pertained to general purchases (i.e., books, toys, gifts) similar to the mother-centric topic, and the second focused explicitly on car seat recommendations (5%), which was not separately divided in the mother-centric model.

Moreover, there were several differences in the types of topics identified between mother and father-centric models. The mother-centric model discussed issues related to *child social-emotional development concerns*, *work-family interface*, and *breast/bottle feeding*. Two of these topics appear to be somewhat tied to a mother’s traditional role, particularly content surrounding early child feeding and balancing work and childcare. Alternatively, the father-centric model included topics tied to *child entertainment*, *single fatherhood challenges* (mainly related to child defiance), *the role of fatherhood*, *diaper-changing issues*, and *financial considerations*. Akin to the mother-centric only topics, a few of these topics seem to be related to a father’s traditional role, specifically, financial considerations and child entertainment (i.e., videogames, music). Furthermore, the father-centric only topics also focused on notions of fatherhood, such as the decision to be a father, needing support and advice about fatherhood, challenges of being a single father, and/or navigating co-parenting after divorce or separation. In general, both mother- and father-centric audiences share various universal parenting topics in common while concurrently using audience-specific forums to discuss topics related to their specific parental role.

Table 4

Summary of r/Mommit Model Topic Labels, Topic Prevalence, Top Words, and Exemplar Post

Topic Label	Topic Prevalence (%)	Topic Words	Example Excerpts from Posts
Social-emotional Development Concerns	23.03	"want", "know", "kid", "say", "tell", "feel", "son", "daughter", "mom", "ask"	My 5 year old daughter gets upset and sometimes cries when anyone laughs “at” her. Such as, she’s doing something cute that makes someone giggle. Sometimes she gets upset if someone so much as smiles while they are watching her do something. I believe she thinks everyone is just making fun of her and laughing. But that’s not the case at all. I try to explain this to her each time. Telling her that it makes me happy seeing her do something and having fun. It doesn’t help though. I’m not sure where I’m going wrong or what more I can do to explain it to her.
Sleep Training	21.73	"sleep", "night", "time", "hour", "wake", "baby", "bed", "nap", "cry", "try"	My 5 mo [month old] won’t sleep. He doesn’t want to go down for naps unless he’s laying against me and then wakes and cries the moment we place him in the crib. In the evenings we do our bedtime routine: bath at 6:30, nurse at 7, book, in crib by 7:30... this was working for a while and now not at all. He keeps rolling

			<p>onto his stomach in his sleep and wakes screaming/crying. We flip him, soothe him back to sleep by patting his back. He sleeps for maybe 10 minutes and then flips over again and the crying and screaming begins again. Only when we place him between us in our bed will he sleep. But then again wakes when we move him to the crib. Long story short we're going out of our minds 🤔👉 advice GREATLY welcome!!!</p>
Work-Family Interface	21.41	<p>"work", "time", "home", "feel", "husband", "want", "mom", "kid", "baby", "family"</p>	<p>Hello, everyone. TLDR [too long; didn't read, i.e., summary]: I am really struggling with the transition from SAHM [stay at home mother] life to working mom life....My LO [little one] is 15 months old and I haven't worked since a couple of months before he was born. I LOVED staying at home with him; I found it to be amazing and fulfilling. But, shortly after he turned one I started thinking about going back to work... Ever since I got hired, I have been completely riddled with anxiety...But mostly, I am terrified of the change. I am terrified that I won't be able to be the hands-on mama that I always have tried to be. I am so scared that I will miss out on my son, and won't be able to balance work and motherhood... I could really use reassurance from other working moms that going back to work won't take away my mom life. I need to know others are successfully balancing work and motherhood...</p>
Birthing Parent and Child Health	18.46	<p>"baby", "feel", "get", "know", "time", "try", "pregnancy", "doctor", "experience", "tell"</p>	<p>Hey mamas, has anyone had a hernia during pregnancy? I noticed a bruising feeling near my belly button so I brought it up to my OB during my appointment this morning. She confirmed that I do in fact have a hernia, but it was nothing to worry about. She said that it should go away after birth. Has anybody had a hernia while you were pregnant? Did it heal itself after birth? I'm a little worried about having to go through a hernia surgery after birth...</p>
Breast/Bottle Feeding	14.29	<p>"milk", "bottle", "formula", "feed", "breastfeed", "pump", "baby", "try", "breast", "weight"</p>	<p>I enjoy nursing and being able to give my baby breast milk. But sometimes I'd like to give a bottle of formula instead. Every time I try she spits it out and won't take it at all. Does anyone have any suggestions? Do I just keep trying? I mix the formula into her oatmeal and rice cereal and she has no problem with that. This is the third formula we've tried. I hate feeling like I'm not able to produce enough milk for my baby and I'd love to be</p>

			able to supplement with a bottle of formula.
Picky Eating	13.97	"eat", "food", "meal", "dinner", "bite", "snack", "cook", "lunch", "egg", "fruit"	I always offer a variety of food to my almost 1 year old. She only likes avocado, cheese and mandarin oranges. Here is an example of what I have offered her the past week for dinner and she tries it but spits it all out....Not to mention daycare always offers her a variety of different foods that they cook in their kitchen and she won't touch it. I've tried everything including only offering one thing at a time and saving the best for last. Any advice? This has been going on for several months now. She sticks to like 3-4 things that she likes and spits out everything else. I'm afraid that once she is off of formula that she won't be getting enough nutrients.
Recommended Purchases	12.90	"look", "car", "buy", "use", "seat", "find", "toy", "wear", "need", "try"	Does anyone know if the maxi cosi zelia stroller system has a compatible buggy board? We love the stroller but I can't seem to find some sort of ride-along attachment.

Note. Hyperparameters - chunk size = 2000, passes = 5, iterations = 1000, random state = 1

Table 5

Summary of r/Daddit Model Topic Labels, Topic Prevalence, Top Words, and Exemplar Post

Topic Label	Topic Prevalence (%)	Topic Words	Example Excerpts from Posts
Birthing Parent and Child Health	29.84	"hospital", "doctor", "test", "birth", "baby", "covid", "pain", "blood", "symptom", "nurse"	My wife and I have a 3 year old that came VERY fast...This time around, my daughter is "sunny side up" and wife and I are taking doctor's recommendation to induce 2 days before full term. Most things she reads states C-section likelihood would be high. Everything else sites new studies that state a lower likelihood of emergency C-section compared to at term natural labor. Does anyone have positive stories of an induced birth with baby in posterior position (otherwise called "sunny side up")? She is pretty anxious, and all of her friends are making it worse with stories "they have heard". Thanks all!
Child Entertainment (video games, music)	28.24	"play", "game", "watch", "video", "kid", "movie", "song", "tv",	Hey fellow dads and future dads. What video games do you play with your kids? Or what are you excited to play? I just downloaded goat simulator on game pass and my 7 year old cracks up when we play it. I'm just

		"music", "screen"	looking for other fun kid friendly games.
Single Fatherhood Challenges	25.89	"time", "wife", "kid", "want", "go", "know", "get", "dad", "come", "home"	...My daughter and I were getting ready to get out of the house, but we weren't exactly on the same page. We were going to the county fair so I insisted that she wear shoes, she thought her flip flops were a better choice. When putting on her shoes she did not cooperate as she had her mind set on flip flops. After about 10 minutes of her throwing a fit I snapped. I raised my voice like I always said I wouldn't...Well she gave me the most saddest, disappointed look and I instantly felt like a P.O.S [piece of shit] dad. I apologized to her and told her I was sorry and she curled into my arms and we both shed some tears. How common is it to yell at a toddler and is it sometimes necessary? Should I have not made it a big deal? She ended up wearing the flip flops and we had an amazing day with no issues. My daughters mother and I split up about 4 months ago and have our child 50/50 (I feel like this might have an affect here idk).
Role of Fatherhood (feelings, support, advice)	20.46	"dad", "feel", "child", "father", "want", "know", "life", "parent", "family", "think"	This is my first month as a dad of twins. My wife and I are getting the hang of things and adapting to the hourly needs for us all to survive. But still I can't help but feel lonely and isolated from the experiences of other families of multiples. My peers that happen to be fathers, despite being very upstanding and great fathers, chuckle when I talk about co-equal parenting of infants let alone two at once. Do any fathers of infant or newborn twins/multiples here share these feelings and experiences? I could really use a friend to talk about and support each other as we go through the new challenges in daily lives. It is a very emotional, overwhelming experience. The support networks and groups that do exist out there feel exclusively tailored to mothers even the ones that aim to be inclusive of all parents.
Picky Eating	19.51	"eat", "food", "bottle", "milk", "snack", "formula", "meal", "dinner", "feed", "lunch"	My son is now 17 months old and has been in a big picky phase for about two months now. The pediatrician says it's normal for kids this age, and he's a healthy weight and height. But it's a daily struggle to get him to eat a balanced meal...Now he eats a lot less and refuses the meals he used to eat. He turns away from anything new or throws food he doesn't want. He will eat some egg and tofu, but refuses any meat. He

			will eat carbs and some fruits. He loves his snack puffs. I just want him to eat healthy and not make mealtime such a struggle.
Sleep Training	17.23	"sleep", "night", "bed", "baby", "wake", "cry", "try", "time", "nap", "scream"	Two week old baby fights taking naps. They only sleep for about 6 hours a night only at night in 3 hour intervals. We have giving him a bath, swaddling, letting sleep on us then transferring into his crib, driving in the car, co-sleeping with mom recommended by the pediatrician. Has anyone else dealt with this issue? Edit- What do we do when we set him down for naps and he wakes up immediately to start crying?
Recommended Purchases	11.95	"book", "read", "gift", "idea", "toy", "christmas", "birthday", "ask", "card", "buy"	Most of the kids books we read to our son are written and illustrated by women, but most of the characters in the books, even if they are animals are boys or men. To the extent that I often change characters from "he" to "she". Any recommendations are welcome. Also would love some culturally diverse characters too...
Diaper Changing Issues	5.03	"diaper", "hand", "potty", "change", "poop", "clean", "pull", "pee", "sit", "bathroom"	Before circumcision it was easy to angle the penis down into the lower portion of the diaper. Afterwards it sits straight up and when he pees it goes up the top and out of the diaper causing his clothes and sheets to get soaked. Is there a way to still angle downwards into the diaper or does the healing process require him to stay how it is and tough it out?
Car Seat Recommendations	5.00	"car", "seat", "travel", "drive", "ride", "buy", "recommendation", "vehicle", "road", "fit"	Looking for recommendations for a convertible car seat for my 8 months old. He's about grown out of his infant car seat. What are your recommendations and why? We are considering the Nuna Rava and Cybex convertible car seats. Thoughts/Opinions?
Financial Considerations	3.35	"pay", "money", "job", "use", "find", "work", "plan", "option", "save", "company"	Dads-I'm looking for advice on anyone who has contributed to 529s for their child for school. I understand that individual states sponsor their own plans and I'm curious how that plays into it. Does it matter which state you use? Should you create an account for the state you pay taxes in? Maybe 1 state is just better than the others? Then there's Coverdell Education Savings Accounts. Limited to \$2K per year it seems? Any thoughts here? I'd like to aim to contribute \$3-5K per year. I have a brokerage account with TD Ameritrade already (they use Schwab), so that's an obvious option. So many choices, thanks for

any input Dads.

Note. Hyperparameters - chunk size = 2000, passes = 5, iterations = 1000, random state = 1

Comparing Topics Prior to COVID-19 and Since the Onset of COVID-19

To address my third question: How have parenting topics discussed online changed with the onset of COVID-19? I compared the types of topics and prevalence of topics from posts discussed across all three parenting forums (i.e., r/Parenting, r/Mommit, r/Daddit) pre-COVID (2/1/2019 - 3/10/2020) and post-COVID (3/11/2020 - 7/1/2022). Like earlier models, I estimated 5-50 potential LDA topics to identify the coherence scores across models. The best-performing models (i.e., highest coherence score) for pre-COVID was 0.447, and post-COVID was 0.419 (See Figures 9 & 10).

