The Dissertation Committee for Justin Kyle Scott certifies that this is the approved version of the following dissertation:

Spanking Attitudes and Parents' Biased Information-Seeking, Distrust in Research, and Overestimations of Scientific Knowledge

Committee:

Elizabeth T. Gershoff, Supervisor

Theodore Dix

Edward R. Anderson

Elma I. Lorenzo-Blanco

Matthew S. McGlone

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by

Justin Kyle Scott

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Dedication

This work is dedicated to the late William Lucas “Luke” Douphrate III, my most trusted friend. Although no longer here, Luke still inspires me every day to be a better person and scientist, and to use my privilege and abilities to help those in need.

“…love all people, no matter their circumstances.”

– William Lucas Douphrate III

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Abstract

Spanking Attitudes and Parents' Biased Information-Seeking, Distrust in Research, and Overestimations of Scientific Knowledge

Justin Kyle Scott, Ph.D.

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Supervisor: Elizabeth Gershoff

This dissertation consists of three chapters that evaluate largely unexamined mechanisms through which parents with positive spanking attitudes could preserve or confirm their attitudes by avoiding cognitive dissonance-invoking information. In Chapter 2, I used Google searches to examine whether biased search terms about the benefits of spanking would retrieve websites that present justifications for spanking and then used those websites to simulate a search about discipline with a sample of parents. Justifications for spanking were most likely to appear when search terms were used about the benefits of spanking. Parents with positive attitudes toward spanking had a higher likelihood of encountering justifications for spanking by selecting search terms about spanking benefits and then selecting links that led to websites recommending spanking. In Chapter 3, I evaluated parents' perceptions of excerpts from two policy statements about the physical discipline of children published by the American Academy of Pediatrics and the American Psychological Association. Although a majority of parents

perceived these statements favorably, those with positive attitudes toward spanking and those who professed a strong desire for autonomy in childrearing decisions reported less trust and belief in the statements. In Chapter 4, I examined whether parents who favor spanking exhibit the Dunning-Kruger effect, such that they would perceive themselves to have a thorough understanding of the science behind spanking yet score low on an objective measure of general scientific literacy. Parents with positive attitudes toward spanking scored the lowest on measures of scientific literacy, overestimated their understanding of how spanking influences children's development, and even perceived themselves as being more knowledgeable than a family scientist—someone who researches, studies, and teaches about parenting and child development. These three chapters contribute to the existing literature on spanking attitudes in the United States by demonstrating how parents could potentially preserve their spanking attitudes by avoiding scientific information that could otherwise educate them about the risks of spanking.

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Chapter 1: Introduction

Evidence that spanking is detrimental to children is one of the most consistent findings in family science. Several meta-analyses have examined the relative size and direction of effects, the most comprehensive meta-analysis examining over 100 unique effect sizes from over 160,000 children found that spanking was consistently linked with problematic outcomes in children (Gershoff & Grogan-Kaylor, 2016), including aggression (e.g., Berlin et al., 2009), externalizing problems (e.g., Lansford et al., 2012), and mental health issues (e.g., Gershoff et al., 2010). The consequences of spanking in childhood are long-lasting and continue to link with poor mental health, antisocial behavior, and substance use issues in adulthood (Afifi et al., 2017; Fergusson et al., 2008). There is now consensus among scientists that this extensive body of literature consistently shows spanking as an ineffective and potentially harmful discipline strategy for children, and large professional organizations such as the American Academy of Pediatrics (AAP; Sege et al., 2018) and the American Psychological Association (APA, 2019) have recently published policy statements condemning spanking. Despite this, national surveys suggest that support for spanking persists, with over 80% of children having been spanked by the time they reached 5th grade (Vittrup & Holden, 2010) and two-thirds of Americans agreeing with the statement that children sometimes need a "good, hard spanking" (Child Trends, 2015). This "knowledge gap" between the recommendations provided by family scientists and the behaviors and attitudes of parents is in dire need of being closed.

In this dissertation, I examined the extent to which parents' spanking attitudes are potentially perpetuated by their information-seeking behavior, including how they search for information online and how they perceive and understand evidence-based information about spanking when they encounter it. The ability for anyone to share their opinions online means that misinformation about topics that have long benefited from scientific consensus, including vaccinations (Kata, 2010), genetically modified organisms (Boccia et al., 2018), and global warming (Shao, 2017), can now be easily found and discussed by the average person seeking information on the Internet. The study of human behavior has also been frequently criticized by the public as unscientific or based on common sense (Lilienfeld, 2012) and misinformation about spanking is easily found online (Lee et al., 2020; Taylor et al., 2016). This widespread problem means that parents can isolate themselves to "dark pockets" of the Internet in which misinformation is shared, allowing them to avoid evidence that might challenge their beliefs about parenting by educating them on the risks of spanking.

Parents tend to favor spanking if they experienced spanking themselves as a child, if they are experiencing financial stress, if they hold inadequate knowledge about child development, if they belong to and follow conservative religions or ideologies, or if they simply perceive that the professionals and peers they rely on approve of spanking (Deater-Deckard et al., 2003; Taylor et al., 2011). There is some evidence that parents' spanking attitudes can be changed by presenting them with information about the potential harms of spanking for children (Holden et al., 2014). However, parents are not likely to encounter such information in real-world situations when they have the freedom

to self-select into information about spanking that is consistent with their existing beliefs. This fact highlights a distinct challenge in broadly educating parents in the United States about the effects of spanking. If parents' information-seeking behaviors bias them away from encountering evidence-based information, they may be less likely reconsider their use of spanking as a disciplinary method.

CONCEPTUAL FOUNDATION

To form hypotheses about why some parents may reject scientific evidence that spanking is harmful, I drew from several cognitive and information-seeking perspectives. Theories of cognitive dissonance, selection, and confirmation bias suggest that people tend to avoid information that is incongruent with their beliefs and attitudes because exposure to such stimuli conflicts with their understanding of the world, brings internal cognitive discomfort (Case, Andrews, Johnson, & Allard, 2005), and arouses negative emotions or fear (van't Riet & Ruiter, 2013). To remove feelings of discomfort, people may engage in "blunting" coping strategies (Miller, 1989) in which avoidance or defensive reactions serve to reduce the individual's negative arousal. By avoiding, people can ignore the dissonance-evoking information and instead select into attending to information consistent with their beliefs. By reacting defensively, people can validate their beliefs for themselves by generating justifications for the beliefs. In both cases, people avoid the negative emotions evoked from incongruent information and preserve their self-worth without having to reconsider whether their behavior should be discontinued (van't Riet & Ruiter, 2013). Thus, parents who favor spanking may

experience cognitive dissonance when presented with information incongruent with their current perspective and engage in various coping strategies to preserve their self-worth.

One way to conceptualize parents' coping strategies when encountering spanking research is the theory of reactance (Brehm, 1966), which suggests that when a person's freedom to engage in a behavior is threatened to be restricted, they may enter a state of psychological reactance, in which they become strongly motivated to maintain that freedom. Individuals may view the source of restriction as a threat or intrusion and thus be motivated to maintain their behavioral freedom by ignoring the recommendation or intentionally contradicting it (Fitzsimons & Lehmann, 2004). Applied to spanking attitudes, a parent who receives an evidence-based recommendation from an expert may feel as if their main disciplinary tool is threatened and thus may react defensively to keep it. In fact, qualitative research examining laypersons' discussions of spanking research online has documented such reactance, with individuals at times expressing concerns about scientists intruding on their parenting decisions, making statements such as "The government and these researchers have taken even our rights as parents away" (Taylor et al., 2016; pg. 568) and "Are you people who write this really that naïve and stupid? You can't see the correlation between the extreme violence and disrespect today, and the lack of any real discipline?" (Taylor et al., 2016; pg. 558). Such a defensive reaction may further entrench parents in their attitudes toward spanking and lead them to discount experts or believe that they know more than experts through their own anecdotal experiences.

A second way to conceptualize parents' coping strategies when encountering

spanking research is a potential bias in their information-seeking behavior. When parents with positive attitudes toward spanking encounter evidence-based recommendations against spanking online, the incongruent information may evoke internal discomfort or arousal. To avoid information that challenges their understanding, parents may instead choose to self-select into receiving information that confirms their attitudes by clicking-on, viewing, and participating in websites that promote their perspective (Schmidt et al., 2017).

SUMMARY OF THE CURRENT STUDIES

Drawing from these conceptual foundations, this three-paper dissertation contributes to our understanding of parents' spanking attitudes by modeling three unexamined mechanisms through which parents with positive spanking attitudes could preserve or confirm their attitudes by avoiding cognitive dissonance-invoking information. I first examined whether the accessing of misinformation online may be one mechanism through which parents' attitudes about spanking are reinforced and justifications for spanking are presented to others. In Chapter 2, I approximated how parents conduct searches about spanking online to determine how likely they are to encounter justifications for spanking using 9 different combinations of search terms. A parent who holds positive spanking attitudes may use specific information-seeking strategies online to avoid finding anti-spanking information that could evoke cognitive dissonance. For example, by using specific search terms (e.g., "spanking benefits"),

parents who approve of spanking could select into receiving only information that confirms their beliefs.

The second topic I explored was whether a general distrust of evidence-based recommendations may be another mechanism through which parents can justify ignoring incongruent information and avoid having their perspective challenged. Chapter 3 presents the results of a study evaluating parents' perceptions of policy statements that outline research on the risk of spanking published by the American Academy of Pediatrics and the American Psychological Association. If a parent does encounter such evidence-based information discouraging spanking, they may feel personally attacked by the information, as if their efficacy and self-worth as a parent have been challenged directly. Reacting defensively, they may appraise the incongruent information as being untrustworthy and thus disregard it as a quality source of parenting advice. Despite the solidarity that large professional bodies provide, they may not be the most convincing messengers for all parents.

The third topic I explored was whether parents would react defensively to incongruent information if they perceive their own knowledge about spanking to be more thorough and valid than the information causing dissonance. The focus of Chapter 4 is the Dunning-Kruger effect, or the phenomenon in which people who are not knowledgeable in a particular area fail to perceive their lack of expertise and instead overestimate their knowledge and skill (Kruger & Dunning, 1999). Individuals exhibiting the Dunning-Kruger effect may also believe themselves to be more knowledgeable about a topic than expert scientists in that field (Motta, Callaghan, & Sylvester, 2018). This

phenomenon may be one mechanism through which cognitive dissonance is evoked when viewing evidence-based information about spanking. If an individual believes they know more about spanking than an expert scientist or an organization recommending against its use, they may be motivated to completely disregard the information.

These three chapters serve as the first steps of my developing program of research. By examining the role of parents' information-seeking behavior online, their trust in organizational and scientific recommendations, and their self-perceptions of their scientific understanding of spanking, my goal was that these studies would contribute to our overall understanding of how to more effectively intervene and educate parents about the dangers of spanking.

Chapter 2: Parents' Search Term Bias and Online Misinformation About Spanking

INTRODUCTION

The Internet has quickly become the largest source of information that is easily accessible worldwide. A majority of parents say the Internet is their primary medium for seeking and sharing parenting information (Baker et al., 2017; Dworkin et al., 2013; LaMarre et al., 2015). Parents use the Internet to access articles about childrearing and pediatric health (Harvey et al., 2017; Lupton, 2016) and to participate in blogs, online forums, and social media platforms where they can share their own and read others' personal anecdotes about parenting (LaMarre et al., 2015; Lee et al., 2020; Lupton et al., 2016; Moon et al., 2019). As is true for the Internet generally, misinformation about parenting is rampant, particularly regarding controversial parenting topics such as spanking. Parents searching the Internet for advice on child discipline may encounter several potential sources of misinformation, including opinions from organizations promoting conservative viewpoints of parenting (e.g., Focus on the Family, 2019), individuals discussing their opinions in online comment threads and discussion boards (Taylor et al., 2016), or parents writing about their personal experiences in blogs (Lupton et al., 2016)—all of which may present convincing pro-spanking arguments to parents who already hold favorable attitudes toward spanking. The accessing of misinformation online may be one mechanism through which parents' attitudes about spanking are reinforced and convincing justifications for spanking are perpetuated to others. The

current study examined whether certain search terms are more likely than others to expose parents to misinformation about spanking.

MISINFORMATION ABOUT SPANKING PRESENTED ONLINE

Despite recommendations against the use of spanking from large professional and respected organizations such as the Centers for Disease Control and Prevention (Fortson, et al., 2016), the American Academy of Pediatrics (Sege et al., 2018), and the American Psychological Association (APA, 2019), around 80% of children in the U.S. report having been spanked by 5th grade (Vittrup & Holden, 2010) and two-thirds of American adults think children sometimes need a "good, hard spanking" (Child Trends, 2015). Parents with positive attitudes toward spanking are typically vocal about their attitudes and are eager to share their justifications, as seen in their explicit approval of spanking in online comments on media coverage of discipline research (Taylor et al., 2016) and in what they choose to post on Twitter (Lee et al., 2020).

Parents' stated justifications tend to lack a scientific basis and reflect anecdotal experience, such as the common phrase, "I was spanked when I was a child and I turned out okay." Justifications presented online may reflect an anecdotal explanation for why spanking is effective (e.g., spanking is necessary to teach children right from wrong) or they may reflect greater ideologies related to spanking attitudes (e.g., the Bible prescribes spanking as necessary discipline). Although it is clear these potentially convincing justifications proliferate online, it is unknown via which search terms parents are most likely to encounter them in their search results.

The general characteristics of the commentaries about spanking found online may also vary widely. There are a number of online resources that present scientific evidence and discuss spanking issues within a greater context, including discussions of the potential consequences for children, children's rights as humans, and the legality of physical punishment (see APA, 2019; Sege et al., 2018). In contrast, the media tends to favor presenting news about spanking as an ongoing debate in the scientific community (e.g., "The "spanking" debate: Views depend on what you call it": Marcus, 2017), and there are myriad websites presenting organizational or individual support for spanking. These sources may focus on presenting anecdotal evidence or personal opinions in support of spanking rather than presenting evidence and guidelines that can help parents make informed decisions.

COGNITIVE DISSONANCE IN ONLINE INFORMATION-SEEKING BEHAVIOR

The role of the Internet in perpetuating positive attitudes toward spanking likely occurs through processes of selection and confirmation bias. The concept of cognitive dissonance provides a foundation for understanding these processes. Cognitive dissonance refers to the tendency for individuals to avoid information that is incongruent with their attitudes or beliefs because exposure to such stimuli conflicts with their understanding of the world and leads to internal discomfort (Case et al., 2005). Applied to the topic of discipline, when parents with positive attitudes toward spanking encounter evidence-based recommendations against spanking online, the incongruent information may evoke internal discomfort or arousal and make parents feel like their self-worth as a

parent has been challenged directly. There are two main ways parents may reconcile this incongruent information with their existing attitudes (Miller, 1989): an avoidance reaction, in which the parent simply leaves the website, avoids using it again, and uses new information-seeking strategies, or a defensive reaction, in which the parent feels the need to justify and validate their attitudes.

To avoid information that challenges their understanding, parents may instead choose to self-select into receiving information that confirms their attitudes by clicking-on, viewing, and participating in websites that promote their perspective (Schmidt et al., 2017). If they choose to defend their parenting attitudes, parents may participate in online discussion threads known as "echo-chambers," in which multiple individuals holding the same ideology share their opinions with one another, giving the illusion that there is a majority consensus on the topic and thus confirming the participants' attitudes (Schmidt et al., 2017). For example, a parent with positive attitudes toward spanking who encounters incongruent information online could start an echo-chamber to validate their attitudes by sharing and openly denouncing the information on social media. Alternatively, they could join an existing echo-chamber in an online discussion thread in which the majority of participants express approval for spanking. Parents who use an avoidance reaction may also actively seek out echo-chambers where their attitudes can be confirmed.

Evidence of an echo chamber supporting spanking has been documented in comments on a news website following a research article finding harm associated with spanking (Taylor et al., 2016); among the comments, 71% reflected approval of spanking

and about 22% expressed contempt for interference in family life from scientists. A recent study demonstrated that when parents were presented with both a scientist advising against the use of spanking and lay comments expressing approval for spanking, parents with positive attitudes toward spanking rated the layperson as more trustworthy than the scientist with expertise (Scott & Gershoff, 2020). Thus, it seems that collective approval from like others serves as a powerful barrier to parents' accepting professional recommendations against spanking.

A key way parents could self-select into echo-chambers and avoid encountering dissonance-evoking information is through the search terms they use while browsing the Internet. If parents only use search terms that align with their spanking attitudes (e.g., "spanking benefits"), it may be that they will only obtain suggested website links that promote those attitudes, resulting in confirmation bias. Research in vaccination attitudes (Ruiz & Bell, 2016) has demonstrated such a bias in the popular search engine, Google: anti-vaccination search terms (e.g., "risks of vaccination") retrieved websites that presented 4.8 times more misinformation about vaccinations compared to websites generated by pro-vaccination search terms (e.g., "benefits of vaccination"). In this sense, individuals can confirm bias in their attitudes by actively searching online for the information that supports them. Although it is unlikely that all of the websites generated by pro-spanking search terms present justifications for spanking, individuals are free to select particular websites based on the titles, leading them directly to information that supports their attitudes.

THE CURRENT STUDY

The current study consists of two parts. The goal of Study 1a was to estimate the presence of various justifications for spanking in websites. Lists of websites were generated in Google by varying the valence of search terms about spanking (e.g., searching for "spanking benefits" (negative), "spanking" (neutral), or "spanking risks" (positive)), and then to code websites for the presence of justifications for spanking. I hypothesized that a search-term retrieval bias would occur, such that using search terms about the benefits of spanking would increase the likelihood that the Google search algorithm would retrieve websites that present justifications for spanking, and decrease the likelihood that the Google search algorithm would retrieve websites that present evidence to counter justifications for spanking.

The goal of Study 1b was to then to simulate the potential process by which parents with positive attitudes toward spanking could use biased search terms to avoid incongruent information and self-select into confirming information. Parents were given the option to choose from one of the search terms used in Study 1a to conduct a search about disciplining children, and then were asked to select which website from the corresponding search results they would be the most likely to click on. I hypothesized that a search-term bias would occur in parents' information-seeking behavior: Parents who spank more frequently, hold positive attitudes toward spanking, and have a low scientific understanding about spanking would tend to select search terms and individual websites that have a higher likelihood of presenting justifications for spanking.

STUDY 1A: JUSTIFICATIONS FOR SPANKING PRESENTED ONLINE

Procedure

Study 1a involved collecting data from online search results and evaluating the information within the suggested websites. On September 4, 2019, I used Google to conduct nine searches created from three base search terms varying by three valences. The three base search terms were "spanking," "physical discipline," and "physical punishment." The three valences were "benefits" (positive), "risks" (negative), and a neutral valence with no other word attached to the search term (e.g., "spanking"). Thus, the nine terms were combinations such as "spanking benefits," "spanking risks," and "spanking" alone. Google's safe search feature was used to remove explicit content. Only the ten websites on the first page of each search results were used, as most people do not go past the first page of results when searching for information online (Malaga, 2008). From these nine search terms, a total of 85 website links were generated (for five of the search results, Google only presented nine website links to provide space on the page for additional information about a top result; see Appendix for a full list of websites).

Website Coding

Two coders independently coded websites for several characteristics and for the presence of various justifications for disciplining children with spanking or other forms of physical punishment. Websites were randomly ordered so that coders were unaware of which search term websites were retrieved from. The first 20 websites were used to establish reliability among the coders. Of the 43 remaining websites (68%), interrater reliability (Kappa) ranged from .18 to 1.00 (M = .69). When calculating Kappa, codes in

which most of the ratings fall under one category (such as not appearing on websites, which was the case here) Kappa can be biased toward a low coefficient. Therefore, reliability was recalculated for these codes using Gwet's agreement coefficient 1 (AC1), which provides a more stable coefficient when agreement is high in one category (Gwet, 2008). This improved the range of reliability, .60 to 1.00 (M = .83). Reliability coefficients for individual codes are presented in Tables 1-3. Coders met weekly after coding sets of ten websites to discuss and resolve discrepancies so that one agreed upon set of ratings remained.

Website coding focused on three main aspects: the presence of common justifications for spanking, the overall tenor of the website (whether the website explicitly recommended or discouraged the use of spanking), and whether the website framed spanking as a scientific debate. Based on previous research examining reasons why individuals support the use of spanking (Taylor et al., 2016), fourteen common justifications for spanking were identified.

Justifications were considered to be "presented" if they were explicitly stated as fact somewhere within the website without a later rebuttal. Justifications were considered to be "countered" if they were mentioned but followed by evidence that the statement is untrue. An example would be, "Some parents believe that spanking improves child behavior, but that is unsupported by research." If a justification did not appear on a website, it was coded as "not mentioned." Coders also identified several website characteristics (e.g., whether experts were quoted or attributed) and whether websites included a greater contextualization of spanking (e.g., the risks of spanking for children

were mentioned). See Tables 1-3 for a full list of website codes.

Analysis Plan

Fisher's exact tests were used to compare how frequently website codes appeared in websites across the three search term valences. Fisher's exact test provides comparisons of categorical data when values in one of the crosstab cells is less than 5, as was the case in this study when frequencies for certain categories were low. Therefore, typical chi-square tests were inappropriate here.

Results

Characteristics of Websites

Table 1 shows characteristics of the websites obtained through the 9 searches. In general, search results lead mostly to organizational or government websites (n = 24; 28.2%) and informational websites (n = 19; 22.4%) dedicated to providing evidence-based articles and resources on a variety of topics. The next most common groups of websites were news organizations (n = 10; 11.8%), scientific peer-reviewed articles (n = 9; 10.6%), blogs (n = 9; 10.6%), and online magazines (n = 8; 9.4%). Less common were opinion pieces (n = 4; 4.7%) and religion-focused websites (n = 2; 2.4%). Across the three search term valences, there were no significant differences in the types of websites that appeared.

Although most websites (n = 57; 67.1%) discouraged using spanking, 14 (16.5%) websites recommended using spanking, and 14 (16.5%) made no recommendation (Table 1). Explicit recommendations to use spanking were significantly more common within

the spanking benefits search results compared to spanking risks ($p < .001$) or neutral ($p = .006$) search results: 12 (42.9%) websites retrieved from spanking benefits search terms recommended spanking while only 2 (6.9%) from neutral search terms recommended it; not a single website from the spanking risks search recommended spanking. In contrast, explicit discouragement was significantly more common within the spanking risks ($p < .001$) and neutral ($p = .022$) search results compared to spanking benefits search results: 24 (85.7%) of the websites identified through spanking risks search terms and 22 (75.9%) of those found through neutral search terms discouraged spanking, while 11 (39.3%) of the websites found through spanking benefits search terms included some discouragement of spanking.

Across all websites, 14 (16.5%) websites framed spanking as a scientific debate, 24 (28.2%) websites mentioned the existence of a debate, and 47 (55.3%) websites did not mention a debate at all. Framing spanking as a scientific debate was significantly more common within the spanking benefits search results compared to spanking risks ($p = .008$) or neutral ($p = .014$) search results: 11 (39.3%) of the websites retrieved from spanking benefits search terms framed spanking as a debate compared to only 1 (3.6%) of the websites from spanking risks search terms and 2 (6.9%) websites from the neutral search terms. In contrast, presenting information without mentioning a debate was marginally more common within the neutral search results compared to the spanking benefits search results ($p = .052$): 20 (70%) of the websites from neutral search terms did not mention a debate, while 10 (35.7%) of the websites from the spanking benefits search terms did not mention a debate.

Table 1 also shows several website characteristics (e.g., whether experts were quoted or attributed) and whether articles include a greater contextualization of spanking (e.g., whether the legality of corporal punishment in schools was mentioned). A majority of all websites, regardless of search terms, presented or cited research about spanking (n = 61; 71.8%) and quoted or attributed experts and professionals (n = 62; 72.9%). Websites retrieved using spanking benefits search terms, compared to those retrieved using spanking risks search terms, were less likely to cite scientific research (p = .006) or quote experts (p = .013). There were no significant differences between search results in how discussions of spanking were contextualized. A majority of the websites described the potential side-effects or risks of spanking for children (n = 75; 88.2%) and described safer discipline strategies parents could use (n = 46; 54.1%). Less frequent were mentions of children's rights as humans (n = 17; 20%), the legality of corporal punishment in schools (n = 26; 30.6%), and bans in other countries (n = 31; 36.5%). Only a small number of websites focused on personal anecdotes (n = 9; 10.6%).

Presented Justifications for Spanking

In total, 32 (37.6%) websites presented justifications for spanking. Of the 85 total websites, 11 (12.9%) presented only one justification, 16 (18.8%) presented between two and four justifications, and 5 (5.9%) presented between five and seven justifications. The most commonly spread justifications were "spanking improves children's behavior" (n = 13; 15.3%), "there is a right or optimal way to spank" (n = 13; 15.3%), "spanking is useful in some situations" (n = 11; 12.9%), and "spanking is discipline, not abuse" (n = 9;

10.6%). Each justification was presented on at least one of the websites (see Table 2).

Presented justifications for spanking were significantly more common among the websites retrieved using spanking benefits search terms ($F(2, 82) = 14.11$, $p < .001$): An average of 2.25 ($SD = 2.14$) justifications were presented per website within the spanking benefits search results, compared to .66 ($SD = 1.49$) per website within the neutral search results and .18 ($SD = .48$) per website within the spanking risks search results. If a parent read every website listed on the first page of search results after searching for the benefits of spanking, they would encounter 12.6 times more justifications than if they had searched for the risks of spanking, and 3.9 times more justifications than if they had searched using neutral search terms. Interestingly, justifications were more likely to appear in the spanking benefits search results except for the justification that "current methods cannot provide a causal link to poor outcomes," which occurred most often in the neutral search terms.

Countered Justifications for Spanking

The majority of websites ($n = 74$; 87.1%) countered justifications for spanking. Of the total websites, 12 (14.1%) countered only one justification about spanking, 54 (63.5%) countered between two and four justifications, and 7 (8.2%) countered between five and seven justifications. In addition, one very thorough website countered a total of eight justifications for using spanking. The most commonly countered justifications were "spanking improves children's behavior" ($n = 66$; 77.6%), "spanking is discipline, not abuse" ($n = 41$; 48.2%), "the government [or scientists] shouldn't interfere with raising

children" (n = 31; 36.5%), and "spanking is equally or more effective than other discipline strategies" (n = 20; 23.5%). Each justification was countered on at least one of the websites (see Table 3).

Countered justifications for spanking were significantly higher among the websites retrieved using spanking risks search terms ($F(2, 82) = 6.27$, $p = .003$): An average of 3.07 (SD = 1.49) justifications were countered per website within the spanking risks search results, compared to 2.83 (SD = 1.63) per website within the neutral search results and 1.64 (SD = 1.73) per website within the spanking benefits search results. The number of countered justifications was fairly equivalent across search terms. If a parent read every website listed on the first page of search results using spanking benefits search terms, they would encounter 1.87 times more countered justifications for spanking than if they used spanking risks search terms, and 1.04 times more countered justifications than if they used neutral search terms.

Ratio of Justifications Countered to Justifications Presented

Across all of the 28 websites retrieved using the spanking benefits search terms, more justifications were presented than they were countered: 1.37 justifications were presented for every justification countered. The opposite was true for the neutral and spanking risks search results. Across the 29 websites retrieved using the neutral search terms, 4.32 justifications were countered for every justification presented. Across the 28 websites retrieved using spanking risks search terms, 17.2 justifications were countered for every justification presented.

STUDY 1B: SEARCH TERM BIAS IN PARENTS' INFORMATION-SEEKING BEHAVIOR

Participants

Participants were 596 parents of children between the ages of 2 and 8 years recruited from Prolific (www.prolific.co). Prolific is an online crowdsourcing tool recently validated as better suited for scientific research than previous popular online data pools (Peer et al., 2017), such as Amazon's Mechanical Turk (Buhrmester et al., 2011). On the Prolific website, participants were notified about the opportunity to participate in our study if they had at least one child between the ages of 2 and 8 years, if they were currently living in the United States, if they were at least 18 years of age, and if they were able to read and respond in English. Data collection was open across four different occasions (~22 days total). We initially collected data on 651 parents; 56 participants were removed either because they started the study but did not meet the listed inclusion criteria or because they failed an attention check question during the survey, resulting in a final sample of 596 parents.

In this sample, 58% of participants identified as female, 78% as White, 9% as Latino, 8% as Black, 5% as Asian, and 1% as other or mixed race/ethnicity. Of participating parents, 20% were low income (< $40,000 annual income), 53% were middle income ($40,000–$100,000), and 27% were high income (>$100,000). Participants represented 40 U.S. states, excluding Alaska, Connecticut, Delaware, Hawaii, Idaho, Maine, Montana, New Hampshire, Rhode Island, and Vermont.

Procedure

Study 1b involved simulated parents' information-seeking behavior by using the

search terms and website links from Study 1a. All participant data were collected online using Qualtrics survey software. After providing consent electronically, participants reported their attitudes, responded to several questions about searching for information online, took a quiz measuring scientific literacy about various topics, and reported demographic information. Institutional review board approval (protocol #2019-07-0152) at The University of Texas at Austin was obtained for the original study, titled "Scientific Information About Spanking Study". This study was not formally preregistered. Neither the data nor the materials have been made available on a permanent third-party archive; however, requests for the data or materials can be sent via email to the author.

Measures

Parents' Search Term and Website Selection

Parents were told they would be simulating a Google search and were asked to choose one of three search terms: spanking, physical discipline, and physical punishment. Then, parents were given the option to add "benefits" or "risks" to the search. Parents were then presented with images of the actual Google search generated by using the corresponding search term. Parents were asked to then select which one of the 9-10 websites they would be the most likely to click on first. The website options for parents' selection included identification numbers so that they could be connected to the websites' codes.

Attitudes Toward Spanking

Positive attitudes toward spanking were measured using the Attitude Toward

Spanking scale (ATS; Holden, 2001). Parents read 10 items such as "Spanking is a normal part of my parenting" and reported how much they agreed with each statement on a 1 (strongly disagree) to 5 (strongly agree) scale. The final score was the average of the 10 items (M = 2.11, SD = 1.05). About 22% of participants reported having high positive attitudes toward spanking (an average score greater than 3), consistent with other online samples (Scott & Gershoff, 2020). Internal consistency (Cronbach's alpha) was $\alpha = .93$.