Figure 9

Model Coherence Scores for Number of Topics Estimated for Pre-COVID Corpus

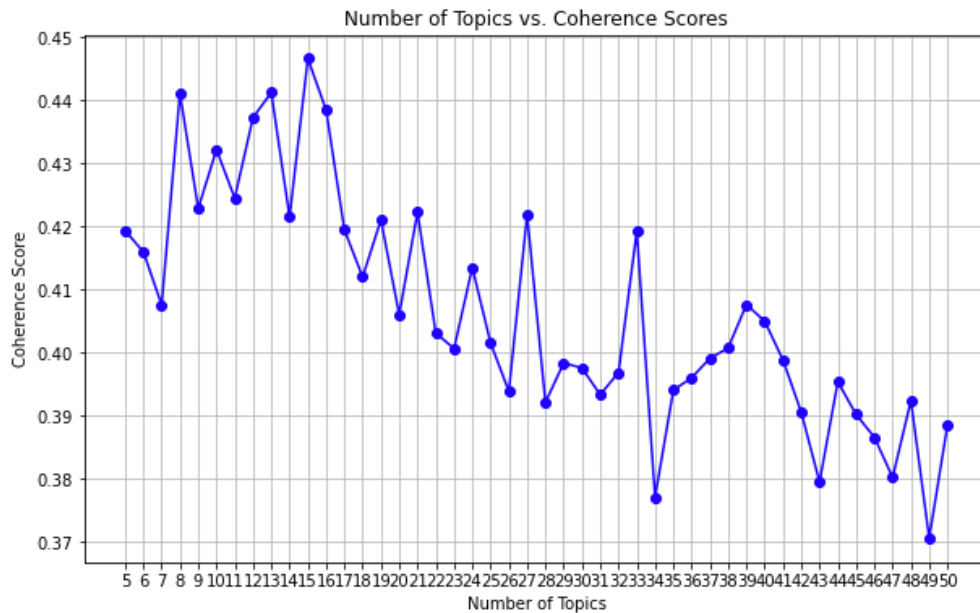
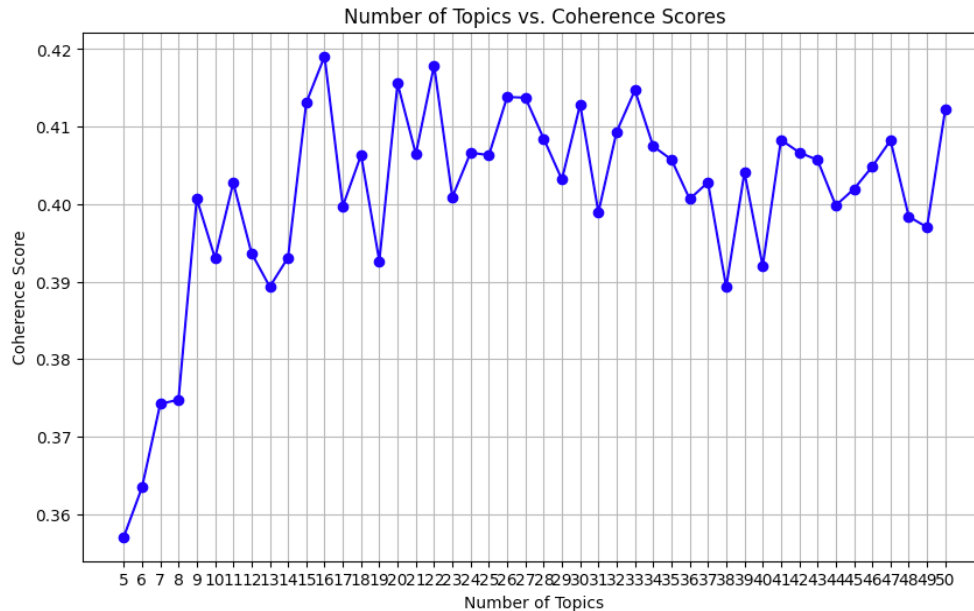


Figure 10

Model Coherence Scores for Number of Topics Estimated for Post-COVID Corpus



The best-performing pre-COVID model identified 15 topics (See Table 6), and the best-performing post-COVID model identified 16 topics (See Table 7). Approximately 10 topics had some similarities across both eras regarding content, albeit not identical. Of the 10 topics, five topics were interchangeable: (a) *Pregnancy concerns* (i.e., medical/physical health concerns related to the pregnancy and/or delivery), (b) *Work-family interface* (i.e., transition to work, staying at home, and daycare considerations), (c) *Potty training* (i.e., challenges with toilet training), (d) *Co-parenting and custody* (i.e., navigating child custody issues and how to co-parent after separation), and (e) *Sleep training* (i.e., frustrations surrounding child sleep challenges). The topics were also comparable in prevalence, except the pre-COVID model had a higher topic prevalence for pregnancy concerns (18% vs. 12%) and a lower topic prevalence for co-parenting and custody (11% vs. 18%).

The five other similar topics had some parallels but were not entirely overlapping. For example, the topic of *recommended purchases* was present in both the pre- and post-COVID; however, in the pre-COVID model, it included a broad range of items (e.g., car seats, formula, strollers), while the post-COVID topic was narrowly focused on *car seat recommendations*. Another somewhat corresponding topic was related to food. In the pre-COVID model, parents discussed *child meal preferences* and generally sought ideas, while the post-COVID model was devoted to issues of *picky eating*. A third neighboring topic referred to *child-peer interactions*. In the pre-COVID model, this topic discussed children’s challenges in making friends and navigating bullying and peer pressure. In contrast, the post-COVID topic emphasized children’s lack of peer socialization due to the pandemic. Furthermore, in the pre-COVID model, there are three separate topics that could fit into one of the post-COVID model topics. One of these pre-COVID topics is tied to parents sharing concerns about their children’s internalized (e.g., fearfulness, withdrawal) and/or externalized behaviors (e.g., hitting, pushing, biting), a second topic is tied to speech delays, and the third is focused on academic and behavioral school concerns. Whereas the post-COVID model identified a related topic that combined externalizing behaviors and developmental disabilities (e.g., speech delays) in school settings.

Several differences were found across topics between the pre- and post-COVID models. The contrasting pre-COVID topics were tied to *technology concerns* (i.e., the appropriate amount

of screen time and parental controls), *birthdays/celebrations* (i.e., ideas for party celebrations and gifts), *hygiene/cleanliness concerns* (i.e., teeth brushing, hair washing, and maintaining a clean home), and *songs* (i.e., selecting a lullaby or song for a child). The varying post-COVID topics included issues of *teething and biting behaviors*, concerns with *breast and bottle feeding*, challenges with *toddler tantrums and meltdowns*, *child physical/medical health* worries, difficulties *maintaining the home*, *recommendations for child entertainment/education* (e.g., games, books), and disclosures of *parent mental health challenges*. Although it appears that topics in both pre- and post-COVID models may be relevant to any parenting moment, it is interesting to note four topics that may have been responsive to the onset of the pandemic: child medical concerns/physical health, difficulties maintaining the home, child entertainment/education recommendations, and parental mental health challenges. Parents may be more apprehensive about their child’s physical health and, therefore, seek reassurance from others. The increased time at home and indoors may have increased concerns about home maintenance and forced parents to explore child entertainment and education suggestions. Finally, the adverse effects of COVID-19 on some people’s mental health and well-being could have potentially generated additional discussions about parental anxiety and depression. Thus, some topics may have been raised or exacerbated by the pandemic.

Table 6
Summary of Pre-COVID Model Topic Labels, Topic Prevalence, Top Words, and Exemplar Post

Topic Label	Topic Prevalence (%)	Topic Words	Example Excerpts from Posts
Child Internalized & Externalized Behavior	20.92	"time", "try", "say", "get", "know", "tell", "kid", "start", "stop", "think"	I have a 3.5 year old boy and 14 month old girl. He has always loved her and was excited and happy to have a baby sister. But, for the past few months he has been being mean towards her. For example, he will purposely push her down and although it is not a hard push, it is a gentle push, but he is still "pushing" her and it is totally unacceptable. Other times he will begin sweetly hugging her and then make her fall with his hug. He will take toys that she is playing with away and it will make her upset and cry. He gets jealous when I hold her and give her attention. I know this is all very typical of a toddler. What is the best way to get him to play nice and be sweet to his little sister?... Any advice on how to help them get along? And how to help with his anger?
Songs	18.60	"song", "niece", "nail", "sing", "doll", "cheek", "pitch", "tape", "clip", "traditional"	Long before I had my first baby, I knew I would sing "If I had Words" as a lullaby. When I was pregnant, I sang that song frequently, and have sung it almost every night to my now 2.5 year since she was born. Now I have an almost 8 month old, and I still don't

			<p>have a song for her. I want it to be something special, and not a conventional lullaby, but also not something too long. I'm struggling to find just the right thing, and I feel a little sad that my baby doesn't have her own song yet. So what are your favorite non-traditional, unconventional or unique lullaby songs?</p>
Pregnancy Concerns	18.23	"baby", "feel", "doctor", "wife", "pregnant", "pregnancy", "sick", "hospital", "second", "birth"	<p>So my wife's due date is 8/7 but due to high blood pressure (167/106 was her highest) and headaches they went to induce. They diagnosed my wife with gastric hypertension and are worried of preclampsia. He'll be full term so I'm not too concerned just was hoping to have a few more weeks to mentally prepare myself for our first baby. Can't wait to meet the little guy. 😊</p>
Work-Family Interface	17.40	"work", "kid", "time", "child", "home", "parent", "job", "daycare", "live", "pay"	<p>My daughter is 18 months old and has been in daycare since she was 10 weeks old. I work full time and so does my husband...Just like any working parent, I am finding it more and more difficult to do all of the things in the limited time that I am not at work. Because of that, I don't think I am the best wife to my husband or the best mom to my daughter. Since I am essentially just working to pay for daycare, I have been tossing around the idea of just quitting to be a sahm [stay at home mother]. My daughter is extremely bright and absolutely loves going to daycare everyday and I truly believe that it has benefited her in so many ways. She is learning things that I could never teach her on my own - not to mention the benefits of the social interaction with children her own age. My question for you, Reddit parenting community, is have any of you made the transition from working parent to stay at home parent? How did your child handle the transition from being in a daycare environment to being home with you all day?</p>
Potty Training	14.36	"potty", "diaper", "poop", "pee", "toilet", "train", "accident", "bathroom", "go", "sit"	<p>Hello. My 3 year old son has been doing really well with potty training. He is wearing underwear and using the potty to pee without needing to be reminded. However, he will not poop on the toilet. He will go stand in a corner and poop in his pants. When I see him do it I try to take him to the toilet and he starts crying that he doesn't want to poop on the potty. How do I encourage him to poop on the toilet? Thank you.</p>
Hygiene/Cleanliness	12.37	"room", "clean", "hair", "tooth",	<p>My (almost) 2 year old HATES having her teeth brushed. She fights it and we just aren't doing well, she</p>

Concerns		"water", "wash", "brush", "bedroom", "bath", "house"	is developing yellow along her upper gums. She will chew on the brush herself though. Can anyone recommend a brush or toy for her throughout the day that will supplement the brushing? Thanks!
Co-parenting & Custody	10.80	"want", "feel", "know", "son", "daughter", "time", "tell", "dad", "go", "mom"	There's a ton of backstory with this, but it boils down to: my husband was involved in sexual harassment, lost his job last year, and lied to me about some of it from the start and the rest of it from January until now. He's not the man I married and he was never the man I married... When my son asks what's wrong and why that's true when things were okay last week (from his perspective), what am I supposed to say to that? Worse, I'm really struggling with myself to decide how I want to handle custody: I'm not sure he's someone I want my son learning how to be a man from. Of course I plan to reassure him that his dad and I both love him very much, and that things will be different but that different can & will be better. I'm looking for a child psychologist and I'm talking to lawyers next week. Does anybody else have any advice for how to handle this?
Recommended Purchases (e.g., car seat/formula)	9.50	"car", "milk", "seat", "bottle", "formula", "pump", "stroller", "need", "buy", "use"	My daughter is nearly 10 months and we will be transitioning her to a convertible car seat soon. What brand and model do you prefer? Pros? Cons? We were considering the Graco so if anyone has this, feedback is appreciated. Thank you.
Child Peer Concerns (e.g., friendships, bullying, peer pressure)	8.37	"kid", "friend", "son", "want", "say", "tell", "play", "daughter", "school", "talk"	I was called into school the other day because a girl has accused my daughter and her best friend of bullying her. Of course they both denied it but this other little girl seemed very upset. My daughter is 10 and I have witnessed some mean behaviour from her. I've heard her calling other girls ugly, fat, making fun of their clothes etc. We try to teach our kids to be kind to others but she seems to have picked up this behaviour from somewhere, either school or tv I guess. I don't know what to do to change her behaviour. I don't want her to be a bully
Speech Delays	7.77	"read", "book", "child", "word", "help", "speech", "therapy", "learn", "language",	Wondering if the evaluation will be similar to the paper 18 mo [month old] evaluation we filled out at the pediatrician. She is 20 months old and says less than six words.