Spanking Frequency

Participants reported how frequently they had spanked their children in the last month on a 1 to 5 scale (0 = not once in the last month; 1 = one to two times a month; 2 = a few times a month; 3 = a few times a week; 4 = almost every day; M = .38, SD = .77); 21.5% of participants reported they spanked their children at least once or more in the last month.

General Scientific Literacy

Participants took a 10-item true-false quiz about various scientific topics, developed by the National Science Foundation (NSF, 2016). Participants read statements that were objectively true (e.g., "Electrons are smaller than atoms") and some that were objectively false (e.g., "Antibiotics kill viruses as well as bacteria") and then rated whether they believed each statement to be true or false. Participants were given 1 point for every correct response. The final general scientific literacy score was used as a covariate and was the sum of all correctly answered quiz items (M = 8.29, SD = 1.62, range = 2-10).

Spanking-Specific Scientific Literacy

Participants responded to a 5-item true-false quiz about how spanking influences child development, developed for this study. Participants responded to five statements drawn from the AAP policy statement on physical discipline (Sege et al., 2018). These included "spanking is just as effective as other forms of discipline" (False; 82% correct), "spanking is approved by pediatricians as an appropriate form of discipline" (False; 89% correct), "spanking increases the likelihood that children will be aggressive" (True; 77% correct), "spanking can harm children by making permanent changes in the brain" (True; 28% correct), and "spanking teaches young children right from wrong" (False; 74% correct). Participants were given 1 point for every correct response. The final spanking-specific scientific literacy score was used as a predictor and was the sum of all correctly answered quiz items (M = 3.49, SD = .99, range = 0-5).

Demographic Covariates

Participants reported their age, gender, race, highest level of education, income, political ideology, and religiosity. Political ideology was reported on a 1 (extremely liberal) to 7 (extremely conservative) scale (M = 3.38, SD = 1.58). Religiosity was measured by asking participants to respond to the following question (Ellison & Bradshaw, 2009): "Which of these statements comes closest to describing your feelings about holy texts (e.g., the Bible, Quran, Torah, etc.)?" Response options were: 1) "Holy texts are ancient books of fables, legends, history, and moral precepts recorded by men" (n =300; 50%); 2) "Holy texts are the inspired word of God but not everything in them should be taken literally, word for word" (n =230; 39%); and 3) "Holy texts are the actual

word of God and are to be taken literally, word for word" (*n* =54; 9%).

Analysis Plan and Missing Data

Although missing data in the study were less than 1%, around 20% of participants (*n* = 122) did not select an individual website after selecting a search term. Participants may have missed the instructions to select a website because the page was designed to look like a Google search. To determine whether this skip pattern was related to characteristics of the participants or to the study variables themselves, I used *t*-tests and χ^2 tests of independence to compare continuous and categorical measures. Missingness on the website selection was not significantly related to any of the study variables of interest, demographic characteristics of participants, or covariates used in the models. Missingness on the website selection was also not significantly related to which search terms parents selected immediately prior. Thus, the data were considered to be missing at random (MAR). Logistic regressions were conducted in Mplus v8 (Muthén & Muthén, 1998-2017) using full information maximum likelihood to allow all cases to be included in model estimation.

Results

The goal of Study 1b was to examine whether parents with positive attitudes toward spanking were more likely to select into biased websites that present justifications for spanking. Table 4 shows parents' likelihood of selecting either negative (e.g., 'spanking benefits'), neutral (e.g., 'spanking'), or positive (e.g., 'spanking risks') search terms. Controlling for demographic characteristics, political ideology, and religiosity,

multinomial logistic regressions showed that for every one-unit increase in positive spanking attitudes, parents were 1.73 times more likely to select spanking benefits search terms (b = .55, SE = .16, p < .001) and 2.29 times more likely to select neutral search terms (b = .83, SE = .17, p < .001) over spanking risks search terms. Additionally, for every one-unit decrease in spanking scientific literacy, parents were 1.92 times more likely to select spanking benefits search terms (b = -.66, SE = .16, p < .001) and 1.73 times more likely to select neutral search terms (b = -.31, SE = .16, p = .043) over spanking risk search terms, and were 1.41 times more likely to select spanking benefits search terms over neutral search terms (b = -.35, SE = .16, p = .025).

Table 5 shows results from models predicting parents' likelihood of selecting particular websites. Parents with positive attitudes toward spanking were more likely to select websites that favored spanking: For every one-unit increase in spanking attitudes, parents were 2.51 times more likely to select websites that recommended using spanking (b = .92, SE = .27, p < .001), 1.57 times more likely to select websites that presented justifications (b = .45, SE = .17, p = .005), and 2.13 times more likely to select websites that did not counter justifications (b = .76, SE = .28, p = .002). Parents with positive attitudes toward spanking were also more likely to select websites that did not rely on research: For every one-unit increase in spanking attitudes, parents were 1.50 times more likely to select websites that framed spanking as scientific debate (b = .41, SE = .19, p = .034), 1.53 times more likely to select websites that did not quote or attribute experts (b = .42, SE = .16, p = .007), and 1.99 times more likely to select websites that did not present or cite research (b = .69, SE = .16, p < .001). Additionally, for every one-unit decrease in

spanking scientific literacy, parents were 1.52 times more likely to select websites that framed spanking as a scientific debate (b = -.42, SE = .17, p = .015) and were 1.41 times more likely to select websites that presented justifications for spanking (b = -.34, SE = .14, p = .016).

DISCUSSION

The current studies examined whether using search terms about the benefits of spanking would increase the likelihood that parents would encounter potentially convincing justifications for spanking presented online. The results from Study 1a suggest a search term retrieval bias in online search engines: Search terms that were neutral or about the risks of spanking retrieved websites that were more likely to provide evidence-based recommendations and counter justifications for spanking, whereas search terms that were about the benefits of spanking retrieved websites that were more likely to recommend spanking, present justifications for spanking, and lack reference to experts or research. The results from Study 1b suggest a bias in parents' information-seeking behavior: Parents with higher positive attitudes toward spanking and a lower scientific understanding of spanking had a higher likelihood of encountering justifications by selecting search terms about spanking benefits and then selecting links that led to websites recommending spanking.

These findings highlight a challenge in changing parents' attitudes toward spanking and reducing the use of physical punishment in the United States. Although digital media can be an inexpensive way to quickly disseminate scientific information to

the public, those needing education about the potential consequences of spanking may never receive it if their information-seeking behavior biases them toward websites that recommend spanking.

This bias in information-seeking behavior is one way in which parents can confirm their own attitudes, present convincing justifications to others, and affirm the decision to spank their children. The theory of planned behavior suggests that parents' engagement in spanking is most proximally determined by whether they hold intentions to spank, which is likely if they hold attitudes that spanking will result in desired outcomes and if they perceive that spanking is a normative behavior among others (Ajzen, 1991; Montaño & Kasprzyk, 2008). Applied to parents' information-seeking behavior, those who believe that spanking will have positive consequences for their children may already intend to spank in the future, and thus their information-seeking behavior reflects attempts to find websites that present only justifications using spanking or arguments about the benefits of spanking. Consider a parent who views the use of spanking favorably and thus searches in Google for the benefits of spanking, physical punishment, or physical discipline. This parent would encounter 12.6 more justifications for spanking than if they had searched for the risks of spanking, physical punishment, or physical discipline. By frequenting websites that recommend spanking based on opinions rather than evidence, parents are able to keep the perception that spanking is a normative behavior, affirm their attitudes and intention to spank (confirmation bias; Schmidt et al., 2017) and avoid encountering evidence that challenges their perspective and invokes cognitive dissonance (Miller, 1989).

Spanking justifications appeared in websites more frequently than did anti-vaccination justifications reported in another study using similar methodology: Websites retrieved by searching for "vaccine benefits" presented only 4.8 times more anti-vaccination justifications compared to websites retrieved by searching for "vaccine risks" (Ruiz & Bell, 2014; pg. 5778)—2.5 times fewer justifications than were found on websites retrieved with "spanking benefits". Although the rampant online misinformation about vaccinations is well known (Kata, 2010) and has received ample media attention (e.g., Hoffman, 2019), there may be an even larger occurrence of justifications for spanking (and perhaps other controversial childrearing topics) due to how normative spanking is in American culture.

About a third of the websites presented a justification about spanking. Most commonly, these justifications focused on improving children's behavior, including the idea that spanking is the most effective way to teach children desired behavior and that there are no better alternatives. Other commentaries focused on justifications that there is a right way to spank that separates it from physical abuse, including the ideas that spanking is safe when administered in a warm, loving manner, and that spanking can be useful for situations in which children are in danger.

Fortunately, a majority of the websites countered these same justifications for spanking and explicitly discouraged parents from using spanking. These commentaries countered justifications about using spanking to improve child behavior by using research to outline the potential negative side effects of spanking and by describing alternate discipline strategies. Other commentaries countered justifications for why spanking is

safe by presenting research demonstrating that similar neurological changes occur in the brains of children who were spanked as in the brains of children who experienced more severe physical abuse. These commonly countered justifications align with the most commonly presented justifications, meaning that parents are able to access high-quality information even if they search for the benefits of spanking. A large percentage of websites also focused on issues more commonly discussed among scientists, including countering the justification that current methodology cannot causally link spanking to poor outcomes and the justification that the experts and policymakers should not interfere with parents' childrearing decisions. Although countered often, these issues were rarely ever presented as justifications for spanking.

Although most websites provided evidence-based arguments for why spanking is not effective, only around a third of the websites contextualized spanking more broadly by discussing the human rights of children (20%), the legality of corporal punishment in schools (31%), or the bans of spanking now in 60 countries (36%) (Global Initiative to End All Corporal Punishment of Children, 2020). This represents a missed opportunity for websites to discuss the dangers of spanking in light of its legality and acceptability in other contexts. As suggested by the theory of planned behavior, parents may decide not to spank if they perceive that spanking is not a normative behavior among their peers (Ajzen, 1991; Montaño & Kasprzyk, 2008); therefore, informing American parents about the global solidarity behind ending the use of physical punishment could help convince them to reconsider their discipline strategies. Moving forward, writers and informational websites could help facilitate change by embedding their presentations of research

findings within greater discussions of human rights and how physical punishment is perceived around the world.

In today's era of rampant misinformation, the merit of an online source is often left to be judged by those who access it; thus, it has become increasingly important to improve scientific literacy in the United States. Anti-science sentiments have even become a public health issue during the COVID-19 pandemic: Dr. Fauci, the nation's leading expert on infectious diseases, has warned that an anti-science bias in the United States could be dangerous (Howard & Stracqualursi, 2020). Distrust in science has indeed been linked to non-compliance of COVID-19 prevention guidelines (Plohl & Musil, 2020). To improve the public's relationship with science, efforts are needed to make science more accessible and to increase the public's ability to distinguish between evidence-based information and opinion-based misinformation. Social media companies like Facebook, which have been criticized for facilitating the spread of misinformation, have begun using fact checking services to identify when misinformation is shared and decrease its appearing on users' news feeds (Facebook, 2020). Another recent study about COVID-19 misinformation demonstrated that simply asking participants to think about the accuracy of a headline can reduce the likelihood that they would share the article on social media (Pennycook et al., 2020). Applied to both social media and search engine platforms, combined methods of removing links from view, adding warning labels to links that include misinformation, or asking users to consider what they are posting before doing so could all help increase the likelihood that misinformation is not shared and that evidence-based information is disseminated effectively.

Limitations

The current studies should be interpreted within their limited ecological validity. In Study 1a, although generating lists of websites by using varied combinations of search terms allowed for a controlled comparison of search term valence, search terms such as "benefits of spanking" are likely dissimilar to what parents actually search for. Parents searching for discipline advice online may use longer phrases that are specific to their scenario and may not include any terms directly related to spanking (e.g., "how do I get my child to behave?"). Additionally, I did not examine any social media platforms, which parents may use frequently to access parenting information and discuss spanking (Lee et al., 2020). The websites and justifications examined were largely U.S.-centric; had a search been done in another country, the search results may be drastically different and may present little to no misinformation about spanking if the country has legally banned spanking.

In Study 1b, simulating a search by asking participants to select a single website likely does not reflect how they actually search for information in a natural context. Future studies could improve upon this study by using eye-tracking and screen-recording technology to collect real-time observations of parents' information-seeking behavior. Another major limitation was the significant proportion of participants who skipped selecting an individual website from the presented lists. The design of this survey page may have caused participants to miss or misunderstand the instructions; the instructions were embedded between an image of the search term they chose being entered into Google and the images of each suggested website link. Had the instructions been clearer,

the models in this study could have more accurately estimated parents' website choices without the use of missing data estimation techniques.

Because the sample was obtained online from Prolific across a short period of time (~22 days), the results may not be entirely generalizable to the greater population. This sample may reflect a younger generation of parents who may favor spanking less than the general population. Additionally, our sample consisted mostly of White, educated parents. Although online data pools such as Prolific and Amazon's Mechanical Turk have been validated as able to generate representative samples (Buhrmester et al., 2011; Dworkin et al., 2016; Peer et al., 2017), the sample we obtained could instead reflect a specific group of parents that participate in online surveys for additional income. Future studies could use more traditional recruitment methods (e.g., recruiting from local communities, social media, or newsletters) to generalize the current study's findings to all parents in the population, not just those participating in surveys online.

Conclusion

Although searching for information about child discipline on Google retrieves a majority of websites that use evidence to discourage spanking, parents who favor spanking and use search terms about the "benefits" of spanking will be led to websites that present justifications for using spanking. This suggests that positive attitudes toward spanking may be perpetuated through parents' information-seeking behavior. Parents will to continue to search for information about childrearing online. Pediatricians, child psychologists, and other mental and health professionals should be aware of the potential

for parents to encounter misinformation and justifications for spanking while searching online and could help intervene by providing parents with links to quality online resources during visits. As pro-spanking attitudes decline in the United States, justifications for spanking may appear less frequently online. To help facilitate this change, scientists, public officials, social media platforms, and search engine companies may need to work together to develop new ways of promoting evidence-based recommendations and removing or labeling misinformation.

Table 1: Characteristics of Websites by Search Term Valence

Variables	Agreement Coefficient	"Benefits" search terms (n = 28)	Neutral search terms (n = 29)	"Risks" search terms (n = 28)	Fisher's exact p-value
		n (%)	*n* (%)	*n* (%)	*p*
Website Type	1.00				
Informational		6 (21.4%)	7 (24.1%)	6 (21.4%)	1.00
Blog		5 (17.9%)	2 (6.9%)	2 (7.1%)	.451
News		3 (10.7%)	3 (10.7%)	4 (14.3%)	1.00
Op-ed		3 (10.7%)	1 (3.4%)	0 (0%)	.216
Organization		5 (17.9%)	10 (35.7%)	9 (32.1%)	.358
Online magazine		2 (7.1%)	2 (6.9%)	4 (14.3%)	.651
Religious group		1 (3.6%)	1 (3.4%)	0 (0%)	1.00
Peer-reviewed scientific paper		3 (10.7%)	3 (10.3%)	3 (10.7%)	1.00
Overall tenor	.87				
Recommends spanking		**12$_a$ (42.9%)**	**2$_b$ (6.9%)**	**0$_b$ (0%)**	**<.001**
Discourages spanking		**11$_a$ (39.3%)**	**22$_b$ (75.9%)**	**24$_b$ (85.7%)**	**<.001**
Neutral		5 (17.9%)	5 (17.2%)	4 (14.3%)	1.00
Framing of spanking research	.70				
Framed as a debate		**11$_a$ (39.3%)**	**2$_b$ (6.9%)**	**1$_b$ (3.6%)**	**<.001**
Debate was mentioned		7 (25%)	7 (24.1%)	10 (35.7%)	.629
Not framed as a debate		**10$_a$ (35.7%)**	**20$_b$ (70%)**	**17$_{ab}$ (60.7%)**	**.035**
Experts are quoted or attributed	.82	**16$_a$ (57.1%)**	**20$_{ab}$ (70%)**	**26$_b$ (92.9%)**	**.007**
Research is cited or presented	1.00	**15$_a$ (53.6%)**	**20$_{ab}$ (70%)**	**26$_b$ (92.9%)**	**.003**
Personal opinion expressed	.89	11 (39.3%)	7 (24.1%)	5 (17.9%)	.211
Personal anecdotes included	.88	5 (17.9%)	1 (3.4%)	3 (10.7%)	.180
Risks of spanking mentioned	.69	21 (75%)	27 (93.1%)	27 (96.4%)	.059
Other discipline methods described	.77	11 (39.3%)	20 (70%)	15 (53.6%)	.093
Children's human rights mentioned	1.00	4 (14.3%)	7 (24.1%)	6 (21.4%)	.703
Legality in schools mentioned	.95	8 (28.6%)	12 (41.4%)	6 (21.4%)	.282
Bans in other countries mentioned	1.00	7 (25%)	13 (44.8%)	11 (39.3%)	.302

Note. Subscripts indicate significant differences between groups.

Table 2: Percentage of Websites Presenting Justifications for Spanking by Search Term Valence

Presented justifications for spanking	Agreement Coefficient	"Benefits" search terms (n = 28)	Neutral search terms (n = 29)	"Risks" search terms (n = 28)	Fisher's exact p-value
		n (%)	n (%)	n (%)	p
Spanking improves child behavior	.78	**11$_a$ (39.3%)**	**1$_b$ (3.4%)**	**1$_b$ (3.6%)**	**<.001**
There is a right or optimal way to spank	.67	**10$_a$ (35.7%)**	**3$_{ab}$ (10.3%)**	**0$_b$ (0%)**	**<.001**
Spanking is useful in some situations	.85	**9$_a$ (32.1%)**	**1$_b$ (3.4%)**	**1$_b$ (3.6%)**	**.002**
Spanking is discipline, not abuse	.60	6 (21.43%)	2 (6.9%)	1 (3.6%)	.111
Spanking is equally or more effective than other discipline strategies	.70	**6$_a$ (21.43%)**	**0$_b$ (0%)**	**0$_b$ (0%)**	**.002**
Spanking is a way to control children and instill fear	.90	**4 (14.3%)**	**0 (0%)**	**0 (0%)**	**.020**†
Some children seem to respond only to spanking	.95	**4 (14.3%)**	**0 (0%)**	**0 (0%)**	**.020**†
I was spanked and turned out fine	.78	3 (10.7%)	2 (6.9%)	0 (0%)	.278
Spanking alone leads to a desirable adult outcome	.90	3 (10.7%)	0 (0%)	0 (0%)	.066
Today's society/generation is worse off due to a lack of child discipline	1.00	2 (7.1%)	0 (0%)	0 (0%)	.212
The government/scientists shouldn't interfere with raising children	.65	2 (7.1%)	0 (0%)	0 (0%)	.212
Religious beliefs (e.g., spare the rod…)	.70	2 (7.1%)	1 (3.4%)	0 (0%)	.540
Current methods cannot provide a causal link to poor outcomes	.89	1 (3.6%)	5 (17.2%)	2 (7.1%)	.262
Spanking was common in earlier generations and they are okay	1.00	0 (0%)	1 (3.4%)	0 (0%)	1.00

Note. Justifications for spanking are rank ordered by the percentage of websites presenting them when negative valanced search terms were used (i.e., "spanking benefits," "physical punishment benefits," and "physical discipline benefits"). Subscripts indicate significant differences between groups. †Although the Fisher's exact test was significant, pairwise comparisons for these two justifications were non-significant.

Table 3: Percentage of Websites Countering Justifications for Spanking by Search Term Valence

Countered justification for spanking	Agreement Coefficient	"Benefits" search terms (n = 28)	Neutral search terms (n = 29)	"Risks" search terms (n = 28)	Fisher's exact p-value
		n (%)	n (%)	n (%)	
Spanking improves child behavior	.78	**15$_a$ (53.6%)**	**26$_b$ (89.7%)**	**25$_b$ (89.3%)**	**.002**
Spanking is discipline, not abuse	.60	**8$_a$ (28.6%)**	**14$_{ab}$ (48.3%)**	**19$_b$ (67.9%)**	**.014**
Current methods cannot provide a causal link to poor outcomes	.89	**4$_a$ (14.3%)**	**3$_a$ (10.3%)**	**12$_b$ (42.9%)**	**.010**
Spanking is equally or more effective than other discipline strategies	.70	4 (14.3%)	10 (34.5%)	6 (21.4%)	.224
There is a right or optimal way to spank	.67	4 (14.3%)	4 (14.3%)	3 (10.7%)	1.00
The government/scientists shouldn't interfere with raising children	.65	**3$_a$ (10.7%)**	**14$_b$ (48.3%)**	**14$_b$ (50%)**	**.002**
Religious beliefs (e.g., spare the rod…)	.70	2 (7.1%)	4 (14.3%)	1 (3.6%)	.492
Today's society/generation is worse off due to a lack of child discipline	1.00	2 (7.1%)	1 (3.4%)	0 (0%)	.540
I was spanked and turned out fine	.78	1 (3.6%)	2 (6.9%)	3 (10.7%)	.691
Some children seem to respond only to spanking	.95	1 (3.6%)	0 (0%)	1 (3.6%)	.212
Spanking is a way to control children and instill fear	.90	1 (3.6%)	1 (3.4%)	0 (0%)	.545
Spanking alone leads to a desirable adult outcome	.90	0 (0%)	1 (3.4%)	1 (3.6%)	1.00
Spanking was common in earlier generations and they are okay	1.00	0 (0%)	1 (3.4%)	1 (3.6%)	1.00
Spanking is useful in some situations	.85	0 (0%)	1 (3.4%)	0 (0%)	1.00

Note. Justifications for spanking are rank ordered by the percentage of websites countering them when negative valanced search terms were used (i.e., "spanking benefits," "physical punishment benefits," and "physical discipline benefits"). Subscripts indicate significant differences between groups.

Table 4: Logistic Regressions Predicting Parents' Search Term Selection Bias

Model and predictors	Log-odds *b* (*SE*)	95% C.I.	Odds ratio
Model: Spanking benefits search terms vs. spanking risks search terms			
Spanking attitudes	**.55*** (.16)**	**.23, .87**	**1.73*** **
Spanking frequency	.06 (.21)	-.35, .47	1.06
Spanking scientific literacy	**-.66*** (.16)**	**-.98, -.35**	**0.52*** **
Model: Spanking benefits search terms vs. neutral search terms			
Spanking attitudes	-.28 (.18)	-.63, .08	0.76
Spanking frequency	.26 (.23)	-.19, .70	1.30
Spanking scientific literacy	**-.35* (.16)**	**-.65, -.04**	**0.71***
Model: Neutral search terms vs. spanking risks search terms			
Spanking attitudes	**.83*** (.17)**	**.50, 1.16**	**2.29*** **
Spanking frequency	-.20 (.21)	-.62, .22	0.82
Spanking scientific literacy	**-.31* (.16)**	**-.62, -.01**	**0.73***

Note. All models controlled for participants' age, gender, race, highest level of education, income, political ideology, religiosity, and general scientific literacy. * $p < .05$, ** $p < .01$, *** $p < .001$.

Table 5: Logistic Regressions Predicting Odds of Parents' Selecting Websites with Particular Characteristics

Model and predictors	Log-odds *b* (*SE*)	95% C.I.	Odds ratio
Model: Spanking is recommended			
Spanking attitudes	**.92*** (.27)**	**.40, 1.44**	**2.51*** **
Spanking frequency	.11 (.28)	-.43, .66	1.12
Spanking scientific literacy	-.37 (.22)	-.79, .06	0.69
Model: Framed as a debate			
Spanking attitudes	**.41* (.19)**	**.03, .79**	**1.50***
Spanking frequency	.20 (.23)	-.25, .64	1.22
Spanking scientific literacy	**-.42* (.17)**	**-.76, -.08**	**0.66***
Model: Experts are not quoted			
Spanking attitudes	**.42** (.16)**	**.11, .74**	**1.53** **
Spanking frequency	.23 (.18)	-.12, .57	1.26
Spanking scientific literacy	-.01 (.14)	-.29, .28	1.00
Model: Research is not cited			
Spanking attitudes	**.69*** (.16)**	**.37, 1.01**	**1.99*** **
Spanking frequency	.05 (.18)	-.30, .40	1.05
Spanking scientific literacy	-.01 (.14)	-.28, .28	1.00
Model: Justifications are presented			
Spanking attitudes	**.45** (.17)**	**.13, .78**	**1.57** **
Spanking frequency	.22 (.18)	-.14, .58	1.25
Spanking scientific literacy	**-.34* (.14)**	**-.63, -.06**	**0.71***
Model: Justifications are not countered			
Spanking attitudes	**.76** (.28)**	**.21, 1.31**	**2.13** **
Spanking frequency	-.08 (.25)	-.58, .41	0.92
Spanking scientific literacy	-.38 (.21)	-.79, .02	0.68

Note. All models controlled for participants' age, gender, race, highest level of education, income, political ideology, religiosity, and general scientific literacy. * $p < .05$, ** $p < .01$, *** $p < .001$.

Chapter 3: Parent's Perceptions of Spanking Research Presented by Two Professional Organizations

INTRODUCTION

In December of 2018, the American Academy of Pediatrics (AAP) published a policy statement entitled "Effective Discipline to Raise Healthy Children" recommending against the use of corporal punishment or spanking, defined as the "noninjurious, open-handed hitting with the intention of modifying child behavior" (Sege et al., 2018; pg. 2). Shortly after, in February of 2019, the American Psychological Association (APA) published a similar policy statement entitled "Resolution on Physical Discipline of Children by Parents" (APA, 2019). Informed by over 20 years of research, these statements outline the potential developmental risks of spanking, detail more effective discipline alternatives, and serve as guidelines for pediatricians, psychologists, and other healthcare providers who may discuss with parents the behavioral management of children. The release of these policy statements is a pivotal moment in the global effort to reduce physical punishment. As a majority of parents trust pediatricians and psychologists to provide advice about children's behavior (Taylor et al., 2012; Taylor et al., 2017), the AAP and APA are in unique positions to educate families about effective discipline strategies through the widespread dissemination of the policy statements. The current study examined how parents of young children perceived excerpts of the AAP and APA policy statements that summarized research on the potential harmful consequences associated with spanking.

There is substantial empirical evidence that spanking is an ineffective and potentially harmful form of discipline. Several meta-analyses have examined the relative effects of spanking; the most comprehensive meta-analysis including data from over 160,000 children (Gershoff & Grogan-Kaylor, 2016) found that spanking was consistently linked with a range of negative outcomes for children, including aggression (Berlin et al., 2009), externalizing problems (Lansford et al., 2012), and mental health issues (e.g., Gershoff et al., 2010). The Centers for Disease Control and Prevention has also stated that reducing spanking is key to preventing child physical abuse (Fortson et al., 2016) and to date 59 countries have legally banned all physical punishment of children (Global Initiative to End All Corporal Punishment of Children, 2020). Despite these collective efforts to reduce spanking, 80% of American children report having been spanked by 5th grade (Vittrup & Holden, 2010) and two-thirds of American adults still think children sometimes need a "good, hard spanking" (Child Trends, 2015).

Although parents who favor spanking are particularly important to educate, their preexisting attitudes may decrease the likelihood they would trust information about the risks of spanking. For example, theories of cognitive dissonance (Case et al., 2005; Miller, 1989; van't Riet & Ruiter, 2013) imply that parents who utilize spanking or hold positive attitudes about spanking may feel that their efficacy and self-worth as a parent have been challenged when they encounter recommendations about discipline that are incongruent with their own experiences or beliefs; therefore, they may avoid or reject the recommendation and instead seek alternative information elsewhere. Parents may also exhibit a desire for autonomy in their childrearing decisions and strategies compared to

professionals or policy imposing control. Evidence of this has been documented, for example, in an online discussion about research on spanking in which commenters openly stated that "the government and these researchers have taken even our rights as parents away," and "the government has stepped in again where it has no business" (Taylor et al., 2016; pg. 568). To ensure that pediatricians and psychologists are well informed for discussing discipline issues with parents, it is important to understand the greater context within which parents interpret evidence-based information to make childrearing decisions about controversial topics like spanking.

THE CURRENT STUDY

The current study consists of two parts. The goal of Study 2a was to evaluate parents' perceptions of an excerpt from the AAP policy statement on the physical discipline of children. The goal of Study 2b was to replicate the findings of Study 2a by evaluating parents' perceptions of an excerpt from the APA resolution. First, I examined three research questions regarding parents' general perceptions: 1) How many parents were previously aware of the AAP and APA policy statements on child discipline? 2) On average, did parents trust the statements and believe the information about the risks of spanking? and 3) How many parents changed their mind about spanking after reading the statements? Second, we examined whether individual differences existed in parents' trust and belief in the statements. Individual differences were tested by several demographic categories (e.g., gender, ethnicity, etc.) and two covariates linked to spanking attitudes (Ellison & Bradshaw, 2009): biblical literalism (belief in the Bible as the actual word of

God) and political ideology (conservative vs. liberal). Third, we examined whether spanking attitudes, spanking frequency, and desire for autonomy in childrearing decisions predicted distrust and disbelief in the statements.

GENERAL METHOD

Participants

Participants were two samples of parents of children between the ages of 2-8 recruited from Prolific (www.prolific.co). Prolific is an online crowdsourcing tool recently validated as better suited for scientific research than previous popular online data pools (Peer et al., 2017), such as Amazon's Mechanical Turk (Buhrmester et al., 2011). Eligible participants were notified and invited to participate through the Prolific site.

Procedure

All data were collected using Qualtrics software. After providing consent electronically, participants reported on their attitudes. Parents were then randomly assigned to evaluate either the AAP statement or the APA statement. Parents were asked several questions about their awareness and perceptions of the official statements released by two professional organizations. Demographic information was collected at the end of the survey. Institutional review board approval (protocol #2019-07-0152) at The University of Texas at Austin was obtained for the original study, titled "Scientific Information About Spanking Study". Neither the data nor the materials have been made available on a permanent third-party archive; however, requests for the data or materials can be sent via email to the lead author.