		"therapist"	
Birthdays, Celebrations, & Gifts	7.10	"birthday", "party", "gifts", "trip", "invite", "buy", "christmas", "present", "holiday", "family"	I'm planning a birthday party for my soon to be one year old which a majority of her cousins will attend. I want to put together a favor bag for the kids with some snacks that they'd actually enjoy. What're some cool snacks I could include?
Child Meal Preferences	6.08	"eat", "food", "kid", "dinner", "meal", "cook", "lunch", "favorite", "fruit", "enjoy",	Parents, what kind of dinner meals do you prepare? Do you prepare separate meals for the kids and yourselves or does everyone eat the same thing?How long does dinner prep take and do you do meal planning for the week?
Sleep Training	4.21	"sleep", "night", "time", "bed", "hour", "try", "wake", "baby", "nap", "help"	My daughter is almost 2 and half and we are struggling big time at bed time. She used to sleep perfectly fine, went to bed and fell asleep on her own at 8pm with no fuss. One night in the middle of the night she started screaming really hard and ran to us in our bedroom. Ever since that night we can't get her to go to bed on time, or even sleep in her own bed, she fights us on it. When we try to put her in her bed at her normal 8 bedtime and crack the door, she screams bloody murder pretty hardcore...To get her to go to bed, we either have to put her in her bed and lay with her in her room til she falls asleep (sometimes in her bed with her) or she has to sleep in bed with us. If we do get her to fall asleep in her bed, she will come in our room in the middle of the night and sleep on the floor or ask to get in bed with us...My wife and I have not had a full good nights sleep in over 2 weeks because of this issue... I'm hoping maybe this is just a phase? Any advice any one can give?
School Concerns (academic, behavioral)	4.13	"school", "teacher", "class", "grade", "homework", "help", "behavior", "issue", "student", "need"	So my 6 year old daughter was having trouble in Kindergarten last year learning her letters and reading. This year in 1st grade it's gotten worse. The school has been giving her extra help because of it. We have brought it up to her doctor and she wants her to be tested for an IEP [Individualized Education Program]. Also she wants to test for some ADHD. What's something we can do as parents to help her. Until the testing and if she does have ADHD and a learning disability what can we do at home for extra help?
Technology	2.91	"game", "phone",	I would like to start a discussion about

Concerns/ Parental Control	"video", "play", "watch", "find", "screen", "time", "online", "monitor"	iPad/tablet/phone use in toddlers! Do you restrict amount of time they have access? How do you monitor what they watch? Are there any shows or channels you have blocked, if so why? Wanting to hear everyone's opinions on frequency, content, ads, online safety, etc. Do you purchase app subscriptions, if so are they worth it? Most apps I download seem to require payment to do just about anything so it's hardly a "free" app to use and enjoy.
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Note. Hyperparameters - chunk size = 3000, passes = 5, iterations = 2000, random state = 1

Table 7

Summary of Post-COVID Model Topic Labels, Topic Prevalence, Top Words, and Exemplar Post

Topic Label	Topic Prevalence (%)	Topic Words	Example Excerpts from Posts
Child Externalized Behavior & Developmental Disabilities	21.52	"school", "say", "kid", "know", "talk", "teacher", "tell", "son", "try", "daughter", "time", "behavior"	So my son is in sixth grade and since returning to in person learning a couple months ago his teachers have reached out to me on maybe 5 different occasions about his behavior. They state that he is being disruptive during class. I have grounded him and talked with him. I told him I would reward him if I receive positive feedback from any of his teacher. I have asked him why he is acting like this or why he can't control it. He never got in trouble in elementary school. I have asked if he is bored, if he needed more challenging work. I just don't know what to do. I don't want this behavior to continue obviously. I don't want him to be known as the bad kid. He always says it's the teachers. Anyway my parents weren't involved and I never got in trouble so I don't know how to properly respond to this situation. Any type of guidance would be appreciated.
Teething/ Biting Behaviors	20.89	"bite", "tooth", "leg", "arm", "hand", "hit", "face", "hurt", "scratch", "mark"	She is teething and seems to put everything in her mouth but today she bit my leg and my arm! It hurts though. She even wanted to bite my cheek and ended up hitting her head in my mouth and she cut my lip a bit. As I said I know that she is teething but is this something I should be worried about? Like what if she does this to other kid? It was painful for me I

			<p>cant imagine if she bites another baby. She is not very much socialized when she plays with my neighbor kid she always wants to pull her hair and ear. Maybe if she is not teething she will not bite?</p>
Car Seat Recommendations	19.61	"car", "buy", "seat", "new", "find", "use", "fit", "want", "need", "recommendation"	<p>I would like suggestions for your favorite convertible car seats & why it's your favorite! I'm looking to buy a new one for my toddler (almost 3) .. she's still rear facing. Not trying to spend over \$250 preferably!</p>
Co-parenting and Custody	17.56	"tell", "daughter", "say", "son", "want", "know", "ask", "mom", "dad", "go"	<p>My son's father is most likely going to go to jail on Monday after court. He is getting charged for domestic violence after attacking his uncle. Over pot.... If for whatever reason he doesn't end up going I'm obviously not going to say anything. I haven't even mentioned anything to my son about it. My son witnessed the event. He has gone to jail before over DV [domestic violence] but my son was little. His father abused me, the girlfriend after me and now his uncle. My son has seen enough violence and I'm going to fight AGAIN for sole custody or supervised visits. Courts denied me before claiming it is best for the child to have 2 parents. I however only let him visit him because he was living with his grandmother who I trust. It breaks my heart that my son has to go through this.</p>
Work-Family Interface	15.80	"work", "time", "home", "job", "daycare", "go", "need", "stay", "help", "leave"	<p>I've been off with my baby the duration of this pandemic (she was born in december), she's an only child and has never been around children. I've found a daycare I like, so how do I actually do it? I don't technically need to work right now but it would go a long ways towards us buying a house. The mom guilt is crazy. I'm going to miss these days with her being so little, but at the same time I know I can't keep it up staying at home because I'm going crazy. Does it get any easier?</p>
Breast/Bottle Feeding	14.44	"feed", "baby", "bottle", "milk", "formula", "try", "breastfeed", "start", "eat", "pump"	<p>We have been trying to switch my 8-month-old daughter from breastfeeding to bottle feeding for weeks. She completely refuses anything we try. We have tried all the bottle and nipple shapes, water, milk, formula, breast milk, and different people feeding her. We are out of ideas, has anyone been through this, or have any tips?</p>

Toddler Tantrums/ Meltdowns	13.00	"time", "try", "cry", "get", "want", "feel", "scream", "tell", "help", "throw"	My daughter just turned 4 a few weeks ago. She's been so rough for the past few months. My wife and I are at a loss for what to do. She gets very mad when she doesn't get her way or just starts bawling. Time outs and taking things away don't work. We try to sit her down and calmly talk with her but she won't listen or just scream cries. Please any advice would be great. We also have a 9 yr old son and a 2yr old son. Never had these problems with the 9yr old.
Pregnancy Concerns	11.93	"baby", "go", "pregnant", "wife", "experience", "pregnancy", "look", "birth", "advice", "expect"	Does anyone have any tips for coping with an irritable uterus? I'm only 28 weeks and still waiting to hear back from my OB over it. I went to the hospital Saturday and this is a new experience and a new term for me. My husband is extremely stressed and worried about me bc I keep having contractions. They're not Braxton Hicks and my cervix wasn't dilated.
Potty Training	11.88	"potty", "diaper", "pee", "try", "poop", "time", "toilet", "change", "training", "accident"	Four days now and this boy has done so good at going potty. Only two mistakes in four days is awesome. The problem I'm having (I really badly need some help with this) is that he refuses to go 🍑 in the potty. He acts like it's bad, like he is doing something wrong and is going to get into trouble for it. 😞 My son wasn't like that, he just went to the potty and was proud of it! So experienced mama's and daycare workers, what do I do to help him overcome this? 😊 #help #poopproblems #toddlers
Sleep Training	11.12	"sleep", "night", "bed", "wake", "nap", "time", "asleep", "bedtime", "crib", "routine"	Since our daughter was a newborn, she would always sleep through the night 12 - 14 hours no problem...Now she is almost 3 and for the past month she has not gone longer than 45 min without waking up. She wakes up and runs to open the door and starts screaming for one of us. We have tried earlier bed times, later bed times, giving her choices like which parent takes her to bed or which blanket she wants. We also tried self soothing methods which helped us get through the regressions in the past. The only way we can get her to lay down and fall asleep is to sit in a chair next to bed, but she will only sleep for about 45 min before getting up again. We are both sleep deprived and losing our minds.

			Please help! Willing to try anything at this point.
Child Medical Concerns/ Physical Health	10.14	"get", "doctor", "sick", "say", "ear", "feel", "test", "infection", "check", "eye"	Both my 3 year old and 1 year old have pink eye. Never ending runny nose and then a cough that started somewhere along the way. Was worried it was Covid only to be told by the doctor after a negative test yesterday that it's "just this bug that's going around". Then the eye crusts and fever started today.
Maintaining the Home	9.50	"dog", "kid", "house", "clean", "run", "go", "get", "room", "wife", "home"	Hey, guys. My son was born last may and it seems like ever since then, my whole apartment has been a complete mess. Clothes not folded, laundry basket overflowing, dishes piled up, dishwasher full and clean but not put away. I can barely see my bedroom floor. Does anyone else have this issue or am I just and exhausted piece of shit lol?
Child Entertainment /Education Recommendations	8.69	"play", "toy", "watch", "game", "want", "time", "video", "book", "tv", "room"	My dude loves coloring and I figure he'd love coloring on his iPad too, was wondering if anyone has an app their kids like. I know it'll probably last like 2 minutes but hey, worth a try.
Parental Mental Health Challenges	7.53	"feel", "child", "want", "know", "kid", "love", "parent", "think", "help", "try"	I'd like to start a discussion about parenting with depression and anxiety. I struggle to show up in my own life because my mind is in other places. As a father of 3, I feel distant from my family and I don't know how to find my way back. This distance makes me feel guilty - especially when there are other fathers out there that seem to be killing it - and the guilt reinforces the negative self talk which makes me feel worse. Granted, there are times when I'm good and I feel like a good husband and father but I have a lot of low lows. Let's talk about it and share some tips on parenting through this stuff. Thank you.
Child Peer Socialization (e.g., lack of interactions)	7.13	"kid", "school", "parent", "family", "friend", "live", "want", "time", "covid", "social"	We have 2 children of 7 and 5 who are desperately needing some interaction with other kids their ages. Unfortunately, none of our friends who live near us have any children. Parks and public places are no longer an option because of COVID. What is the best way for us to find play dates with kids their age to help them with their social skills and boredom? Is there a safe app out there that serve this purpose?
Picky Eating	6.04	"eat", "food", "dinner", "snack",	My 30 month old (haha, 2 and a half year old I mean) is SO PICKY! It all started when we moved

"try", "meal", "want",
"lunch", "picky",
"refuse"

from purees and onto actual food when he was around 9 months old. Around the time he turned 2 he started going off a lot of the *very limited* food that he did eat...he will pick out any fruit or veg bits that he notices. He even picks out chocolate chips because he's THAT picky... Does anyone have any tips or recipes for how to get fruits and veg into him? He will not eat any fruit or veg because he hates the texture. He used to eat freeze dried raspberries but he doesn't anymore. He does not have any meat in his diet at present because he refuses anything I offer. Thanks for any help! This parenting thing is so hard.

Note. Hyperparameters - chunk size = 9000, passes = 5, iterations = 2000, random state = 1

IV. Qualitative Content Analysis Methods

Chapter 4 explores the utilization of upvoting as a sampling approach and then delves into the qualitative method of content analysis.

Akin to the computational methods, I also used Reddit, specifically focusing on three subreddits dedicated to parenting: r/Parenting, r/Mommit, and r/Daddit. For additional details on the setting and subreddits, refer to the methods outlined in the computational unsupervised machine learning chapter (Chapter 2).

The Advantages and Drawbacks of Upvoting

For this method, I utilized a self-moderated built-in voting system to determine the sample. Reddit's platform is based on community-driven curation and moderation. Users determine what information is more visible to the community through Reddit by "upvoting" and "downvoting" (Gaudette et al., 2021). Although Rediquette (i.e., "is an informal expression of Reddit's community values as written by the community itself") emphasizes upvoting if the content is relevant to the discussion and downvoting if the content is irrelevant, users upvote the content they like and downvote the content they dislike (Reddiquette, n.d.). Upvoted content is then pushed to the site's front page and exposed to millions of other users (Kassaeyan, 2016; Widman, 2022). Reddit's voting algorithm shapes the discourse of the subreddit community, where users develop and contribute to like-minded communities that share similar views (Leavitt & Clark, 2014). However, the voting algorithm can produce an environment where extreme views are continuously validated. In a study exploring a Donald Trump subreddit that promoted anti-Muslim and anti-Left sentiment, the voting algorithm facilitated an "echo chamber" where upvoting only supported extreme views and not ones outside the dominant narrative of the subreddit (Gaudette et al., 2021). Despite its potential misuse, it is important to explore upvoted content as it has high exposure and spotlights content that a subreddit community values. Analyzing the posts and comments that users upvote on r/Parenting, r/Mommit, and r/Daddit provides insight into users' preferences and what they consider valuable content. This sampling approach helps understand the types of posts and comments that resonate with users and are deemed worthy of recognition or attention within these communities.

Procedure

As mentioned above, users can upvote posts or comments to increase the visibility of the post or comment and can downvote posts to decrease the visibility of the post or comment (Teague & Shatte, 2018). I selected the "Top" posts of "All Time" using Reddit's filtering features for each subreddit. Next, I extracted the 10 most upvoted posts for each subreddit (10 posts * 3 subreddits = 30). I then retrieved the "Top" five comments responding to each of the original posts (5 comments * 10 posts * 3 subreddits = 150). The total sample size comprised $N=180$ posts and comments.

Inclusion and Exclusion Criteria

Upvoted posts and comments were extracted from the three parenting subreddits between February 1st, 2019, and July 1st, 2022. Responses to the comments of the post were excluded. Other exclusion criteria for posts and comments were non-English language posts, non-textual

posts (e.g., images, videos), posts with only a URL (web page address), promotional posts or advertisements, and redundant posts or comments by the same user (i.e., same username).

Sample

Data included posts, comments, author (unique usernames/pseudonyms), how long an author has been a Reddit user/account age, link_flair_text (text labels assigned by moderators to categorize or label posts based on their content), number of votes, number of comments, and timestamps, with no identifying information.

Daddit had the widest timeframe between upvoted posts (3 years and three months) and the highest mean user account age (6.5 years, SD=3.48) on Reddit (See Table 8). Furthermore, r/Daddit had the least number of deleted usernames (i.e., when a user deletes their account to stop using the site or creates a new account with a different username; 7%), suggesting that they are more committed to the platform. On the other hand, r/Mommit users had the narrowest and most recent timeframe of upvoted posts (~ 1 year), the shortest mean user account age (4 years, SD=2.54), and the highest number of deleted usernames (15%). r/Parenting had the highest number of upvotes for posts (8200), which is unsurprising as the subreddit has the highest number of members compared to r/Mommit and r/Daddit. Unexpectedly, r/Mommit had the highest number of upvotes for comments of a post (3400) compared to r/Parenting (3000) and r/Daddit (1900). r/Daddit had the lowest number of upvotes for both posts and comments.

Table 8
Subreddits Sample Description

	r/Parenting	r/Mommit	r/Daddit
Timeframe of Upvoted Posts & Comments (mm/dd/yyyy)	5/9/2019 - 5/22/2022	6/7/2021- 6/25/2022	3/19/2019 - 6/21/2022
No. of Votes of Posts (Rounded to nearest 100)			
Maximum	8200	6000	4500
Minimum	5400	2400	2400
No. of Votes of Comments (Rounded to nearest 100)			
Maximum	3000	3400	1900
Minimum	44	66	25
No. of Unique Usernames	55	51	56
Deleted Usernames	5	9	4
Upvoted Users Account Age in Years ^a			
Mean	6.1 (SD=3.05)	4 (SD=2.54)	6.5 (SD=3.48)
Range	0-13	0-12	0-14

^aMeasured from the time users joined Reddit to the time of data extraction (12/2022)

Coding and Analysis

Dedoose, a qualitative analysis tool, was used to code and explore salient themes parents discuss in upvoted posts and comments within and across subreddits. My team employed content analysis, a systematic coding and categorizing approach used to explore trends and patterns in the data (Krippendorff, 1980). Content analysis examines the data both qualitatively and quantifies the data using counts of codes (Downe-Wamboldt, 1992). It answers questions about who says what, to whom, whether something is present, to what extent, and how (Bloor & Wood, 2006). A deductive codebook was created to represent a continuum of parenting practices from promotion to prevention to treatment. Promotion was captured by coding for components of positive psychology parenting (Seligman, 2002), which stems from the Broaden and Build Framework (Fredrickson, 1998) of parents discovering and praising their child's character strengths (e.g., wisdom, courage, humanity). I added codes for principles and skills of positive parenting (e.g., having realistic expectations, encouraging desirable behavior, and using assertive discipline; Sanders, 1999) to incorporate prevention and treatment. Furthermore, I included codes for the most common topics covered in evidence-based parenting programs identified by Temcheff and colleagues' (2018) scoping review of programs (e.g., family communication and positive reinforcement). Given the study's exploratory nature, inductive codes were added iteratively (e.g., parenting successes, challenges, interactions, emotions).

Depending on the size of the data, 10-25% of the data units are typical for recoding (O'Connor & Joffe, 2020). After refining the codebook, a second rater separately coded a random sample (30%) of the posts and comments from each subreddit. The second rater, an undergraduate student researcher, received training over approximately 1.5 months through weekly meetings with the dissertation author in qualitative coding and using the codebook before participating in the coding process. Next, we performed an inter-coder reliability (ICR) assessment to evaluate the rigor and transparency of our codebook against the data. Following the parameters of Landis and Koch (1977), we achieved a "good" agreement (0.80) between raters. To answer my research questions, I looked at the prevalence of each code, its co-occurrence with other codes, and its occurrence within and across separate subreddits. Finally, I connected the codes to generate overarching themes and subthemes.

V. Exploring Upvoted Parenting Content, Interactions, and Emotions

Chapter 5 explores the research questions about parenting content, interactions, and how parents express their emotions in upvoted posts and comments online. Furthermore, it examines whether there are similarities or differences across mother-centric and father-centric forums. Below, I present the key findings in response to the research questions.

Salient Themes in Upvoted Parenting Content

First, I describe the themes related to the first research question using the qualitative approach: What parenting content do parents value/popularize on online parenting forums? I generated three themes with subthemes to understand parenting topics and how parents discuss them online.

Theme 1: The Power of Storytelling, “I needed to ... get my own feelings into words.”

The first theme highlights the parenting topics discussed across posts in the three subreddits (r/Parenting, r/Mommit, and r/Daddit). This theme focuses on posts rather than comments because, in this sample, comments did not introduce new topics; instead, they responded to the topics discussed in the original posts. The majority of upvoted posts in this sample - 23 out of 30 or 77% - described parenting challenges and successes through storytelling or venting/ranting with no explicit language of sharing or seeking advice. Moreover, the discussion of challenges (13/30 or 43%) was more prevalent than successes (10/30 or 33%).

Theme 1a.: Parenting Challenges, “I don’t know what I’m supposed to do now.”

Parents discussed a variety of challenges, characterized into three overarching themes: (a) grief and loss, (b) societal shifts and value conflicts, and (c) institutional barriers and constraints.

Grief and Loss. Five of the 13 challenge-related posts (38.5%) discussed the loss of a child across a range of ages from birth to a teenager. Parents used the platform to process the loss of their child through storytelling as a way to memorialize their child. For example, some described their experience by sharing specific dates and events, while others used it as a place to process their feelings and write a eulogy or poem. One parent, whose premature birthed child suffered health complications, described the exact dates and medical procedures that his son went through until the moment he passed away and what witnessing his son’s experience meant to him. He wrote,

I was never the type of person to have heroes. Even as a kid I didn’t aspire to be like someone else.... My son is my hero. From the day he was born to his final moments he fought harder than I ever could have imagined. I now know what it feels like to aspire to be like someone else. (r/d 10)

Another parent similarly described a timeline of events of their 3-year old’s illness and ended the post unable to specify the purpose of sharing: “My entire life revolved around my son and now that he’s gone I have no idea what to do or think. I am broken. I don’t know what the point of this post is.” (r/p 3). While others were more explicit with what they needed “My son was killed and we’re going to the funeral home. Need well wishes.” (r/d 4). A fourth parent gave an account of specific days in their teenage daughter’s life: the day their daughter was born, the normalcy of the day before her death, the day of her car accident and death, and the difficulty of the day three months after her accident. This parent ends the posts explaining the reason for

posting: “I needed to put [daughter’s name] pictures out there and I [sic] get my own feelings into words. She is an amazing daughter, and I was very lucky to be her father.” (r/d 9). Finally, one parent wrote a poem-like entry with a series of statements for their stillborn son, beginning with “I was supposed to...” tied to hearing their son cry, taking him to the playground, bringing him to his nursery, picking his outfits, celebrating mother’s and father’s day and ended with “I was supposed to be a father on Sunday but I don’t know what I’m supposed to do now.” (r/d 3). Overall, it is clear that parents need and value the space to share their children’s stories and process their emotions.

Societal Shifts and Value Conflicts. A second equally prevalent challenge was societal shifts and value conflicts (38.5%). These ranged across a variety of topics, from generational differences in physical punishment, generational and societal differences in parenting expectations, gendered societal norms, and marital separation due to traditional gender role expectations. All five posts discussed the challenge of fulfilling their parenting role as a consequence of these value conflicts and societal expectations. One mother shared her experience of being judged and receiving unsolicited advice from her husband’s grandmother about how to discipline their two-year-old child who was crying. She wrote, “...my husband’s grandma.. said we need to get a wooden paddle and go to town on her. I said, “sorry but we don’t abuse our kids” and she had the guts to say “ha, yeah, and look”” (r/m 8). Another mother more broadly discussed the difficulties of being a mother in this generation in comparison to the previous generation. She states,

Baby Boomers judge Millennial mothers so harshly because being a mother was a lot fucking easier then than it is now...And if WE did the things THEY did to us, they would call CPS on us in a heartbeat.... It’s so much harder to be a mom now than it was when we were kids. (r/m 7)

She proceeded to list all the difficulties of being a mother in this generation, including the intense school standards/pressures, inflation and how it is near-impossible to survive on a single income, and how mothers are expected to “do it all” (i.e., housework, child-rearing, and contribute financially).

On the other hand, fathers vented about the obstacles they face in their role as single fathers and “Why is the world is SO unfriendly to single dads??...” (r/p 6). Specifically, one post described the lack of changing tables in men’s bathrooms, receiving “dirty looks” when taking daughters to the men’s room, and having to skip mother-daughter events because parent-child days are unavailable. Furthermore, two posts described the specific challenge of extra societal surveillance of fathers when they are with their children. One noted, “When I travel with my kids we often get questioned like I’m kidnapping them.” (r/p 6). The other father described a specific story of a stranger taking photos of him and his daughter in a playground, and when questioned about her behavior, she claimed to be protecting the child.

...“Hey I noticed you were taking photos of me and my daughter, is there an issue?” She tries to deny it but explain each time I saw it and she says “well how am I supposed to know she is your daughter? I am doing this for her protection!” Um... excuse me? I explain to her that she was not doing it to any other adult there (all women) and she says “because those are the children’s mothers” I am confused. I ask her if my daughter calling me Dada and hugging me wasn’t enough (like I had to) and she had the balls to say it wasn’t. (r/d 5)

In general, the posts allude to the need for societal norms and expectations to change, and the users appear to be seeking a space to vent and share their experiences.

Institutional Barriers and Constraints. The third group of topics falls under the category of institutional barriers and constraints (23% of challenges posts). Three parents recount a range of topics tied to policies or regulations that are having or had a detrimental effect on their role as parents.

One mother expressed frustration at the enacted “Trigger Law” in her state, which automatically bans abortion during the first or second trimester. She used the forum to “rant” about her inability to have a second child due to her history of prenatal medical issues and ended with her intention to fight against the bill: “Thanks to Texas’s new trigger bill, I’m going to miss out on having a second kid...I’m ready to fight tooth and nail to get everyone I know to vote this November and fight the propaganda of [sic] nothing will change.” (r/m 10).

Another mother vented about her infant having cancer and hospital rules during COVID-19 only allowing for one parent to remain with the child.

The hospitals all have a strict rule of one parent with a pediatric patient due to COVID.

My daughter is very attached to me and stays much more calm for me than she does for my husband, so I’ve basically carried the burden of all the time in the hospital this week.

I’m tired and I’m scared and my baby is distraught and it’d be nice to have some help and support... but COVID is making it even harder. (r/p 9)

The mother apologized for the rant and stated that she “just needed to unload” (r/p 9). The third post discussing institutional barriers was by a mother highlighting a school’s failure to take action for her daughter being physically bullied and how instead, her daughter is punished. She explains, “When he hurts her on the playground she tells on him and the teacher makes them both do laps around the playground. So my child ultimately gets punished for telling.” (r/m 2) The mother describes all the actions she took, communicating with the school and emailing the superintendent, and updated her post that she is still waiting to receive a response from the superintendent. Although the types of regulations vary greatly across the posts, there is a clear frustration with institutional barriers and constraints that are impacting parents’ capacity and their ability to care for and protect their children.

Theme 1b.: Parenting Successes, “That’s what parents do.” Parents described a range of successes that were framed as either how the parent overcame a challenge or their child’s positive behavior as an outcome of their parenting. The two overarching topics are related to (a) safety and trust and (b) overcoming judgment.