Measures

Perceptions of Excerpts from the Statements on Effective Discipline

Before reading the statement, participants were asked whether or not they were aware the AAP/APA had released a statement about the physical punishment of children. After reading the statement, participants were asked "How much do you trust the statement from the American Academy of Pediatrics/American Psychological Association?" on a 1 (do not trust at all) to 5 (trust a great deal) scale (AAP: M = 4.06, SD = 1.08; APA: M = 4.05, SD = 1.06). Participants were also asked "How much do you believe the statement from the American Academy of Pediatrics/American Psychological Association?" on a 1 (do not believe at all) to 5 (believe a great deal) scale (AAP: M = 4.14, SD = 1.09; APA: M = 4.10, SD = 1.10). Finally, participants were asked whether reading the statement changed their mind about using spanking. Participants were able to indicate whether they already disagreed with spanking, whether the statement changed their mind about spanking, and whether the statement did not change their mind about spanking.

Attitudes Toward Spanking

Positive attitudes toward spanking were measured using the Attitudes Toward Spanking scale (ATS; Holden, 2001). Participants read 10 items such as "Spanking is a normal part of my parenting" and reported how much they agreed with each statement on a 1 (strongly disagree) to 5 (strongly agree) scale. The final score was the average of the 10 items (AAP: M = 2.10, SD = 1.05, APA: M = 2.16, SD = 1.06). About 23% of participants in Study 2a and 22% of participants in Study 2b reported having high

positive attitudes toward spanking (an average score greater than 3). Internal consistency (Cronbach's alpha) in both studies was $\alpha = .93$.

Spanking Frequency

Participants reported how frequently they had spanked their children *in the last month* on a 1 to 5 scale (0 = not once in the last month; 1 = one to two times a month; 2 = a few times a month; 3 = a few times a week; 4 = almost every day; AAP: $M = .28$, $SD = .68$; APA: $M = .38$, $SD = .77$). Roughly 19% of participants in Study 2a and 25% of participants in Study 2b reported they spanked once or more in the last month.

Desire for Autonomy in Childrearing Decisions

Parents' desire for autonomy in childrearing advice from was measured using a scale developed for the current study. Participants read 10 items related to receiving advice from groups outside of the family unit, including other parents, healthcare professionals, organizations, and government. These included items such as "researchers should not tell parents how to raise their children," "I prefer making parenting decisions without the help of others," and "the government should not enact policies regarding parenting decisions." The final score was the average of the 10 items (AAP: $M = 2.86$, $SD = .61$; APA: $M = 2.86$, $SD = .64$). Internal consistency in both studies was $\alpha = .72$.

Political Ideology

Participants rated their sociopolitical leaning on a 1 (extremely liberal) to 7 (extremely conservative) scale. Political ideology was reduced to three categories: liberal (scores of 1-3), moderate (score of 4), and conservative (scores of 5-7).

Biblical Literalism

Religiosity was measured using adapted biblical literalism questions (see Ellison & Bradshaw, 2009). Participants responded to the following question: “Which of these statements comes closest to describing your feelings about holy texts (e.g., the Bible, Quran, Torah, etc.)?” Response options were: 1) “Holy texts are the actual word of God and are to be taken literally, word for word;" 2) " Holy texts are the inspired word of God but not everything in them should be taken literally, word for word;" and 3) " Holy texts are ancient books of fables, legends, history, and moral precepts recorded by men.”

Demographic Covariates

Participants’ reported their age, ethnicity, completed education, and annual household income. Education was reduced to ‘college or more’ (0) versus ‘less than college’ (1). Annual household income was measured in increments of $10K and reflects the total household income without adjusting for household size.

STUDY 2A: PARENT PERCEPTIONS OF THE AMERICAN ACADEMY OF PEDIATRICS STATEMENT ON EFFECTIVE DISCIPLINE

Participants

Participants were 150 parents of children between the ages of 2-8 recruited from Prolific (www.prolific.co). In this sample, 61% of participants identified as female, 80% as White, 10% as Latino, 6% as Black, and 4% Asian. Of participating parents, 21% were low income (< $40,000 annual income), 59% were middle income ($40,000–$100,000), and 21% were high income (>$100,000). Participants represented 40 U.S. states,

excluding Alaska, Connecticut, Delaware, Hawaii, Idaho, Maine, Montana, New Hampshire, Rhode Island, Vermont.

Procedure

Participants were provided with a brief description of the AAP and were asked if they were aware the AAP had released a statement about physical punishment. Participants then read an excerpt from the larger AAP policy statement:

> "There appears to be a strong association between spanking children and subsequent adverse outcomes. The consequences associated with parental corporal punishment are summarized as follows:
>
> - Corporal punishment of children younger than 18 months of age increases the likelihood of physical injury;
> - Repeated use of corporal punishment may lead to aggressive behavior and altercations between the parent and child and may negatively affect the parent-child relationship;
> - Corporal punishment is associated with increased aggression in preschool and school-aged children;
> - Experiencing corporal punishment makes it more, not less, likely that children will be defiant and aggressive in the future;
> - Corporal punishment is associated with an increased risk of mental health disorders and cognition problems;

- The risk of harsh punishment is increased when the family is experiencing stressors, such as family economic challenges, mental health problems, intimate partner violence, or substance abuse; and
- Spanking alone is associated with adverse outcomes, and these outcomes are similar to those in children who experience physical abuse.

Therefore, the American Academy of Pediatrics recommends that parents, other caregivers, and adults interacting with children and adolescents should not use corporal punishment (including hitting and spanking), either in anger or as a punishment for or consequence of misbehavior, nor should they use any disciplinary strategy, including verbal abuse, that causes shame or humiliation." (Sege et al., 2018; pg. 4 & 6)

Participants were asked a question about the content of this statement to increase the likelihood they read and understood the information. After reading, participants provided ratings of their perceptions of the statement. Demographic information was collected at the end of the survey.

Results

Awareness of the AAP Policy Statement on Effective Discipline

Twenty-five participants (17% of the full sample) reported they were already aware the AAP had released a statement on the physical punishment of children. Percent awareness did not differ between those who spanked in the last month (17%) and those who did not (17%), χ^2 (1, N = 150) = .00, p = 1.00, nor did it differ between those with

high positive attitudes toward spanking (15%) and those with low positive attitudes toward spanking (17%), χ^2 (1, N = 150) = .01, p = .93. Black participants (0% awareness) appeared to be much less aware of the statement than White (18%), Latino (13%), or Asian (17%) participants, although this was not statistically significant, χ^2 (3, N = 150) = 2.16, p = .54 .

Perceptions of the AAP Policy Statement

In general, participants reported favorable perceptions of the excerpt from the statement (see Figures 1 and 2). Seventy-three percent reported high trust in the statement (scores of 4 or 5) while only 10% reported little to no trust in the statement (scores of 1 or 2), and 78% reported high belief in the statement (scores of 4 or 5) while only 11% reported little to no belief in the statement (scores of 1 or 2).

Individual Differences in Trust

Figure 1 shows individual differences in parents' trust in the AAP policy statement. Independent regressions using robust standard errors were used to test for individual differences in several demographic categorical variables. Black and White participants were significantly more likely to report having little to no trust in the AAP statement compared to Latino (Black: t = -2.34, b = -1.09, p = .020; White: t = -2.43, b = -.52, p = .016) and Asian (Black: t = -2.62, b = -1.22, p = .010; White: t = -2.97, b = -.65, p = .004) participants. Twenty-five percent of Black participants and 10% of White participants reported little to no trust, whereas no Latino or Asian participants reported any distrust. Following suit, 20% of conservative participants reported little no trust,

whereas only 6% of liberal participants reported any distrust (t = -2.57, b = -.59, p = .011). Trust in the statement also appeared to decrease as biblical literalism increased: Twenty-seven percent of those who perceive holy texts as the word of God (t = -2.66, b = -.86, p = .009) and 14% of participants who perceive holy texts as the inspired word of God (t = -2.32, b = -.41, p = .022) reported little to no trust, compared to just 2% of participants who perceive holy texts as a collection of fables.

Individual Differences in Belief

Figure 2 shows individual differences in parents' belief in the AAP policy statement. Similar to the results for trust, Black participants were significantly more likely to report having little to no belief in the AAP statement compared to Latino (t = -2.24, b = -.91, p = .026) and Asian (t = -3.26, b = -1.28, p = .001) participants, and White participants were significantly more likely to report little to no belief compared to Asian participants (t = -3.91, b = -.73, p < .001). Twenty-two percent of Black participants and 12% of White participants reported little to no belief, whereas no Latino or Asian participants reported any disbelief. Twenty-two percent of politically conservative participants reported little no belief, compared to only 7% of liberal participants (t = -3.28, b = -.78, p = .001). Belief in the statement also declined as biblical literalism increased: Twenty-one percent of those who perceive holy texts as the word of God (t = -2.71, b = -.90, p = .008) and 16% of participants who perceive holy texts as the inspired word of God (t = -2.49, b = -.44, p = .014) reported little to no belief, compared to 5% of participants who perceive holy texts as a collection of fables.

Changing Parents' Perceptions of Spanking

The high average ratings of trust and belief partially reflect participants' existing opinions about spanking: 53% of participants said they already did not believe in using spanking before reading the statement. Out of the remaining 70 participants, slightly more than half (n = 37; 53%) reported that reading the statement changed their mind about using spanking. Of the parents who spanked at least once in the last month, 56% reported that reading the statement changed their mind about using spanking. The percentage was slightly less in parents with the highest positive attitudes toward spanking (average scores above the midpoint of 3): 47% reported that reading the statement changed their mind about using spanking.

Attitudes Predicting Parents' Perceptions of AAP Policy Statement

Two multiple regression models were estimated to determine whether positive attitudes toward spanking, spanking frequency, and desire for autonomy in childrearing decisions predicted less trust and belief in the AAP statement, controlling for demographic covariates (see General Methods above) and using robust standard errors. Results are shown in Table 6. In the prediction of trust in the AAP statement, greater positive attitudes toward spanking and greater desire for autonomy in childrearing advice both significantly predicted less trust in the statement. In the prediction of belief in the AAP statement, only greater positive attitudes toward spanking significantly predicted less belief in the statement.

Summary

In Study 2a, parents of young children evaluated an excerpt from the American Academy of Pediatrics policy statement on effective discipline. Although less than a fifth of the sample was previously aware of the policy statement's existence, a majority of the parents perceived this key excerpt of the AAP policy statement favorably. Some parents (n = 37) even reported that reading the AAP statement excerpt changed their opinions about using spanking. Parents with positive attitudes toward spanking were found to report less trust and belief in the AAP statement. Similarly, parents who professed a strong desire for autonomy in childrearing decisions reported less trust in the AAP statement.

STUDY 2B: PARENT PERCEPTIONS OF THE AMERICAN PSYCHOLOGICAL ASSOCIATION RESOLUTION ON PHYSICAL DISCIPLINE

Participants

Participants were 148 parents of children between the ages of 2-8 recruited from Prolific (www.prolific.co). In this sample, 57% of participants identified as female, 80% as White, 6% as Latino, 8% as Black, and 5% Asian. Of participating parents, 29% were low income (< $40,000 annual income), 44% were middle income ($40,000–$100,000), and 27% were high income (>$100,000). Participants represented 40 U.S. states, excluding Alaska, Connecticut, Delaware, Hawaii, Idaho, Maine, Montana, New Hampshire, Rhode Island, Vermont.

Procedure

Participants were provided with a brief description of the APA and were asked if they were aware the APA had released a resolution about parents' use of physical discipline on children. Participants then read an excerpt from the larger APA resolution:

- "Physical discipline by parents has been associated with heightened risk for harm to children's mental health, as well as to their cognitive, behavioral, social, and emotional development
- Physical discipline is associated with increased adverse outcomes for children across racial, ethnic, and socioeconomic groups and across community contexts
- Research indicates that physical discipline is not effective in achieving parents' long-term goals of decreasing aggressive and defiant behavior in children or of promoting regulated and socially competent behavior in children
- The research on the adverse outcomes associated with physical discipline indicates that any perceived short-term benefits of physical discipline do not outweigh the detriments of this form of discipline
- Research has shown that children learn from the behavior modeled by parents, and therefore physical discipline may teach undesirable conflict resolution practices
- There is evidence that physical discipline may escalate into injurious behavior that meets accepted criteria for abuse

- Socially acceptable disciplinary goals of education, training, and socialization of children can be achieved without the use of physical discipline" (APA, 2019, pg. 1-2)

Participants were asked a question about the content of the resolution to increase the likelihood they read and understood the information. After reading the information, participants provided ratings of their perceptions of the statement. Demographic information was collected at the end of the survey.

Results

Awareness of the APA Resolution on Physical Discipline

Twenty-four participants (16% of the full sample) reported they were already aware the APA had released a resolution on physical discipline of children. Percent awareness did not differ between those who spanked in the last month (19%) and those who did not (15%), χ^2 (1, N = 148) = .07, p = .80, nor did it differ between those with high positive attitudes toward spanking (13%) and those with low positive attitudes toward spanking (17%), χ^2 (1, N = 148) = .14, p = .71. Although percent awareness did not differ significantly by race, χ^2 (3, N = 148) = 1.25, p = .74, only a single Black participant (8% of Black participants) was previously aware of the resolution compared to 16% of White, 22% of Latino, and 25% of Asian participants.

Perceptions of the APA Resolution

In general, participants reported favorable perceptions of the excerpt from the resolution (see Figures 3 and 4). Seventy-six percent reported high trust in the resolution

(scores of 4 or 5) while only 11% reported little to no trust in the resolution (scores of 1 or 2), and 76% reported high belief in the resolution (scores of 4 or 5) while only 9% reported little to no belief in the resolution (scores of 1 or 2).

Individual Differences in Trust

Figure 3 shows individual differences in participants' trust in the APA resolution. Independent regressions using robust standard errors were used to test for individual differences in several demographic categorical variables. Black participants were significantly more likely than participants with other racial identities to report having little to no trust in the APA resolution. Seventeen percent of Black participants reported little to no trust, compared to 12% of White participants (t = -2.43, b = -.66, p = .017) and 0% of Latino (t = -2.44, b = -.81, p = .016) and Asian participants (t = -2.41, b = -.96, p = .017). Moderate and conservative participants were significantly more likely than liberal participants to report distrust: Twenty-three percent of politically conservative participants (t = -3.33, b = -.70, p = .001) and 13% of moderate participants (t = -3.05, b = -.68, p = .003) reported little no trust, compared to just 4% of liberal participants.

Individual Differences in Belief

Figure 4 shows individual differences in parents' belief in the APA resolution. Similar to the results for trust, Black participants again were the most likely to report little to no belief in the resolution. Twenty-five percent of Black participants reported little belief in the resolution, compared to 9% of White participants (t = -2.26, b = -.73, p = .025) and 0% of Asian (t = -1.08, b = -2.49, p = .013) and Latino participants (t = -1.77,

b = -.69, p = .079), although this difference was only marginal for Black vs. Latino participants. Moderate and conservative participants were also significantly more likely than liberal participants to report disbelief: Fifteen percent of politically conservative participants (t = -3.21, b = -.72, p = .002) and 16% of moderate participants reported little to no belief (t = -3.02, b = -.70, p = .003), compared to only 4% of liberal participants.

Changing Parents' Perceptions of Spanking

The high average ratings of trust and belief partially reflect participants' existing opinions about spanking: 55% of participants said they already did not believe in using spanking before reading the resolution. Out of the remaining 67 participants, slightly more than half (n = 35; 52%) reported that reading the resolution changed their mind about using spanking. Of the parents who spanked at least once in the last month, 53% reported that reading the resolution changed their mind about using spanking. The percentage was slightly less in parents with the highest positive attitudes toward spanking (average scores above the midpoint of 3): 42% reported that reading the resolution changed their mind about using spanking.

Attitudes Predicting Parents' Perceptions of the APA Resolution

Two multiple regression models were estimated to determine whether positive attitudes toward spanking, spanking frequency, and desire for autonomy in childrearing decisions predicted less trust and belief in the APA resolution, controlling for demographic covariates (see General Methods above) and using robust standard errors. Results are shown in Table 7. In the prediction of both trust and belief in the APA

resolution, greater positive attitudes toward spanking and greater desire for autonomy in childrearing decisions significantly predicted less trust and less belief in the resolution.

Summary

In Study 2b, parents of young children evaluated an excerpt from the American Psychological Association resolution on physical discipline. The results from Study 2b were very similar to Study 2a. Although less than a fifth of the sample was previously aware of the resolution's existence, a majority of the parents perceived this key excerpt of the APA resolution favorably. Some parents (n = 35) even reported that reading the APA resolution excerpt changed their opinions about using spanking. Parents with positive attitudes toward spanking were found to report less trust and belief in the APA resolution. Similarly, parents who professed a strong desire for autonomy in making childrearing decisions reported less trust and belief in the APA resolution.

Discussion

The current studies surveyed parents of young children to examine their perceptions of excerpts from recent policy statements about the physical discipline of children released by the American Academy of Pediatrics and the American Psychological Association. Both excerpts presented a list of research findings about the potential risks of spanking, and the majority of parents found this information to be trustworthy and believable. Some parents even reported that reading the excerpt changed their opinions about using spanking. The results suggest that although few people may be

aware of these policy statements, increasing visibility and access to them could be useful in convincing some parents not to spank their children.

However, not all parents were convinced by the information about the risks of spanking. In particular, the percentages of those who did not trust or believe the statement at all were highest among parents who were Black, politically conservative, or perceived the Bible as the literal word of God. Followers of conservative religions, and those of Protestant Christianity in particular, have historically shown high support for physical punishment (Ellison & Bradshaw, 2009), often citing the phrase "spare the rod, spoil the child" as Biblical justification for spanking (Taylor et al., 2016). Black parents may be particularly difficult to reach and convince. After a long history of systemic discrimination and mistreatment, many Black Americans unsurprisingly are skeptical of health professionals (Halbert et al., 2006) and medical research (Rajakumar et al., 2009) and instead may rely on guidance about how to discipline and other parenting issues from their family members, greater social networks, and community or religious leaders (Taylor et al., 2013).

Parents with positive attitudes toward spanking were found to report less trust and belief in both the AAP statement and the APA statement. Similarly, parents who professed a strong desire for autonomy in making childrearing decisions reported less trust in the AAP statement, and both less trust and belief in the APA statement. These findings highlight the challenge of disseminating evidence-based recommendations to families: The parents that perhaps need the information the most are also the most likely to discount it. Parents who favor spanking may avoid encountering information that

suggests spanking is harmful and instead seek out and share alternate information consisting of misinformed beliefs and opinions about spanking, often occurring through online discussions (Taylor et al., 2016) and social media (Lee et al., 2020). Interestingly, greater desire for autonomy in childrearing decisions predicted less trust in the AAP statement but not less belief in it, while desire for autonomy predicted both less trust and less belief in the APA statement. Those who strongly value autonomy in making their parenting decisions may find information about spanking from a medical perspective to be believable but remain skeptical because of the organizational origin of the message. In contrast, parents who value autonomy may find information about spanking from a psychological perspective to be entirely unbelievable and untrustworthy, perhaps due to the long history of skepticism about the nature of psychological research (Lilienfeld, 2012).

These results suggest that although evidence-based policy and recommendations backed by large professional organizations such as the AAP and APA can be effective in communicating information about discipline to parents, there is not a one-size-fits-all approach to convincing parents not to spank. To be effective, information about discipline and other child-rearing issues may need to be tailored to fit within particular groups' specific cultural ideologies. It may also be that information needs to be presented by an individual health professional with whom the individual has built a relationship with over time rather than by an amorphous professional organization. The provision of anticipatory guidance by pediatricians and other health professionals has shown to be useful for decreasing parents' use of physical punishment and promoting more positive

parenting strategies (Hsu et al., 2018). By taking time to consider parents' needs, expectations, and perceptions before meeting with them in person, pediatricians, psychologists, and other mental and health professionals can discuss evidence-based discipline strategies with parents in a more trustworthy and convincing manner.

Limitations

Because the sample was obtained online using an online survey platform, parents in the study sample may differ from those in the general population. Limiting our sample to parents of young children may have resulted in a sample of a younger generation of parents who hold less favorable attitudes toward spanking compared to the general population. Additionally, our sample consisted largely of White, female, educated parents. Although online data pools have been validated as able to generate representative samples, the sample we obtained could instead reflect a specific group of parents who use such surveys as a source of additional income and may differ from parents who do not participate in online surveys.

The use of an online survey platform also means that the measures relied entirely on parents' self-report at a single point in time. Although some participants stated that reading the summaries changed their mind about spanking, the data did not allow for an examination of whether this changed actual behavior in the home or whether the change is long-lasting. Additionally, because the measure of desire for autonomy in childrearing decisions was created for the current study, it has not been fully validated and would

benefit from research examining its psychometric properties and potential benefits for family and developmental research.

In this study, participants only read a small section of the full AAP and APA policy statements. Participants did not read other sections of the statements, including information about alternative, more effective discipline strategies. Participants who have concerns about how to manage children's behavior without physical punishment may perceive information that includes alternative discipline strategies as more trustworthy, compared to only list of the potential consequences of spanking. Future studies could address this issue by conducting a more in-depth analysis about what type of messages about discipline are most effective at convincing parents to refrain from spanking.

Conclusion

In these two studies, I found that parents of children between the ages 2 and 8 had favorable perceptions of policy statements about the physical punishment of children released by the American Academy of Pediatrics and the American Psychological Association. Although information about the risks of spanking can reach a wide audience through organizational policy statements, pediatricians, psychologists, and mental and health professionals should pay particular attention to parents' backgrounds and preexisting attitudes when discussing discipline and other childrearing issues. A statement in itself may not change the opinions of Americans, but the support of the AAP and the APA promotes solidarity behind the movement to end physical punishment.

Table 6: Regression Models Predicting Trust and Belief in the AAP Policy Statement on Effective Discipline

	Model Estimates				Model Fit		
Predictor	*b* (*SE*)	95% CI	*β*	*t*	*F*	*df*	R^2
Trust Model					10.21***	13, 136	.45
Attitudes toward spanking	-.59*** (.08)	[-.74, -.43]	-.56***	-7.25			
Spanking frequency	-.07 (.14)	[-.35, .21]	-.04	-0.47			
Desire for autonomy in childrearing	-.32** (.12)	[-.55, -.10]	-.18**	-2.78			
Belief Model					14.50***	13, 136	.54
Attitudes toward spanking	-.65*** (.09)	[-.82, -.48]	-.61***	-7.36			
Spanking frequency	-.19 (.14)	[-.46, .08]	-.12	-1.40			
Desire for autonomy in childrearing	-.19 (.10)	[-.39, .01]	-.11	-1.90			

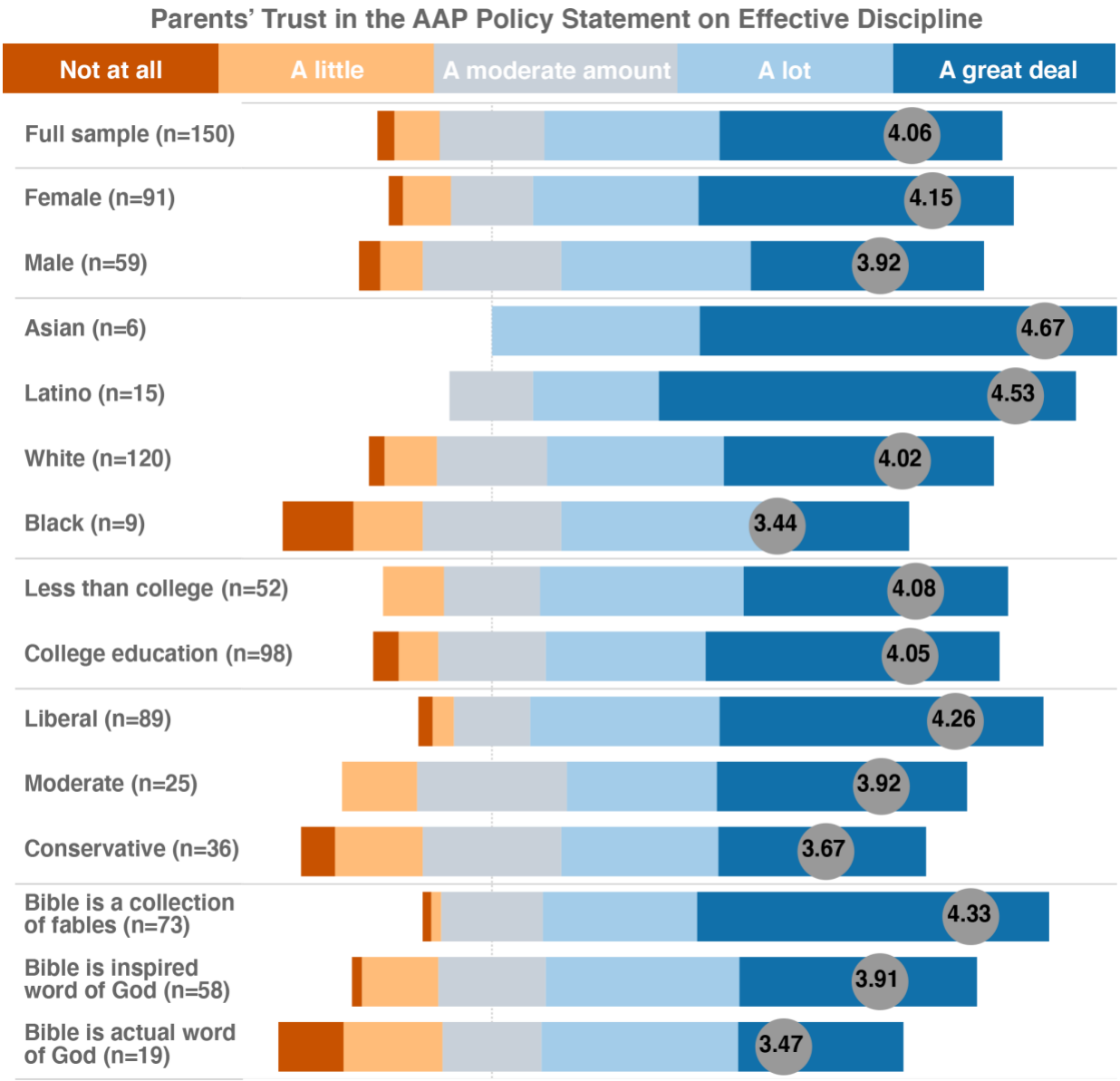
Note. Each model represents an independent regression predicting trust or belief and controlled for participants' age, gender, race, highest level of education, income, political ideology, and religiosity. ** $p < .01$, *** $p < .001$.

Table 7: Regression Models Predicting Trust and Belief in the APA Resolution on Physical Discipline

	Model Estimates				Model Fit		
Predictor	*b* (*SE*)	95% CI	*β*	*t*	*F*	*df*	R^2
Trust Model					10.19***	13, 134	.45
Attitudes toward spanking	-.54*** (.09)	[-.73, -.36]	-.54***	-5.80			
Spanking frequency	.25 (.13)	[-.01, .50]	.18	1.91			
Desire for autonomy in childrearing	-.54*** (.13)	[-.79, -.30]	-.33***	-4.32			
Belief Model					12.98***	13, 134	.51
Attitudes toward spanking	-.61*** (.09)	[-.79, -.43]	-.59***	-6.77			
Spanking frequency	.27 (.16)	[-.03, .58]	.19	1.75			
Desire for autonomy in childrearing	-.59*** (.11)	[-.80, .37]	-.34***	-5.41			

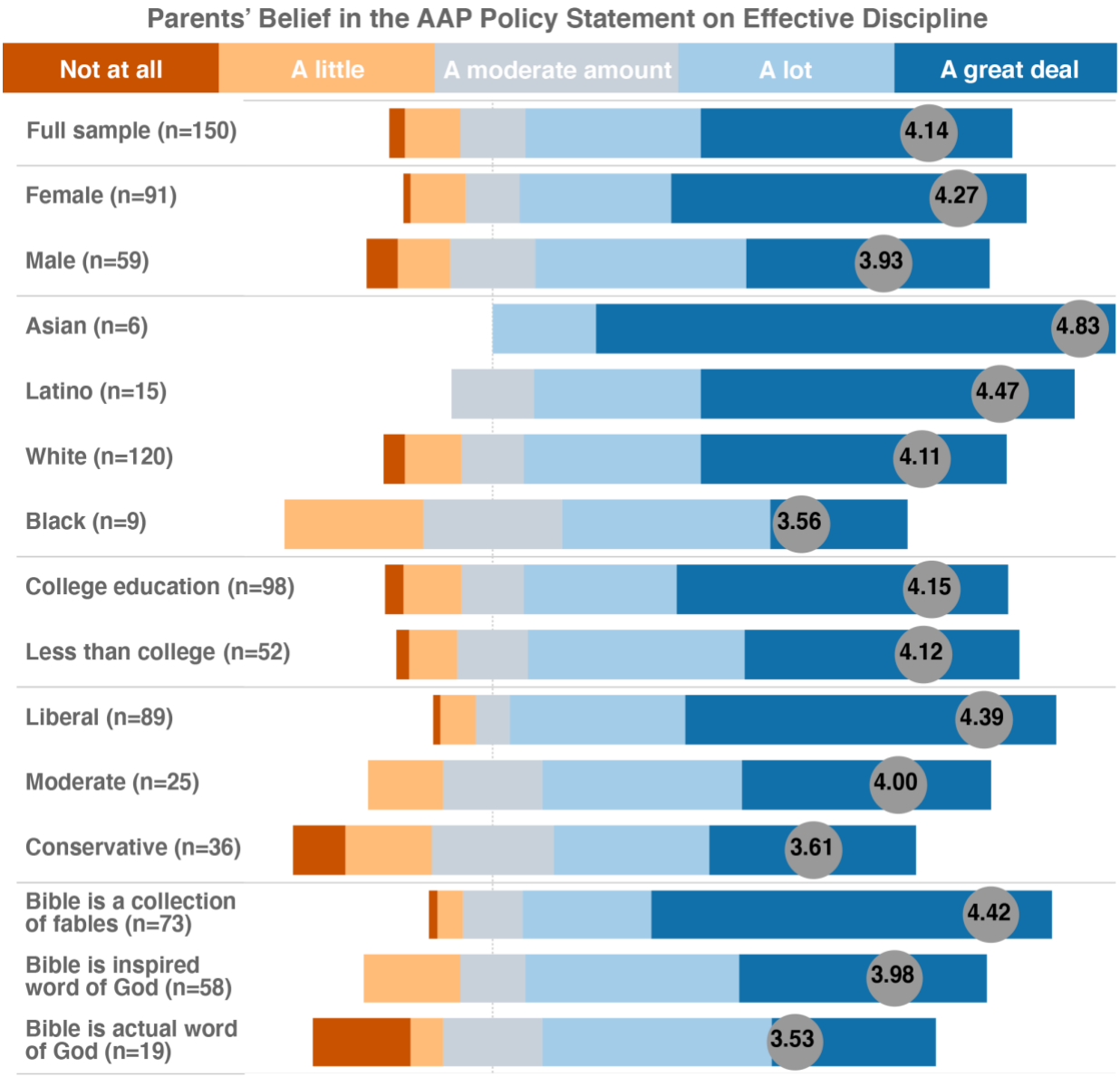
Note. Each model represents an independent regression predicting trust or belief and controlled for participants' age, gender, race, highest level of education, income, political ideology, and religiosity. ** $p < .01$, *** $p < .001$.