Safety and Trust. Seven of the 10 success-related posts (70%) described instances of building trust and feelings of safety between the parent and child - typically highlighted through stories of positive communication. The majority of these posts discussed older children and teenagers. The most upvoted post in the r/Parenting subreddit details an agreed-upon message that a child can send their parent to remove them from unsafe or uncomfortable situations,

My kid just texted me 🍌 It’s code for I want to come home, but I want it to be your fault.

Any random emoji when we’re not texting each other will work...but for tonight I will just be grateful that he remembered that I would come if he used any emoji. (r/p 1)

Another parent recounts a story of their 20-year-old daughter’s car accident and how, although the daughter was physically safe, her “upset and frantic” emotional state led to her parents

driving across states to pick her up and take her to their home. In response to the daughter's gratitude, the parent shares, "All I could say to that was "That's what parents do"." (r/p 10). A third parent describes how their home became the safe "hang out house" for their children and their children's friends. The parent is happy but surprised by this outcome and states the exact rules they share with the children:

... "This is not a frat house, so clean up your own messes. Don't do anything that has a good chance of killing you because I don't have time to bury your body. Don't do anything illegal. I won't bail you out of jail. If you like coming here, don't do anything that would make your parents stop allowing you to come over." (r/p 4)

All three posts highlight the exact approach of positive communication that parents use to assume their parental role of providing their children with safety.

Two other posts discuss specific conversations between a parent and their teenager related to sexual health and teen pregnancy. One parent describes how "My 18 year old asked me for 400\$ to buy an IUD. I have never been so fucking happy to pay a bill..." (r/p 2), illustrating the level of safety and trust the daughter must feel to ask her parent. Another parent shares the discussions with her daughter about deciding to have an abortion. Although the parent might have a different opinion, she respects her daughter's decision and supports her to get the necessary services.

I have to admit I am not for abortion but I respect her decision and will not think badly of her for choosing that path... We have already scheduled a video appointment with a counselor at Planned Parenthood to further discuss the abortion process with them. (r/p 8)

Both posts also demonstrate positive forms of communication between a parent and teenager that occur when trust has been established.

Feelings of safety and trust were also witnessed through children's responses to parenting. One parent discussed the challenges of being a step-father and how he navigated his step-daughter's disappointment about her biological father's lack of presence. He narrated a specific turning point involving his step-daughter, describing how communicating with and comforting her led to her updating his contact information in her phone from his previous details to a new entry as "daddy." He pridefully shares, "It was me. I'm daddy... Any man can be a father, it takes a real man to be a dad." (r/d 1). Another example of a child's positive behavior and potential outcome of the poster's parenting is a post that described a 3-year-old toddler comforting their parent who suffers from depression. Even though the child is the one creating a safe space for the parent, it is likely that they learned these behaviors from interactions with their parent.

But when my son noticed me crying I couldn't have been prouder. He came up to me and said "why are you crying daddy" and I said through my sobbing... "I don't know..." He gave me as big of a hug as his little arms could and he said "It's okay daddy." He ran over to his wipes and brought them over to me and tried to dry my eyes. He asked me to blow my nose. I did. He grabbed the tissue from me and said "It's okay I throw that away for you daddy." (r/p 7)

This subtheme shows the importance of communication between parents and their children and how this impacts mutual feelings of trust and safety.

Overcoming Judgment. Fewer success posts (20%) focused on triumphant storytelling of how parents navigated judgment from relatives. One parent shares how she used the same

“passive-aggressive” approach that her mother-in-law uses on her to critique her caregiving back to her mother-in-law. She notes,

My MIL [mother-in-law] constantly makes these passive aggressive, indirect comments to my baby about me like “Did mommy forget to put socks on you? Doesn’t she know it’s cold outside?” Etc so I decided to turn the tables and make the same type of comments about her. “did Grandma forget to wipe your face after eating? Doesn’t she know how to clean a baby?” etc. and the look. on. her. face. PRICELESS...Petty? Yes. Immature? Also yes. But damn, was it effective. (r/m 3)

Another parent describes her pride in her husband’s response to a relative’s judgment about her son’s female-gendered toy preferences (playing with a baby doll).

Our relative says (somewhat jokingly), “Oh careful, that’s a slippery slope. You don’t want him to end up...” and my husband didn’t miss a beat, looked him straight in the eye and said, “What, a caring parent? One who looks after and protects his kids? A dad who shares responsibility?” (r/m 6)

Both instances highlight the type of judgment and critique parents can receive about their parenting approaches and how they navigate these situations to overcome them.

Additional Successes. One success post did not fit the categorization of safety and trust or overcoming judgment. Still, it discussed how the parent positively handled a challenging situation. A parent shared the story of successfully navigating an unexpected home driveway birth and delivering their child. They state,

I call 911 and grab the bath towels I had tossed in the car, lay them on the ground, she hits the towels on her knees, screams and after some frantic pushing, pulling and unwinding of umbilical cord I got our baby wrapped in a towel. Ambulance arrived to us sitting next to each other on the ground holding our crying 5 minute old little girl. (r/p 5)

In general, parents used these forums to share stories or vent about different challenges and successes without necessarily asking for or sharing advice, emphasizing the power of storytelling.

Theme 2: Explicit Advice Seeking and Sharing, “I don't know. Help.”

Although the majority of upvoted posts did not explicitly use language to seek or share parenting advice, a small number (3 out of 30, or 10%) of the original posts did ask for help or advice, and the majority of top comments for these posts responded with advice. Additionally, 11 posts had comments (20 out of 150, or 13%) offering or sharing unsolicited advice.

Theme 2a.: Advice Seeking. Parents posed specific questions for other users in the forum relating to two topics: (a) grief and loss and (b) navigating family judgment. One father, who lost his wife during childbirth, specifically asked if he should take the baby to the funeral given that her immune system is not developed and that he does not want to miss the funeral, nor does he want his daughter to miss it. He asks, “Wife died in childbirth, how do I do this? I'm sure I'll have a million questions for this forum at some point, but my first thing is the funeral. Do I take the baby?... I don't know. Help.” (r/d 6). Out of the five most upvoted comments in response to this post, four offered advice. Parents shared tips for taking care of a newborn related to feeding (i.e., how often, where to find donated breast milk), sleeping, diaper changing, and resources for parenting information (e.g., YouTube, DVD). One specifically responded to the question about the baby attending the funeral: “I highly recommend wrapping her up against you

in a Moby or Solly type wrap.” (r/d 6.4). Another recommended prioritizing counseling and processing the grief: “do not neglect your mental health because you’re caring for a new infant...Get counseling.” (r/d 6.5).

The second grief and loss post was a parent describing the stillbirth of their child and asking others how to handle life after loss. He notes, “Excited to see my daughter born, made funeral plans instead...has anybody else had to go through an unfortunate situation like mine? If so, how did you get through it? Did you still have kids afterwards?” (r/d 7). All five upvoted comments responded with advice from personal experience, either their own loss or relatives, and advocated for taking the time to grieve and seek professional help. “Lean on each other, but also give the space for each of you to grieve in your own ways. Please consider finding therapists, either for each of you separately, or for both of you together.” (r/d 7.5). Moreover, four of the posts disclosed successfully having children after grieving. One example, “Amazingly, we survived and came out the other side. We now have three amazing children (including another set of twins) ...” (r/d 7.2). Both posts seeking advice following loss received responses to their original questions alongside additional recommendations.

The third post that requested advice was related to navigating extended family members’ judgment about their parenting. A mother discussed gifting her two-year-old son a “toy kitchen” based on his interests since he enjoys exploring the kitchen. In response to sharing this news with the family, there were opposing views and “the family group chat fighting” that toy kitchens are “girls only toys.” The mother then asks members of the forum, “Did I really do something so wrong.” (r/m 4). Three of the five upvoted comments responded by recommending that she ignore the family or suggested various ways to respond to them, for example, “Text. “If you’re mad, you can congratulate me after he wins his first Michelin Star. Until then, your opinion is neither wanted or needed.”” (r/m 4.5). The other two comments did not offer advice but validated her frustration.

Theme 2b.: Unsolicited Advice Giving/Sharing. Alongside prompted advice, parents shared advice in the comments of 11 posts (36%) when not prompted by the original poster. Eight out of the 13 challenge-related posts (62%) had unsolicited advice in the comments, while only three (30%) of success-related posts included unprompted advice in the comments.

Across the eight challenge posts, twelve comments offered a range of suggestions: (a) using other subreddits and websites to find specific support (e.g., for baby loss, for pro-choice community, CaringBridge site), (b) seeking professionals to speak with (e.g., social workers and nurses for medical issues, therapists for grief and marital separation), and (c) naming people or outlets to escalate institutional barriers (e.g., superintendent for school issues, media outlets for challenges of single fatherhood).

Three parent success posts had eight comments of parents sharing unsolicited advice, including (a) suggestions for communicating with judgmental family members, (b) codes or forms of communication in their households for maintaining child safety, and (c) specific names and types of birth control and side effects to consider.

Overall, parents shared both general and specific concrete strategies in response to original posters, whether prompted or unprompted, demonstrating how these forums are used for knowledge-seeking and sharing.

Theme 3: Limited Discussion of Positive Parenting Frameworks and Topics

The primary objective of this study was to explore the themes in parenting discussions among parents online. By doing so, I am also determining whether these discussions involve topics and parenting frameworks commonly aligned with generic evidence-based parenting programs (EBPP). Reviewing the excerpts with the deductive codes applied (See Methods, i.e., positive psychology parenting, principles of positive parenting, and common topics of EBPP), it is apparent that there is a limited discussion of such topics.

Theme 3a.: Positive Psychology Parenting - Promotion. Topics of positive psychology parenting were minimal. I explored how posts mapped onto ideas of parents identifying, naming, and/or praising a child's character strengths: wisdom/knowledge, courage, humanity, justice, temperance, and transcendence. Overall, six out of the 30 upvoted posts (20%) included conversations about character strengths. The three character strengths highlighted were humanity, courage, and wisdom/knowledge, while justice, temperance, and/or transcendence were not mentioned. Two posts named their child's *humanity* (i.e., love, kindness, compassion, social intelligence). One of these is by a mother who discussed her two-year-old son's interest in playing with baby dolls through caregiving tasks of "carrying around the 'baby,' feeding it, pushing it in the stroller, etc." (r/m 6). The second is a father who described his three-year-old son's humanity by sharing how he comforted his father - who suffers from depression - by asking him what was wrong, hugging him, comforting him, getting him a tissue, and drying his eyes. The instances of *courage* (i.e., bravery, persistence, integrity) were present in two posts. In one post, a stepfather discussed his step-daughter's decision to stop interacting with her unreliable biological father; he explains, "She made the decision herself that she was done with him and didn't wanna see him anymore which was totally fine. She's clearly had enough and was just done with his shit. Mature decision, I respect it." (r/d 1). The second courage-related post highlighted the pride a parent felt at the courage of their daughter to ask for birth control, "I think I raised my little woman to respect herself and to choose a partner with integrity. I'm glad she came to me with this." (r/p 2). Finally, one mother spotlighted her two-year-old son's strength of *wisdom/knowledge* (i.e., creativity, curiosity) by describing his love and interest in exploring the kitchen and cooking food, resulting in her purchasing him a toy kitchen.

Theme 3b.: Positive Parenting Principles - Prevention and Treatment. Strategies of positive parenting are commonly taught in EBPP. The five core principles that form the theoretical basis for positive parenting and address risk and protective factors are (a) encouraging a safe and engaging environment, (b) creating a positive learning environment, (c) using assertive discipline, (d) having realistic expectations, and (e) taking care of oneself as a parent (Sanders, 1999). All but *creating a positive learning environment* were found in the upvoted posts (10 out of 30 or 33%). However, these posts describe the expansive ways to consider positive parenting principles.

Encouraging a safe and engaging environment was the most prevalent principle across five posts (17%), and parents applied this principle in a variety of ways. One approach was through ensuring a child's safety, which was present in two posts about (a) the use of an agreed-upon code for communication to remove a child from unsafe or uncomfortable situations (r/p1) and (b) traveling to pick up an adult child after an intense car accident (r/p 10). Another method was through the safe communication of parents with their teenagers about sexual health (r/p 2)

and teen pregnancy decisions (r/p 8). The third approach was creating a safe and engaging “hang-out house” for their children and their friends (r/p 4).

Parents discussed *taking care of oneself* in three posts (10%) across a range of situations. One mentioned staying with his in-laws after the death of his wife during childbirth to help with caregiving (r/d 6). Another parent disclosed their struggles with depression and how they are coping with it “I’m in therapy for it and taking medication so I’m on the road to recovery but I still have tough days.” (r/p 7). A third parent discussed the decision to separate from her neglectful and abusive husband and how, after making this choice, she “feels free” (r/m 9). It seems that parents are taking the actions needed for self-care to improve their well-being for themselves and their children.