Figure 1: Parents' Trust in the American Academy of Pediatrics Policy Statement on Effective Discipline



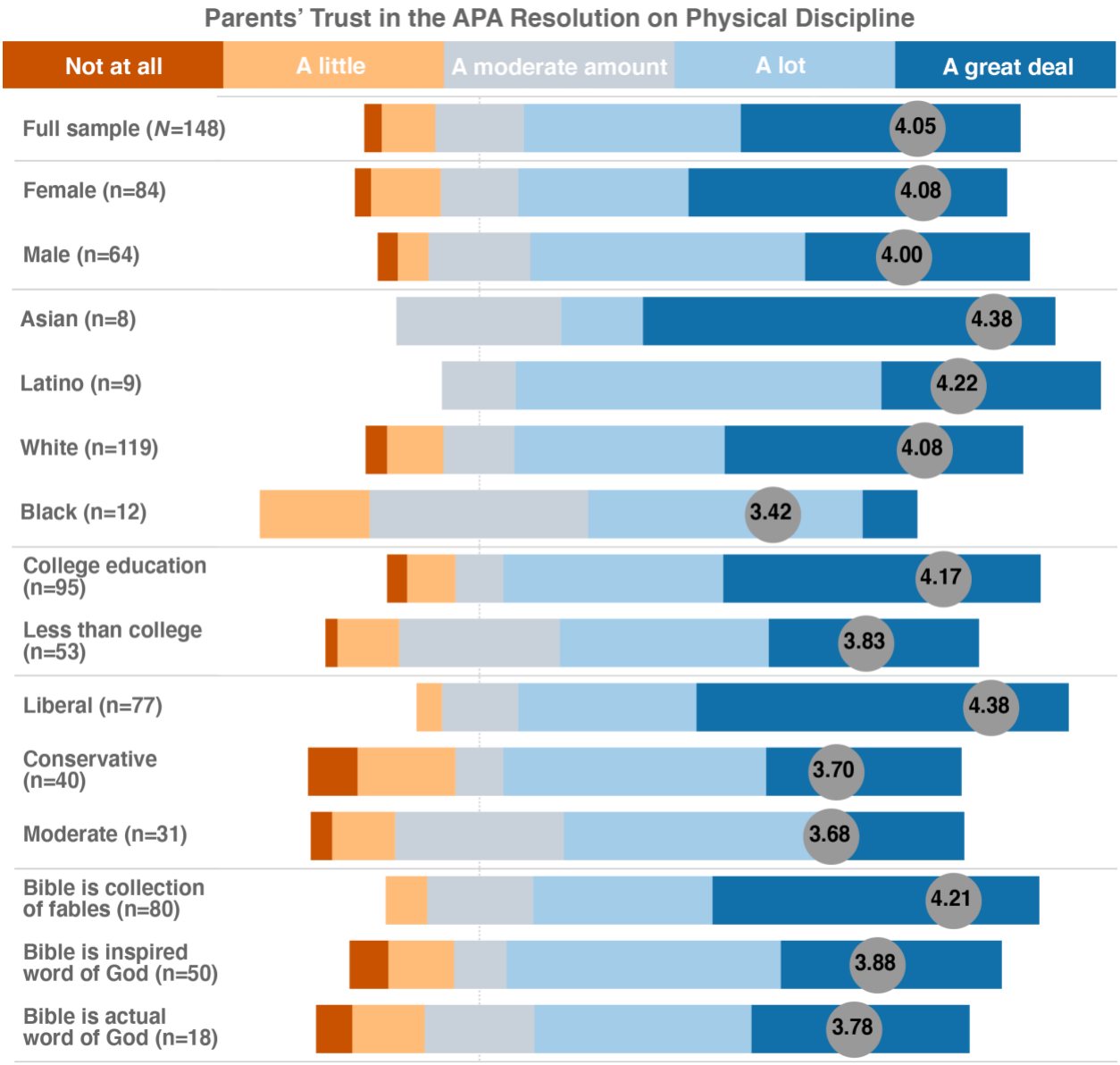
Note. Bars represent the percentage of participants who selected each response, centered on moderate scores. Numbers in circles represent means.

Figure 2: Parents' Belief in the American Academy of Pediatrics Policy Statement on Effective Discipline



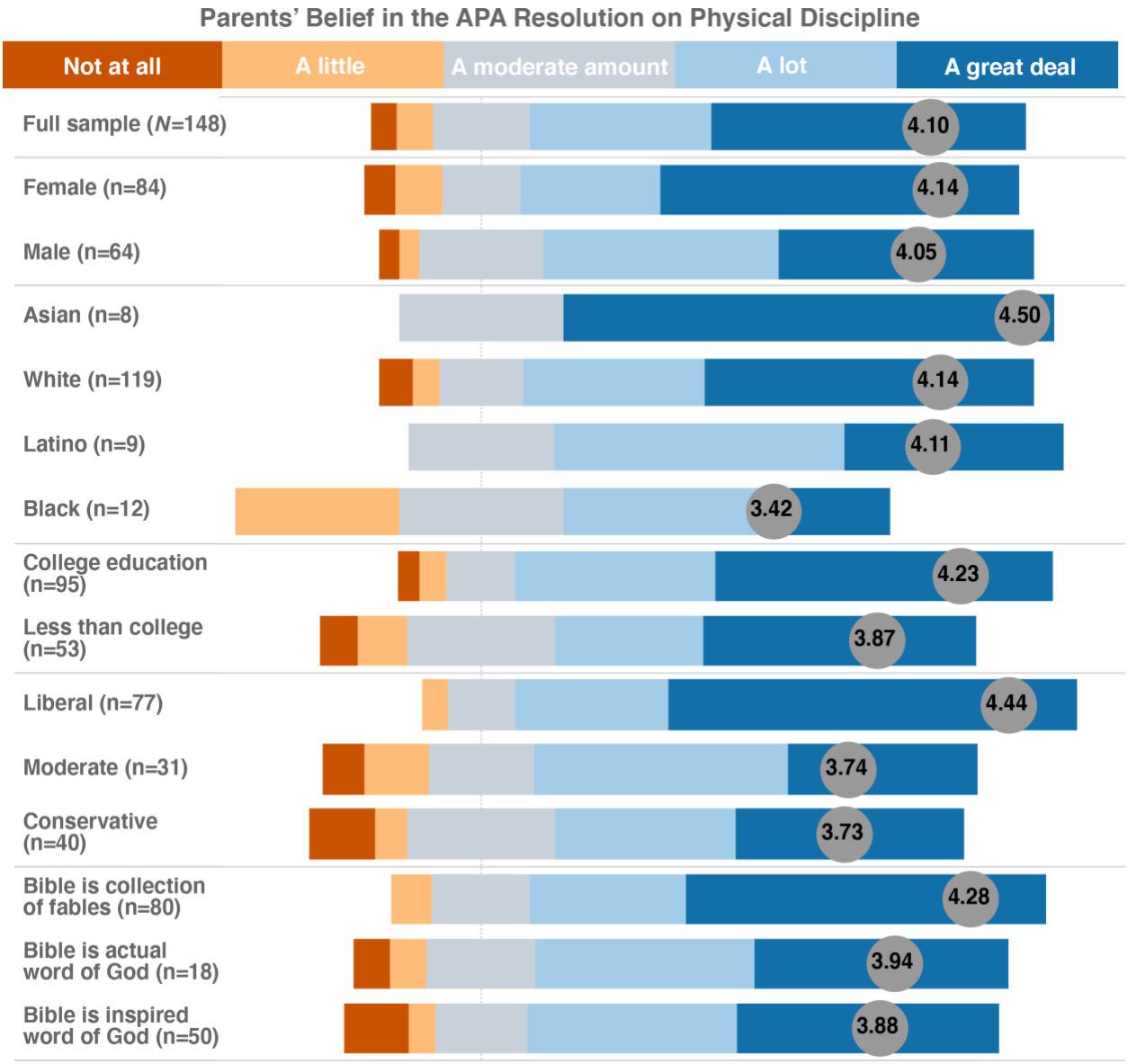
Note. Bars represent the percentage of participants who selected each response, centered on moderate scores. Numbers in circles represent means.

Figure 3: Parents' Trust in the American Psychological Association Resolution on Physical Discipline



Note. Bars represent the percentage of participants who selected each response, centered on moderate scores. Numbers in circles represent means.

Figure 4: Parents' Belief in the American Psychological Association Resolution on Physical Discipline



Note. Bars represent the percentage of participants who selected each response, centered on moderate scores. Numbers in circles represent means.

Chapter 4: The Dunning-Kruger Effect in Parents' Knowledge About Spanking Research

Introduction

According to a 2016 National Science Foundation (NSF) survey, roughly 32% of Americans felt that knowing about science was not important to their daily lives (NSF, 2016). The need to increase scientific literacy, or the ability to understand and interpret information from the scientific process, has long been a concern (Hotez, 2020; Howard & Stracqualursi, 2020; Levine, 2017) and may be of particular importance now: The ability for anyone to share their opinions online means that misinformed beliefs can be communicated rapidly to others. Myths about topics that have long benefited from scientific consensus, including vaccinations (Kata, 2010), genetically modified organisms (Boccia, Covino, & Sarnacchiaro, 2018), and global warming (Shao, 2017), can now be easily found and discussed by the average person seeking information on the Internet. The misinformation spread online can create a false sense that there is a debate about the science of a topic, when in fact scientists themselves have reached consensus. A lack of scientific literacy could be a reason why misinformation is shared in the first place as well as a reason why people may distrust quality scientific information when others foment fear of science online.

Family science is also affected by this distrust of experts. For decades, family scientists have struggled to convince the public that spanking, a topic that is controversial among the public but not within the scientific community, is detrimental to children's development (Gershoff & Grogan-Kaylor, 2016). The scientific conclusions about

spanking have now gained the support of large professional organizations in the form of policy statements from the Centers for Disease Control and Prevention (Fortson, Klevens, Merrick, Gilbert, & Alexander, 2016), the American Academy of Pediatrics (Sege et al., 2018), and the American Psychological Association (APA, 2019). Yet, 80% of children in the U.S. report having been spanked by 5th grade (Vittrup & Holden, 2010) and two-thirds of Americans still believe children sometimes need to receive a "good, hard spanking" (Child Trends, 2015). In online comments following news articles about spanking research, a majority of commenters display support for spanking, with some expressing outright contempt for family scientists (Taylor et al., 2016). Similarly, when parents with positive attitudes toward spanking read a news article containing commentaries from an expert and misinformed opinions from laypersons, they tend to rate the laypersons as more trustworthy than the expert (Scott & Gershoff, 2020). An overall lack of scientific literacy could explain the persistence of a general rejection of research on spanking.

THE DUNNING-KRUGER EFFECT AND PARENTS' INFLATED PERCEPTIONS OF SCIENTIFIC UNDERSTANDING

Individuals who trust layperson opinions for information about discipline more than they do experts (Scott & Gershoff, 2020; Taylor et al., 2016) may do so because they lack an understanding of the scientific process and its ability to support conclusions about human behavior. Without an inclination to trust science, such individuals thus rely on experience rather than research to form opinions about the effects of spanking on children. In fact, public opposition to controversial scientific topics, such as global

warming, is often attributed to a lack of accurate knowledge (e.g., Ranney & Clark, 2016).

Perhaps equally important, however, is the need to consider parents' perceived knowledge, or how well parents think they understand a scientific topic. If they think they know about a topic, but are in fact misinformed, parents' beliefs may be particularly entrenched and resistant to intervention. This phenomenon, known as the Dunning-Kruger effect, refers to situations in which people who are not knowledgeable or are unskilled in a particular area fail to perceive their inability and instead overestimate their knowledge and skill (Kruger & Dunning, 1999). People are generally unskilled in judging accurately how well they understand complex topics (Alba & Hutchinson, 2000), and when they try to give explanations for the mechanisms behind a process, their confidence in the accuracy of their understanding tends to decline (Rozenblit & Keil, 2002). These studies suggest that public opposition to controversial scientific information may reflect a discrepancy between perceived knowledge and objective knowledge, or the accurate, evidence-based knowledge about a topic.

Three recent studies have demonstrated the Dunning-Kruger effect with topics that have reached scientific consensus but remain controversial to the public, namely, whether vaccines are safe to administer to children and whether genetically modified organisms (GMO's) are safe for consumption. In one study, participants took an objective assessment of their knowledge of autism spectrum disorder and then estimated how well they performed on the assessment (McMahon et al., 2020). Those with the lowest

objective knowledge scores greatly overestimated their knowledge, demonstrating they were naïve to their lack of understanding.

Another study examined overconfidence by examining individuals' objective knowledge about autism and perceived knowledge relative to an expert—in other words, whether they think they know more or less than medical doctors and scientists (Motta et al., 2018). Individuals who exhibited low accurate knowledge about autism and instead endorsed myths about autism, such as the false idea that vaccines can cause autism in children, tended to believe that they knew as much or more than both doctors and scientists (Motta et al., 2018). This overconfidence in perceived knowledge was also associated with an opposition to mandatory vaccination policies.

A similar design was used to examine the Dunning-Kruger effect with the topic of GMOs (Fernbach et al., 2019). After self-assessing how well they understood the science behind GMOs, participants reported their overall scientific literacy via a measure developed by the National Science Foundation (NSF, 2016). Through moderation analyses, those who were highly opposed to GMOs (and thereby going against the scientific consensus that GMOs are safe) scored low on objective knowledge despite perceiving themselves as having a thorough understanding of GMOs. In other words, for the participants who held extreme views about GMOs that go against the scientific consensus, being less scientifically literate was associated with thinking they had more accurate knowledge than they actually did (Fernbach et al., 2019).

THE CURRENT STUDY

The purpose of Study 3 was to examine whether parents' perceived knowledge about spanking and observed scientific literacy differ by whether they have positive or negative attitudes toward spanking. I hypothesized that a Dunning-Kruger effect would be present, such that parents with positive attitudes toward spanking—those who hold attitudes counter to the scientific consensus about the risks of spanking—would perceive themselves to have a thorough understanding of the science behind spanking yet score low on an objective measure of general scientific literacy. I also hypothesized that parents with positive attitudes toward spanking would perceive themselves to be more knowledgeable about spanking than an expert in family psychology yet score low on an objective measure about how spanking influences child development.