Two more positive parenting principles were touched upon. One post illustrates a mother implicitly *having realistic expectations* about the causes of her two-year-old child’s behavior, despite her relative’s advice to beat the child: “Suggests beating our daughter because she was overwhelmed and tired and started to cry. She’s 2.”. Finally, *using assertive discipline* was enacted, although it was not the focal point of the post of a step-father discussing his relationship with his step-daughter. Nonetheless, it emphasized how the child’s misbehavior “led to her being grounded” (r/d 1) as a way to enforce consequences.

Theme 3c.: Common Topics in Generic EBPP - Prevention and Treatment.

Temcheff and colleagues (2018) conducted a scoping review and identified common components of 14 rigorously evaluated evidence-based parenting programs for preventing child maltreatment (e.g., The Incredible Years, Triple-P, Parent-Child Interaction Therapy). One of the common components they searched for was common topics across programs (i.e., in 70% or more of the programs). These were family communication, regulation of emotions, child discipline, and reinforcement.

Altogether, there were 10 upvoted posts (33%) that included one of these topics. *Family communication* was captured across many of the same posts that were underlined in the parental success subtheme of building trust and safety (six out of seven). As discussed earlier, parents highlighted interactions with their children surrounding their child’s physical safety, emotional well-being, and safer sexual health. For example, one parent explains how and when the interaction occurs:

...we will talk more tomorrow about why he felt uncomfortable (he said it wasn’t anything bad, grandpa was just acting weird), but for tonight I will just be grateful that he remembered that I would come if he used any emoji. (r/p 1)

Although *regulating emotions* in EBPP is typically intended to support a child in handling their emotions or for a parent to regulate their own emotions when interacting with their child, I applied it more broadly to the upvoted posts. Parents shared instances of regulating their own emotions due to other adults’ behaviors across three posts (10%). One parent described how she handled frustrating comments and behaviors from her husband by writing him a letter to express her feelings, to which he responded negatively. Two other parents also discussed moments where they removed themselves from situations where another adult (i.e., a relative or stranger) judged their parenting or questioned their parental role. One notes, “This is where I removed myself from the situation.” (r/d 5). There were no posts about how a parent regulated their own emotions when interacting with their child or how they helped regulate their child’s emotions.

Reinforcement was also captured more expansively in a post where a parent shared that they hugged their child for showing compassion and comforting the parent: “I grabbed him and gave

him the biggest squeeze. He said “You better now?” and I said “I’m better now”” (r/p 7). Finally, like the positive parenting principle of using assertive discipline, only one post discussed a *child discipline* approach of grounding for misbehavior.

Generally, parents seem to be more expansive in the content they discuss online and go beyond the theoretical frameworks and common topics of EBPP. Aside from the parenting challenges, successes, and EBPP-related topics, three posts did not fit into any of the generated themes. Two were intended for humor, and one was a concerned user posting to support another user's potential disclosure of intimate partner violence.

Interactions and Emotions Present in Upvoted Parenting Content

Next, I describe the two themes related to my second research question using the qualitative approach: What interactions and emotions are present in popularized posts and comments across parenting forums?

Theme 1: Positive and Supportive Parent Interactions, “None of us knew what we were doing.”

At large, interactions between the original poster and commenters were positive and supportive. Across all three subreddits, 143 out of 150 comments (95%) consisted of some form of positive or supportive social interaction (i.e., praising, consoling, validating, and/or sharing similar personal anecdotes/offering normalization). These interactions tended to co-occur and were not mutually exclusive within a comment. When parents disagreed or offered an alternative perspective (<3%), they did so in a respectful manner.

Parents praised each other’s parenting decisions and behaviors (59/150 = 39%), particularly when the original poster shared a parenting success. For example, one commenter praised a parent who described how their home became the safe hangout house for their children and their children’s friends, “You know what this means right? You are great parents that you even got the indirect love from their friends. You’re a shining example if [sic] being a great parent.” (r/p 4.5). Consoling parents (20% of comments) was common when original posters recounted a parenting challenge and more frequently as a response to posts related to grief and loss. One parent responds to another who shared a story about the loss of his son with empathy and encouragement,

I could never imagine what you are going through, and I am so sorry for your loss. From what it seems though you are a strong dad and you are going to be able to be strong and help Mom through this as well. (r/d 10.5)

Parents’ praise and comfort in the comments appear sincere and thoughtful.

Several parents go beyond praising and comforting to supporting and validating (42% of comments) parents’ experiences. For example, one mother shared a challenge of her family arguing over her purchasing a “girls only” toy for her son. In response, a parent not only comforted her but also supported and validated her decision. She commented,

You’re in the right - they’re in the wrong. You are doing your son a huge favour by not gender categorizing toys...Labeling toys by gender is detrimental and studies show that. I feel bad that your family isn’t agreeing with you but trust your instincts... (r/m 4.3)

Another commenter validated a father’s challenges as a first-time parent by stating, “None of us knew what we were doing. You learn by trial and error, and no matter how well prepared the

parent kids have a mind if [sic] their own...Nothing to do with you or your quality as a parent.” (r/d 6.1).

Moreover, three comments (2%) offered support in a way that transcends the online platform. For instance, one parent responded to a grieving father who lost his wife during childbirth by offering physical support. They noted,

Would be willing to publicly share your approximate location? If your near me I would be more than willing to come lend you a hand for a few hours, cook you dinner, and help you any way I can. I’m sure there are others here willing to do the same. (r/d 6.2)

While another parent extended an invitation for the original poster to stay in her “guest room” should she choose to have a second child in a different state and avoid her state’s trigger law (r/m 10.1).

Another common form of positive social interaction was parents responding to the original poster by sharing similar personal anecdotes and offering normalization (35%) across many topics. For example, in response to a parent sharing how they taught their child a code to communicate when needing to be removed from unsafe situations, all five commenters described a version of a code they teach their children. Parents also related to the original poster when venting about challenges surrounding their parenting roles (e.g., overcoming judgment, single fatherhood). Posts about grief and loss were also responded to with people’s experiences of loss and lessons learned. One father disclosed,

so as a fellow dad that just lost my SO [significant other] last Wednesday - take time to grieve. It’s okay to cry, to ball your eyes out into the pillow, to scream until you’re hoarse because you can’t imagine life without her...But please, for your baby daughter’s sake, take time to let yourself feel. (r/d 6.5)

Parents’ commenting or replying through their own storytelling could be intended to increase feelings of belongingness and further the sense of community.

Still, there were a few instances (3%) where parents disagreed with the original poster. For instance, in response to a parent discussing their daughter asking “to buy an IUD,” three people began their comment with praise but added “as a side note” followed by mentioning certain side effects, additional forms of birth control, or other brands the original poster should consider. Although the commenters had an alternative perspective, the language and tone they used conveyed respect.

Theme 2: Parents Share Their Emotions and Feelings, “Thank you Reddit for everything.”

Parents utilized the platform to express a multitude of emotions. Negative emotions were more prevalent and found in 56 out of 180 posts and comments, or 31%, while positive emotions were present in 33/180 posts and comments, or 18%.

The negative emotions included anger/frustration, sadness, shock, and worry/concern. Sadness was the most common negative emotion (12%) and was reported in posts and comments related to grief/loss and suffering from depression. Parents shared their feelings in statements like “I am broken” (r/p 3) or “I am overwhelmed by sadness...it physically wears me out... I feel like I’m barely holding on” (r/d 9). Anger and frustration (9%) were prevalent in posts and comments related to challenges such as familial judgment, institutional constraints, and single fatherhood. One mother who vented about this generation’s unreasonable demands of motherhood wrote, “I feel like if I’m not 100% stressed 100% of the time, I’m not doing enough.” (r/m 7). Parents expressed feeling worried/concerned (6%) when discussing institutional barriers, family conflict, and navigating loss. Commenters responded with shock

(4%) to parental posts about societal surveillance of fathers, emotionally abusive husbands, and unsolicited judgmental remarks from family members.

Positive emotions focused on pride, relief, and gratitude. Parents shared feelings of pride (4%) in various situations, including how they overcame judgment from relatives, their children's decision-making, and their children's behaviors. Relief was demonstrated in a couple of posts related to physical safety (e.g., an unexpected driveway birth or following a terrible car accident). Gratitude was repeatedly expressed (13%) by parents for their children in moments ranging from being a parent to a child that passed away, to the safety of a child, or to behaviors their child presented (e.g., compassion). Additionally, original posters edited their posts (9/30 or 30%) to show appreciation to the subreddit community for the supportive and positive comments they received. For example, one mother remarked, "First, thank you all so damn much for your love and support... If there is one positive aspect of social media it's getting to find a community of amazing people like this ❤️" (r/m 2). While another father wrote, "UPDATE: Thank you everyone for your kind words. You have no idea the pain relief they carried... Thank you Reddit for everything." (r/d 3).

A Comparative Analysis of r/Mommit and r/Daddit

To address the third research question using the qualitative approach: What are the similarities and differences of parenting topics and interactions across popularized posts and comments in mother-centric and father-centric forums? I generated two themes.

Theme 1: Differences - Mommit Doing More

The first theme reports the differences between the mother-centric and father-centric parenting forums. Mommit users discussed a wider scope of topics in this sample of upvoted posts and were more interactive in the comments than Daddit users.

Topics discussed in the mother-centric forum covered a broad range of challenges, including dealing with societal shifts and value conflicts (i.e., judgment from family members, generational pressures of parenting, gender roles), navigating institutional barriers and constraints (i.e., parent-school misalignment, state abortion laws), and intimate partner violence. Conversely, the father-centric forum predominantly discussed stories of grief and loss of their children or partner (60% of posts).

Furthermore, Mommit users were more interactive on the forum. As previously mentioned, Mommit users had higher upvotes for comments (3400) than Daddit users (1900). Their interactions in the upvoted comments consisted of more praise (32%) and support/validation (54%) compared to Daddit users (17%; 25%) respectively. However, this could be attributed to the types of topics discussed, as the father-centric forum had more users consoling the original poster, given that the majority of posts were related to grief and loss of loved ones. Moreover, among the Mommit users, 63% of posts that did not request advice received unsolicited advice in the comments, compared to Daddit users, where only 33% of posts that did not seek advice received comments offering unsolicited advice.

Theme 2: Similarities - Parent Role and Belonging

The second theme highlights the similarities across the mother-centric and father-centric forums. Both Mommit and Daddit users described issues related to their parental role. For example, Mommit users vented about the difficulty of being mothers who are expected to "do it

all,” and Daddit users discussed challenges tied to their role as fathers (i.e., step-fatherhood, single fatherhood). It is also interesting to note that the majority of upvoted posts on both the gender-specific forums (i.e., r/Mommit and r/Daddit) focused on sharing parenting challenges (70% of posts in each subreddit) as opposed to the mixed-audience forum (r/Parenting) which predominantly focused on parenting successes (70% of posts). One possible explanation is that parents might feel more comfortable disclosing difficulties to others with the same role. Regarding interactions, Mommit and Daddit users similarly responded to original posters by sharing comparable personal anecdotes of their experiences in around 30% of comments for each subreddit, promoting normalization and a sense of belonging. Although mother-centric and father-centric forums were used differently by discussing disparate topics and with Mommit users interacting more actively, both audiences similarly utilized the forums to discuss challenges specific to their role and identity as parents through storytelling. Thus, audience-specific forums have both commonalities and differences in shared content and interaction styles.

VI. Discussion

This dissertation aimed to inspire solutions to the persistent challenge of engaging parents in parenting programs by understanding parents' needs and preferences for parenting information by examining their behaviors online. Through two aims, I identified prevalent and popularized topics across parenting forums with different intended audiences. I also ascertained the types of interactions observed in popularized parenting posts and comments. Furthermore, I observed topics before and after the onset of the COVID-19 pandemic on March 11, 2020 - as declared by the World Health Organization's Director General (WHO, 2020) - to discern any changes in the nature of topics parents discussed online. Finally, I investigated the extent to which content typically discussed in existing well-studied and widely disseminated parenting programs was present in parents' online discourse. These findings will be elaborated upon and contextualized alongside the relevant literature.

Identifying Common Parenting Topics

To identify the nature and prevalence of parenting topics across three parenting forums on Reddit (r/Parenting, r/Mommit, r/Daddit), LDA topic modeling was used to analyze the posts. Five models were estimated: a model with aggregated posts from all three subreddits (r/Parenting, r/Mommit, and r/Daddit), a model with mother-centric posts, a model with father-centric posts, a model with pre-COVID posts from all three subreddits, and a model with post-COVID posts from all three subreddits. Each model identified a range of topics, resulting in four main findings. First, the aggregated model estimated various novel parent-centered topics. Second, only a few topics aligned with common topics in well-studied and widely disseminated evidence-based parenting programs (EBPP), but several aligned with prenatal and baby care education. Third, there were several similarities and differences across audience-specific forums. Fourth, a number of parenting topics were identified in the post-COVID model that may be associated with parent experiences during the pandemic. In the following paragraphs, I will delve deeper into each of these findings as they relate to existing research and practice.

First, the aggregated model identified 23 topics, of which 15 were child-centered (i.e., focused on issues directly relating to a child) and eight were parent-centered (i.e., focused on issues directly relating to the parent and the capacity to parent). The most prevalent topic across all aggregated posts in the dataset was the parent-centered topic of *postpartum depression and postpartum anxiety* (~20%). Comparable studies used topic modeling to identify topics across the same parenting forums (Ammari et al., 2018; Sepahpour-Fard & Quayle, 2022; Westrupp et al., 2022); however, none of these studies found postpartum mental health issues present in their models. One possible explanation for this pattern could be linked to the timing of the posts, as all three related studies used earlier timeframes: (a) 2009 until 2016, (b) December 2019 through February 2020, and (c) posts exclusively during 2020. Given that I investigated posts from February 2019 through July 2022, there could be a connection between the impact of the COVID-19 pandemic on birthing parents' mental health and, subsequently, their expression of it online. Rokicki and colleagues (2022) explored trends in postpartum health from pre-pandemic to post-COVID-19. They found that there was an increase in both the diagnosis of postpartum mental health conditions and an increase in the percentage of diagnosed individuals who did not receive treatment (Rokicki et al., 2022). These findings are consistent with a systematic review that found an increase in the global prevalence of worsening perinatal mental health (i.e., depression and anxiety) as a result of the COVID-19 pandemic (Tomfohr-Madsen et al., 2021). It

is possible that the Sepahpour-Fard and Quayle's (2022) study did not identify this topic despite their 2020 timeframe (inclusive of the pandemic) because insufficient time had passed for pregnant individuals since the onset of the pandemic (3/11/2020; WHO, 2020). Another potential explanation is that their narrow sample of only repeat users across forums shrunk their pool of posts to analyze. Future studies should explore the extent to which the pandemic exacerbated mental health challenges for postpartum parents and whether the phenomenon persists.

Second, there was a lack of estimated topics from the aggregated model aligned with common topics from well-studied and widely disseminated EBPP (e.g., Triple P, Incredible Years, SafeCare, Parent-Child Interaction Therapy). Out of the four most common topics (e.g., family communication, regulation of emotions, child discipline, and reinforcement) that emerged from a scoping review of 14 well-studied parenting programs (Temcheff et al., 2018), only one topic overlapped with the topics I observed. *Child externalized behavior* was the third most prevalent topic (16%) from the aggregated model and fits with the parenting program topics of child discipline and reinforcement. Parents shared their children's behaviors (e.g., hitting, screaming, biting) and sought advice for solutions to modify such behaviors. The content of this topic was also found in Westrupp and colleagues' (2022) study, which described it as responding to a child's negative emotions and behavior. Nonetheless, the scarcity of EBPP topics observed in parent-initiated discussions highlights the ways in which inspiration from a parent-centered approach could inform intervention development.

Although there was only one topic related to the aforementioned common topics in generic EBPP, several topics aligned well with prenatal and newborn baby care classes (Barnes et al., 2008; Kovala et al., 2016). For example, the aggregated model identified topics related to *breast and bottle feeding, sleep training, potty training, and early developmental milestones* (e.g., rolling, walking, sitting up). The majority of these topics were also found in parallel studies (Ammari et al., 2018; Sepahpour-Fard & Quayle, 2022; Westrupp et al., 2022), thus suggesting the alignment of parental needs and preferences with perinatal education.

Third, findings across audience-specific forums show some variation compared to related studies, possibly indicating a move toward gender convergence of parent roles. Both the mother-centric and father-centric models identified topics tied to early childcare and basic needs (e.g., *sleep training* and *picky eating*), whereas comparable studies found that solely the mother-centric model emphasized these topics (Ammari et al., 2017; Sepahpour-Fard & Quayle, 2022). Furthermore, my father-centric model also included another topic related to early childcare: *diaper-changing issues*. Additionally, Ammari and colleagues (2018) concluded that the mother-centric forum discusses health information more than the father-centric one. However, my models estimated a topic concerning *birthing parent and child health* in both audience-specific forums. These differences with parallel studies could suggest that parenting societal norms are shifting to greater gender convergence in topics related to early childcare.

Notwithstanding the potential shift to similar parenting roles, gendered parenting topics in the mother-centric and father-centric models were identified. One of the top three most prevalent topics in the r/Mommit model was the *work-family interface* (21%), and it discussed challenges surrounding returning to or transitioning out of paid work and balancing childcare. This topic highlights mothers' need to negotiate their role between the workforce and mothering, as they tend to be viewed as the primary caregivers (Arendell, 2000; Barnett, 2004). Another topic in the mother-centric model was tied to concerns of *breast and bottle feeding*, which reinforces the idea of a mother's biological role in certain aspects of parenthood (i.e., pregnancy, breastfeeding; Palkovitz et al., 2014). These two topics were absent in the father-centric model

and uphold the female-gendered nature of parenting. Inversely, two topics generated from the father-centric model buttress gendered notions of fathering. *Financial considerations*, such as how to set up a child savings account, was identified in the father-centric model, and fits well with societal views of fathers as the primary breadwinners and providers (Miller, 2010). The second father-centric topic that supports the gendered roles of parenting was *child entertainment* (e.g., video games, movies, songs). Although research suggests that fathers are more likely to engage in physical play with children (Lamb & Lewis, 2010; Paquette, 2004), it is possible that users in the father-centric forum may be seeking advice on modern forms of play. Despite the reinforcement of gendered parenting roles uncovered in the models, it appears that there is a trajectory toward gender convergence, particularly in early childcare responsibilities.

Fourth, there were many interchangeable topics across both timeframes (pre- and post-COVID-19), yet several differences have been found since the onset of COVID-19. Both pre- and post-COVID models estimated similar topics concerning *pregnancy concerns*, *work-family interface*, *potty training*, *sleep training*, and *co-parenting and custody*. There were also various somewhat similar topics across timeframes tied to *recommended purchases*, *feeding issues* (i.e., child meal preferences, picky eating), *child externalized behaviors*, *developmental delays*, and *child peer interactions*. However, pre-, and post-COVID discussed these topics in slightly different ways. For example, child peer interactions in the pre-COVID model referred to child challenges in making friends, experiences of bullying, and peer pressure. In the post-COVID model, this topic focused on children's lack of peer interactions and socialization due to the pandemic. This finding is unsurprising, as virus mitigation strategies limited opportunities for socialization due to social distancing measures during the COVID isolation period (Eales et al., 2021).

From the seven distinct topics identified exclusively in the post-COVID model compared to the pre-COVID model, four topics are particularly noteworthy as parenting concerns that could inspire parenting programs to be responsive to the pandemic. *Maintaining the home* was one of the four topics present in the post-COVID model, which discussed the challenges of household upkeep (i.e., cleanliness and chores) when children are constantly present. While this challenge could exist at any time for parents, it is possible that it was more difficult during the pandemic since children spent more time at home and required increased attention from parents (Lee et al., 2021), particularly with the removal of in-person education. A second post-COVID topic linked to increased child presence at home revolves around *child entertainment/education recommendations*. Given that approximately 1.38 billion children globally were out of school or childcare, lacking access to group activities, team sports, or playgrounds during the pandemic (Cluver et al., 2020), parents might have assumed a more prominent role in entertaining and educating their children, leading to an increased demand for recommendations from fellow parents. The amplified role of parents in child entertainment and education aligns with findings from a study on parent-child dynamics during COVID-19-related school closures, where parents were found to be more actively engaged in entertaining their children through various activities such as games, TV, toys, books, and walks (Lee et al., 2021). Additionally, parents reported that the important needs of children during the pandemic were socialization, entertainment, and physical activity. *Child medical/physical health concerns* emerged as the third post-COVID topic, potentially exacerbated by the pandemic. Factors such as guidance to reduce in-person doctor visits, cancellations, and delays in children's healthcare services (Patrick et al., 2020), along with the reduced capacity of healthcare workers, including staff shortages (Holthof & Luedi, 2021), may have led parents to seek health advice from other parents online. The fourth

topic from the post-COVID model was *parent mental health challenges*, where parents shared feelings of depression and anxiety. The identification of this topic is in agreement with findings from various studies where parents reported high levels of parental depression, anxiety, and parenting stress during the pandemic (Kerr et al., 2021; Lee et al., 2021). Parents reported elevated stress levels compared to adults without children (American Psychological Association [APA], 2020). Studies also indicated that COVID-19 substantially worsened psychological well-being not only for adults but also for children (Gassman-Pines et al., 2020; Patrick et al., 2020). Furthermore, the notable increase in parenting stress during COVID-19 has not returned to pre-pandemic levels (Adams et al., 2021). Consequently, it is possible that the impact of the pandemic raised additional parenting challenges or evolved existing challenges in ways that showed up in parenting discussions online.

Exploring Upvoted Parenting Content and Interactions

To explore the content and interactions in popularized content, upvoted posts and comments were analyzed across three parenting subreddits. Themes were generated to understand the topics parents discussed, how they discussed them, how parents interact with each other, and whether there are differences in the content and interactions between mother-centric and father-centric forums. The seven themes generated can be summarized into four central takeaways. First, even though users upvoted a broad scope of topics, they communicated similarly across forums, prioritizing storytelling as opposed to explicit advice seeking. Second, there was a modest overlap between the types of topics discussed in parents' popularized posts and those in parenting frameworks and well-studied EBPP. Third, users' supportive and positive interactions appear to be providing peer support. Fourth, although there were a few similarities in the topics and interactions between Mommit and Daddit users in each forum, several differences are worth considering for inspiring audience-specific interventions. I will discuss each of these discoveries in more detail.

The first takeaway from analyzing the most upvoted (i.e., liked) posts across the three subreddits was that most users shared parenting challenges and successes through storytelling (80%) instead of explicit advice seeking (10%). Storytelling is one of the earliest ways of societal communication (Tooze, 1959). It is plausible that parents shared successes through storytelling as a way to influence others or transmit educational messages (Hodge et al., 2002). Alternatively, parents may have shared challenges through storytelling as a form of release since narratives have been well-documented as a therapeutic technique (Hanninen & Koski-Jannes, 1999; Hydén, 1997). It is also possible that parents were not seeking advice but instead were seeking "affective witnessing," which typically refers to the emotional and empathetic engagement with one's experiences or stories (Richardson & Schankweiler, 2020). A "witness" validates and empathizes with the emotional experiences of the storyteller. Thus, it is imperative to explore the role of storytelling as a preferred method when developing parenting interventions.

The subsequent discovery was that upvoted posts had a few intersecting topics with principles of positive parenting frameworks and common topics of well-studied EBPP. Most prevalent was the positive parenting principle of *encouraging a safe and engaging environment*, which was present across 17% of posts. Parents discussed this principle in various ways that simultaneously overlapped with the common EBPP topic of *family communication*. Parents encouraged a safe environment through the use of positive communication. For example, parents created agreed-upon codes (i.e., phrases or emojis) for a child to text when feeling unsafe or uncomfortable, established rules for safe behaviors of teenagers when "hanging out" in the

home, and navigated conversations with teenagers about sexual health and teen pregnancy. The second most prevalent positive parenting principle was *taking care of oneself*, which was present in three posts (10%) where parents discussed the use of medication for their own mental health challenges, leaning on their support system after the loss of a partner, and separating from a toxic partner. Parents also discussed the common topic of *regulating emotions* in three posts (10%); however, this was applied differently than intended in EBPP. In my data, this was related to regulating emotions due to other adults' behaviors and not their children's. These findings suggest that there are principles and topics from EBPP that are relevant to parents' needs, albeit few. Nevertheless, exploring their expanded application across diverse scenarios, as identified by parental needs, could prove beneficial.

A third noteworthy finding was that the majority of peer interactions between the commenters and the original poster were supportive and positive. Supportive social interactions encompass *emotional* aspects, such as expressing care and allowing the expression of feelings; *informational* components, which involve the provision of information to enhance perceived control; and *instrumental* elements, which entail offering tangible goods or physical assistance to reduce the loss of control (Finfgeld-Connett, 2005; Hogan et al., 2002). Out of 150 comments, 143 (95%) included at least one supportive form of communication (e.g., praising, consoling, validating, offering normalization through personal anecdotes, advice sharing, and offering tangible support), as these were not mutually exclusive within a comment. The most frequent emotional interaction was validation (42%), followed by praise (39%), normalization (35%), and consoling (20%, found in instances where the original poster shared an experience of grief and loss). Informational support was less frequent, where parents provided unsolicited advice (13%) to original posters' challenges and successes. Although sporadic, it was surprising to witness exchanges of instrumental support (2%) in a pseudonymous environment. For example, one commenter offered physical support to a grieving parent, and another offered accommodation to help another parent avoid their state's trigger laws. Parents might also experience a sense of support merely by reading the shared experiences of others, even if they do not engage in the interactions (Haslam et al., 2017). Comparable emotional and informational support interactions (i.e., support, normalization, advice) were found in another study exploring fatherhood across two subreddits (r/Predaddit and r/Daddit; Smith et al., 2022). While subreddit moderators may contribute to fostering positive community norms by removing negative comments, it is worth acknowledging that Reddit's platform-wide content moderation policy allows for a broader range of acceptable content that permits users to express their views on controversial topics (Gaudette et al., 2021; Reddit Content Policy, n.d.). In turn, this permissiveness of the platform could truly reflect the preferred forms of supportive communication for parents within the parenting subreddits. Therefore, these findings should inspire us to consider the value of incorporating peer support into parenting interventions.

The final insight is that audiences in mother-centric and father-centric forums engaged in discussions surrounding different topics and interacted contrastingly. Upvoted posts by Mommit users included a broad range of topics, such as coping with societal shifts and value conflicts, navigating institutional barriers and constraints, and intimate partner violence. Conversely, a significant portion of Daddit user posts revolved around topics related to grief and loss of a partner or child. This trend aligns with findings from another study, where pseudonymous online communities served as an outlet for fathers to express negative thoughts and emotions (Smith et al., 2022). The opportunity to disclose complex emotional experiences could be particularly important when the emotions being shared (e.g., regret, resentment, anger) are socially taboo or

silenced in face-to-face interactions (Matley, 2020; Moore & Abetz, 2019). Not only were the topics dissimilar, but Mommit users were also more interactive than Daddit users, engaging in a variety of supportive interactions, including twice the amount of unsolicited advice in upvoted comments. Still, the Daddit users likely gave less unsolicited advice due to the nature of the topics discussed. This discovery can be understood through the lens of the optimal matching model (Cutrona & Russell, 1990), which suggests that stressors within one's control tend to elicit problem-focused support (i.e., advice), while uncontrollable events, like the loss of a loved one, often prompt support aimed at emotional processing (i.e., consoling; Wingate et al., 2020). Considering that most of the issues raised in the Daddit posts were uncontrollable situations (i.e., grief and loss), it is unsurprising that they had fewer comments with unsolicited advice.

A supplementary unanticipated finding was that parents shared more success-related posts in the mixed-audience forum (r/Parenting) and disclosed more challenge-related posts in the audience-specific forums (r/Mommit and r/Daddit). It is probable that users feel more comfortable with those whom they view as members of a common social group or of the same social identity (i.e., mothers or fathers; Neville et al., 2022). This sense of “we-ness” creates a sense of belonging, leading to trust, respect, cooperation, help, and support between group members (Neville & Reicher, 2011; Reicher & Haslam, 2010). Furthermore, men are more inclined to reciprocate self-disclosure with other men when dealing with complex situations (Barak & Gluck-Ofri, 2007). Hence, observing the unique topics and behaviors within mother-centric and father-centric audiences' popularized posts and comments inspires us to consider group-specific parenting interventions.

Limitations and Future Directions

While this dissertation contributes valuable insights into parenting content and interaction styles on online platforms, it is crucial to acknowledge certain overarching limitations. The questions within this project are exploratory, and therefore, no inferential claims can be made. However, this dissertation aimed to inspire solutions to the persistent problem of parent engagement in parenting programs by understanding parents' needs and preferences for parenting information by examining their behaviors online. The findings from this project accomplished this goal and will be used for future experimental research during the ideation and implementation phases of human-centered design. Another limitation is that the findings may be unique to Reddit, yet the insights generated may generalize to other parenting social media sites and parents' offline needs and preferences. This is worthy of future empirical inquiry. While the inability to discern specific subreddit (i.e., r/Parenting, r/Mommit, and r/Daddit) user demographics limits our generalizability of findings, the population characteristics of general Reddit users can help provide context. As discussed in Chapter 2, Reddit users are skewed towards males, possibly resulting in an oversampling of fathers. Nevertheless, users have comparable proportions of Black (17%), White (17%), and Hispanic (14%) racial and ethnic groups (Auxier & Anderson, 2021). They align with the US general population's mean age of becoming a parent and mirror the educational attainment of the broader US population (U.S. Census Bureau, 2023; U.S. HHS, 2019). Therefore, these users could potentially represent the intended audience of EBPP. Still, the utilization of publicly available pseudonymous data offers advantages. This approach allows for an observational study that circumvents potential biases associated with survey methods, such as traditional non-response social desirability biases.

Alongside the overarching limitations, there were several method-specific limitations with potential avenues for future research. The topic modeling approach had a couple of

limitations. First, data cleaning of the father-centric forum removed 65% of the scraped posts due to the high number of non-textual posts (exclusively images or videos). Considering that the analytical method was topic modeling, which requires text analysis, it was necessary to remove non-textual posts. Future research could explore posts and comments with visual content as computational methods continue to become more sophisticated. The second limitation was the imbalanced sample of the pre- and post-COVID datasets. The pre-COVID corpus covered slightly over a year (02/01/2019 - 03/10/2020), while the post-COVID corpus spanned two years and four months (03/11/2020 - 07/01/2022). I opted for a broader timeframe for the post-COVID corpus, prioritizing recent content and aiming for a more comprehensive range of topics that did not exclusively focus on a year heavily affected by the most acute phase of the pandemic (i.e., school closures, social distancing measures, remote work). This choice was motivated by the hope that the challenges of that particular year would not reoccur, and instead, I sought to identify lasting parenting topics of interest. The stability of these post-COVID themes over time is a question that could be explored in the future. Finally, my approach of estimating separate models to compare differences in topics across various audiences (i.e., r/Mommit and r/Daddit) and timeframes (i.e., pre-COVID and post-COVID) hinders my ability to draw associations between audiences and timeframes within topics generated from the same model. Future studies could consider using structural topic modeling (STM), which uncovers correlations between a document's "metadata" (e.g., subreddit and time) and the topic prevalence and topic content within one estimated model (Roberts et al., 2016). However, a revised R package that allows for more options for preprocessing and tuning hyperparameters is necessary.

Likewise, the qualitative approach encountered a few limitations. Initially, I aimed to capture changes in upvoted posts and comments since the onset of the pandemic. However, Reddit's upvoting features do not enable the identification of upvoted posts and comments at a specific moment in time (such as pre-pandemic on 3/10/2020). It is only feasible to ascertain upvoted posts and comments for the current day. Although I was unable to conduct a temporal analysis, the upvoted posts and comments I extracted span a period from 3/19/2019 to 6/25/2022, encompassing both periods before and during the pandemic. Another limitation is that while it is evident that users share and upvote storytelling as opposed to advice-giving, it is unclear how much storytelling contributes to improving parenting practices. Future research should assess whether the delivery of parenting content through storytelling impacts parents' engagement, knowledge, attitudes, and behaviors. Additionally, I only explored upvoted posts and did not examine downvoted posts. While the goal was to determine parents' preferred content and communication styles to enhance engagement with evidence-based parenting information, exploring the content and interactions that parents find less favorable could have offered additional insights. Subsequent research could delve into disparities between the least popular and most popular content for a more comprehensive understanding. Although sampling upvoted posts and comments may not offer a representative or generalizable view of Reddit discussions compared to random sampling, this strategy was most effective for addressing my research questions. Specifically, I gained valuable insights into what parents agree with and what they deem worthy of others' attention. Future studies exploring questions about general topics and interactions of parent discussions on Reddit should consider using a random sampling approach. Lastly, I did not assess the quality of upvoted posts or comments when parents shared parenting suggestions or successes. Previous research indicates that upvoting may not necessarily be tied to the quality of a post but rather to agreement (Kassaeyan, 2016). Future research could investigate

parents' capacity to discern high-quality information, considering factors such as consistency, completeness, accuracy, and reliability.

Implications for Research, Practice, and Policy

The observations of parent behavior online, as presented in this dissertation, have implications for research, practice, and policy. A central research implication involves leveraging these findings to shape the ideation and implementation phases of the human-centered design process. Researchers can use the identified preferences of parents, who are the end beneficiaries, to inform the development and testing of interventions. In the ideation phase, researchers would begin by defining the components under consideration for the intervention. Critical components extracted from this dissertation include the preferred topics and format for content delivery. Researchers would synthesize evidence-based information on prevalent topics discussed by parents online, such as postpartum depression/anxiety, child externalized behavior, sleep training, and potty training. Separate interventions would be generated for prevalent topics from mixed audiences (e.g., r/Parenting) and those from audience-specific groups (e.g., r/Mommit and r/Daddit). Next, researchers would test presenting the information using storytelling from a fellow parent's perspective or incorporate a program component for parents telling their own stories. Once these features have been developed (i.e., prototypes), researchers can pilot the content and format and seek immediate feedback from parents during the implementation phase. Content would then be disseminated on online platforms where peer support is embedded. Additionally, content designed for mixed-audience and audience-specific groups would be shared with their specific audiences. Finally, researchers would evaluate parental engagement, including openness, interest, and likelihood of engagement, as well as parental self-efficacy in terms of knowledge, ability, and outcomes with the developed online parenting content and storytelling format. These interventions would be iteratively optimized for different subgroups of parents and their unique needs (Collins, 2018). This comprehensive approach holds promise for interventions that are responsive to parents' preferences and needs.

Practical implications highlight the need to expand current services to better cater to the needs of parents. Recognizing the trend of parents seeking parenting information and support online, practitioners should focus on refining interventions for effective online dissemination. In addition to training parents on existing evidence-based parenting practices related to child behavior, creating safe and engaging environments for children, and enhancing family communication, practitioners should emphasize addressing prenatal and newborn care issues. Issues such as breastfeeding, sleep training, potty training, and developmental milestones need additional attention. However, these need to be adaptive based on the unique needs (e.g., developmentally and culturally sensitive) of parents and their children. Furthermore, practitioners are encouraged to supplement existing interventions with parent-centered services that focus on aspects of parents' well-being and their capacity to parent. Offering services or resources to normalize mental health challenges from prenatal stages onward, providing support for balancing work and family responsibilities, offering tools for co-parenting, and assisting with financial planning have the potential to alleviate some parental stress. To facilitate a positive and supportive online environment, practitioners could adopt a role-specific peer support model (i.e., tailored to either mothers or fathers) to normalize and validate parent experiences while engaging with their common concerns. The involvement of researchers and practitioners can potentially address information accuracy concerns, ensuring that the support provided remains current and adheres to evidence-based practices (Niela-Vilén et al., 2014). Maintaining anonymity or using

pseudonyms for both practitioners and parents may be beneficial, facilitating open disclosure of true feelings and concerns (Yamashita et al., 2020). By addressing both parenting and parental well-being concerns through refined online interventions and adopting a peer support model, practitioners may be able to better engage parents in parenting interventions.

Finally, this dissertation produced a few policy implications. Given that the topic of work-family interface was prevalent across models, policymakers might consider exploring the implementation of family-friendly policies. Examples of such policies include offering flexible work hours, allowing employees to work from home or remote locations, extending parental leaves, and subsidizing early childcare costs. In response to the financial considerations' topic in the father-centric model, especially regarding establishing child savings accounts, policymakers should consider advocating for bills like the 401Kids Savings Act. These bills empower families by providing savings accounts to all children and help build wealth for lower and moderate-income families by offering direct federal support (Casey, 2024). Another potential policy implication could be improving the funding and access of perinatal education programs for expectant parents. These policy measures would aim to address and support the needs of individuals navigating the transition into parenthood.

Conclusion

Utilizing a human-centered design approach to discern parents' preferences in topics, content delivery, interactions, and role-specific needs empowers researchers to enhance the design and dissemination of parenting interventions. This study deepened our understanding that parents have diverse information needs, extending beyond child-centered parenting situations to issues impacting parental well-being and capacity (e.g., mental health challenges, co-parenting problems, work-family conflict, and financial considerations). Furthermore, it revealed that parents leverage online communities for support, seeking validation and normalization from peers who share similar experiences. The study also highlighted the differential needs of mother-centric and father-centric audiences. Findings from this project aim to build a future line of research aimed at developing a new generation of engaging, accessible, and parent-centered parenting interventions, ultimately striving to enhance child and family outcomes.

VII. References

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Appendix A: Ethics and Human Subject Protections

The Committee for Protections of Human Subjects/Office for Protections of Human Subjects (CPHS/OPHS), which serves as the Institutional Review Board for the University of California Berkeley determined that the study protocol (ID: 2022-09-15594) did not meet the definition of research with human subjects outlined in the Federal Regulations at 45 CFR 46.102. Therefore, the project proceeded without further review from the CPHS/OPHS as the protocol did not fall within the scope of their responsibilities.