METHOD

Participants

Participants were 596 parents of children between the ages of 2-8 recruited from Prolific (www.prolific.co). Prolific is an online crowdsourcing tool recently validated as better suited for scientific research than previous popular online data pools (Peer et al., 2017), such as Amazon's Mechanical Turk (Buhrmester et al., 2011). On the Prolific website, participants were notified about the opportunity to participate in our study if they had at least one child between the ages of 2 and 8 years, if they were currently living in the United States, if they were at least 18 years of age, and if they were able to read and respond in English. Data collection was open across four different occasions (~22 days total). We initially collected data on 651 parents; 56 participants were removed either

because they started the study but did not meet the listed inclusion criteria or because they failed an attention check question during the survey, resulting in a final sample of 596 parents.

In this sample, 58% of participants identified as female, 78% as White, 9% as Latino, 8% as Black, 5% as Asian, and 1% as other or mixed race/ethnicity. Of participating parents, 20% were low income (< $40,000 annual salary), 53% were middle income ($40,000–$100,000), and 27% were high income (>$100,000). Participants represented 40 U.S. states, excluding Alaska, Connecticut, Delaware, Hawaii, Idaho, Maine, Montana, New Hampshire, Rhode Island, and Vermont.

Procedure

All data were collected online using Qualtrics survey software. After providing consent electronically, participants reported their attitudes, perceived scientific understanding about spanking, and perceived scientific understanding about spanking relative to an expert in family psychology. Participants then took a 24-item quiz measuring scientific literacy about various topics. Finally, participants reported demographic information. Institutional review board approval (protocol #2019-07-0152) at The University of Texas at Austin was obtained for the original study, titled “Scientific Information About Spanking Study”. This study was not formally preregistered. Neither the data nor the materials have been made available on a permanent third-party archive; however, requests for the data or materials can be sent via email to the author.

Measures

Attitudes Toward Spanking

Positive attitudes toward spanking were measured using the Attitudes Toward Spanking scale (ATS; Holden, 2001). Parents read 10 items such as, "Spanking is a normal part of my parenting," and reported how much they agreed with each statement on a 1 (strongly disagree) to 5 (strongly agree) scale. The final score was the average of the 10 items (M = 2.11, SD = 1.05). About 22% of participants reported having high positive attitudes toward spanking (an average score greater than 3), consistent with other online samples (Scott & Gershoff, 2020). Internal consistency (Cronbach's alpha) was α = .93.

Self-Perceived Knowledge About Spanking

Adapted from procedures conducted by Rozenblit and Keil (2002) and Fernbach and colleagues (2019), participants were asked to self-assess their understanding of how spanking works in children's development on a 1 ("vague understanding") to 7 ("thorough understanding"). To increase the likelihood participants understood how to use the scale to accurately rate their own perceived understanding, a detailed example (how a crossbow works; Rozenblit & Keil, 2002) was provided with descriptions of what a 1, 4, and 7 would look like on the knowledge scale. In the measure itself, participants were asked, "Using the scale you just learned about, how would you rate your understanding of how spanking influences children's development?" To disguise the true purpose of the study, participants were asked the same question about various other

scientific topics, including vaccinations, breastfeeding, global warming, evolution, the solar system, and genetics.

Self-Assessed Knowledge Relative to a Family Scientist

Adapted from procedures conducted by Motta and colleagues (2018), participants were asked to self-assess their understanding of how spanking influences children's development relative to a family scientist. Specifically, they were asked, "A family scientist is someone who researches, studies, and teaches about parenting and child development. How much do you think you know about the effects of spanking on children compared to a family scientist?" Participants responded on a 1 ("I know a lot less") to 5 ("I know a lot more") scale. To disguise the true purpose of the study, participants were presented this description within a list of descriptions of several other scientific topics, including vaccinations, breastfeeding, global warming, evolution, the solar system, and genetics.

Scientific Literacy: Objective Knowledge About General Topics and Spanking

Participants took a 24-item true-false quiz about various scientific topics. Participants read statements (e.g., "Antibiotics kill viruses as well as bacteria") and rated whether they believed the statement is true or false. Ten of the questions reflect topics in the physical and biological sciences and come from the National Science Foundation report on scientific literacy (NSF, 2016). Participants also rated a parallel set of fourteen statements about the topics of spanking (drawn from the AAP policy statement on physical discipline; Sege et al., 2018), vaccinations (drawn from a study about common

vaccination myths; Ruiz & Bell, 2014), and breastfeeding (drawn from the AAP policy statement on breastfeeding; Eidelman & Schanler, 2012). Participants were given 1 point for every correct response. The final general scientific literacy score was the sum of all correctly answered quiz items. The final spanking-specific scientific literacy score was the sum of the correctly answered five spanking quiz items. Although the vaccination and breastfeeding questions were used to disguise the true purpose of the study, they were not included in the final scientific literacy scores.

Demographic Covariates

Participants reported their age, gender, race, highest level of education, income, political ideology, and religiosity. Political leaning was reported on a 1 (extremely liberal) to 7 (extremely conservative) scale (M = 3.38, SD = 1.58). Religiosity was measured by asking participants to respond to the following question (Ellison & Bradshaw, 2009): “Which of these statements comes closest to describing your feelings about holy texts (e.g., the Bible, Quran, Torah, etc.)?” Response options were: 1) "Holy texts are ancient books of fables, legends, history, and moral precepts recorded by men” (n =300; 50%); 2) “Holy texts are the inspired word of God but not everything in them should be taken literally, word for word” (n =230; 39%); and 3) “Holy texts are the actual word of God and are to be taken literally, word for word” (n =54; 9%).

Analysis Plan

A series of multiple regressions was estimated to examine relations among attitudes toward spanking, objective knowledge, and self-assessed knowledge about

spanking. All models included demographic covariates and used robust standard errors. Total missingness at the item level was .14%. Missing data were imputed with the mean for the item before scales were calculated; missing data on the scientific literacy quiz items were imputed as an incorrect response (and thus 0 points to the total score). Descriptive statistics among the study variables are shown in Table 8.

RESULTS

The first set of analyses examined whether attitudes toward spanking predicted parents' actual and perceived scientific literacy. As positive attitudes toward spanking increased, general scientific literacy significantly decreased (β = -.29, b = -.80, SE = .11, 95% CI [-1.02, -.58], p < .001), as did scientific literacy about spanking (β = -.61, b = -.58, SE = .04, 95% CI [-.66, -.51], p < .001). Attitudes were also significantly related to parents' perceptions of their knowledge. As positive attitudes toward spanking increased, parents perceived themselves as knowing less about how spanking influences child development (β = -.12, b = -.18, SE = .07, 95% CI [-.31, -.04], p = .01), but perceived themselves as more knowledgeable than an expert who studies families and relationships (β = .13, b = .12, SE = .05, 95% CI [.02, .21], p = .02). In fact, 29 parents (5% of total sample) with positive attitudes toward spanking (ATS scores > 3) perceived themselves as being at least as knowledgeable about spanking as an expert scientist, and 14 parents (2% of total sample) with positive attitudes toward spanking perceived themselves as being more knowledgeable about spanking than an expert scientist. These 43 parents had lower scientific literacy about general topics ($M_{General}$ = 16.56, t(594) = 6.29, p < .001)

and about spanking specifically ($M_{Spanking}$ = 2.37, $t(594) = 8.07$, $p < .001$) compared to the total sample ($M_{General}$ = 19.33; $M_{Spanking}$ = 3.58).

After creating z-scores of parents' perceived and actual scientific literacy, I calculated two difference scores: 1) the difference between perceived spanking knowledge and general scientific literacy, and 2) the difference between perceived spanking knowledge relative to an expert and scientific literacy about spanking. High difference scores represent parents' overinflated perceived knowledge about spanking. These difference scores increased as parents' attitudes toward spanking increased (general: $\beta = .12$, $b = .16$, $SE = .07$, 95% CI [.03, .29], $p = .02$; relative to expert: ($\beta = .49$, $b = .71$, $SE = .07$, 95% CI [.58, .85], $p < .001$), indicating that parents with positive attitudes toward spanking overestimate their understanding of how spanking influences children's development.

We then examined whether parents' perceived knowledge predicted their scientific literacy differentially as positive attitudes toward spanking increased. First, general scientific literacy was regressed onto spanking attitudes, perceived knowledge about spanking, and their interaction. Second, scientific literacy about spanking was regressed onto spanking attitudes, perceived spanking knowledge relative to an expert, and their interaction. The left side of Figure 5 shows the simple slopes for the predicted relations. The relation between perceived and actual knowledge did not significantly differ by attitudes toward spanking ($\beta = -.06$, $b = -.04$, $SE = .08$, 95% CI [-.18, .11], $p = .62$). Although parents with positive attitudes toward spanking had lower general scientific literacy ($\beta = -.25$, $b = -.72$, $SE = .31$, 95% CI [-1.33, -.11], $p = .02$), all parents'

perceived knowledge about spanking was negatively associated with general scientific literacy (β = -.10, b = -.19, SE = .07, 95% CI [-.33, -.04], p = .01). Regardless of parents' attitudes, those who think they know the most about spanking had the lowest scientific understanding.

The relation between perceived knowledge relative to an expert and actual knowledge about spanking differed slightly by attitudes toward spanking; this relation was only marginally significant (β = -.13, b = -.05, SE = .03, 95% CI [-.12, .01], p = .08). Similar to the previous model, parents with positive attitudes toward spanking had lower scientific literacy about spanking (β = -.49, b = -.49, SE = .08, 95% CI [-.65, -.33], p < .001), and all parents' perceived knowledge about spanking relative to a spanking expert was negatively associated with scientific literacy about spanking (β = -.07, b = -.08, SE = .03, 95% CI [-.14, -.01], p = .02). Tests of simple slopes show that this relation was nonsignificant for parents with low positive spanking attitudes (see the right panel of Figure 5; (β = -.02, b = -.02, SE = .03, 95% CI [-.09, .04], p = .52) but significantly negative for parents with high positive spanking attitudes (β = -.12, b = -.13, SE = .05, 95% CI [-.24, -.02], p = .02). Parents with low positive spanking attitudes had a high understanding of spanking and accurately perceived their understanding. For parents with high positive spanking attitudes, those who thought they know more than an expert had the lowest understanding of spanking.

Discussion

The current study surveyed parents of young children to examine whether parents' perceived knowledge about spanking and observed scientific literacy differed by their attitudes toward spanking. Parents with positive attitudes toward spanking scored the lowest on measures of scientific literacy, overestimated their understanding of how spanking influences children's development, and even perceived themselves as being more knowledgeable than a family scientist—someone who researches, studies, and teaches about parenting and child development. The results are evidence of the Dunning-Kruger effect: Those who think they know more about spanking than an expert actually know the least about spanking. Although spanking in the United States may be on the decline (national surveys report that 55% of children between 2 and 8 years of age were spanked in 2014; Finkelhor et al., 2019; 60% of children worldwide; UNICEF, 2014), it may still take considerable time before those who endorse spanking and other forms of physical punishment are convinced to use safer discipline methods. Although considerable time and money is spent by researchers, physicians, and organizations to educate families about effective discipline practices, my results imply that those who need parenting education the most may also be the least receptive to it.

It is unclear why some parents perceived themselves to be more knowledgeable than an expert in family science. Theories of cognitive dissonance imply that parents who encounter information incongruent with their beliefs sometimes react defensively in self-preservation (Miller, 1989). Entering a reactant state, parents may ignore recommendations from experts and even intentionally contradict them (Fitzsimons &

Lehmann, 2004). This type of "blunting" coping strategy helps parents avoid the discomfort of having their self-worth and parenting ideology challenged by alternate perspectives. Parents who endorse spanking perceive spanking experts as less trustworthy than do parents who do not endorse spanking (Scott & Gershoff, 2020; Taylor et al., 2016), suggesting that parents may react defensively to experts by discrediting them so that evidence presented by that expert can be easily dismissed. Parents may also react defensively to experts if they exhibit solution aversion to the recommended alternative discipline strategies (Campbell & Kay, 2014). Because spanking can appear to cease a child's immediate behavior (or at least get a child's attention), it may remain an appealing method to control children's problematic behavior in the moment rather than alternative parenting strategies that may require more time and effort to notice long-term behavioral changes.

Thus, parents' overestimation of their knowledge relative to a spanking expert could reflect their attempts to discredit the expert and preserve their self-worth (van't Riet & Ruiter, 2013) and may constitute a major point of resistance to reducing spanking in the United States. If parents truly think they know more than an expert, then they are unlikely to seek out and consider resources that recommend against using spanking. Furthermore, the messages that professionals think will resonate with parents may not resonate at all for those with the lowest understanding of science or the highest positive spanking attitudes.

Parents' lack of scientific literacy and overestimation of knowledge may be particularly problematic when engaging with other parents online. Parents rely on the

Internet as one of their primary sources of parenting information (Lupton et al., 2016; Orr et al., 2017) and they visit blogs, online forums, and social media to share anecdotes about parenting and connect with others (LaMarre et al., 2015; Lupton et al., 2016; Moon et al., 2019). If parents believe they know more about disciplining children than an expert, they are unlikely to search for, click on, or share evidence-based information about discipline online. Instead, parents may instead seek out "echo-chambers" in the form of websites and discussion threads consisting of polarized and homogenous groups discussing their shared misinformed opinions (Colleoni et al., 2014; Del Vicario et al., 2016; Taylor et al., 2016). Such echo chambers not only provide a platform for parents to express their opinions and find others who share those opinions, but also protect against the possibility of encountering evidence-based information and thus experiencing cognitive dissonance. Parents low in scientific literacy may also be less skillful at searching online for high-quality information about parenting and may be more likely to share misinformation.

Limitations

Because the sample was obtained online from Prolific across a short period of time (~22 days), the results may not be entirely generalizable to the greater population. Limiting our sample to parents of young children may have resulted in a sample of a younger generation of parents who hold less favorable attitudes toward spanking compared to the general population. Additionally, our sample consisted mostly of White, educated parents. Although online data pools have been validated as able to generate representative samples (Buhrmester et al., 2011; Dworkin et al., 2016; Peer et al., 2017),

the sample we obtained could instead reflect a specific group of parents that participate in online surveys as a source of additional income. Furthermore, scientific literacy could be overestimated in our sample because those seeking out and selecting into scientific research online may have more favorable attitudes toward or interest in science. If this is the case, it would make our findings even stronger, as it suggests that having more education does not necessarily protect against the Dunning-Kruger effect in parenting.

Future studies could address these issues in several ways. More traditional recruitment methods (e.g., recruiting from local communities, social media, or newsletters) could be utilized to generalize the current study's findings to all parents in the population, not just those participating in surveys online. Oversampling for racial minority groups could also help generate a more balanced sample and increase the likelihood that all U.S. families are represented in study findings. Given the growing Latinx population in the U.S., utilizing surveys both in English and Spanish could help ensure a more diverse sample and allow for tests of cultural differences in parents' perceptions. Additionally, translating the scientific literacy quiz questions into Spanish could help ensure that the scientific literacy scores of Spanish-speaking participants are not underestimated due to differences in language.

Conclusion

This study found evidence of the Dunning-Kruger effect in parents who favor spanking as a form of child discipline: Parents with positive attitudes toward spanking scored the lowest on measures of scientific literacy, overestimated their understanding of how spanking influences children's development, and even perceived themselves as

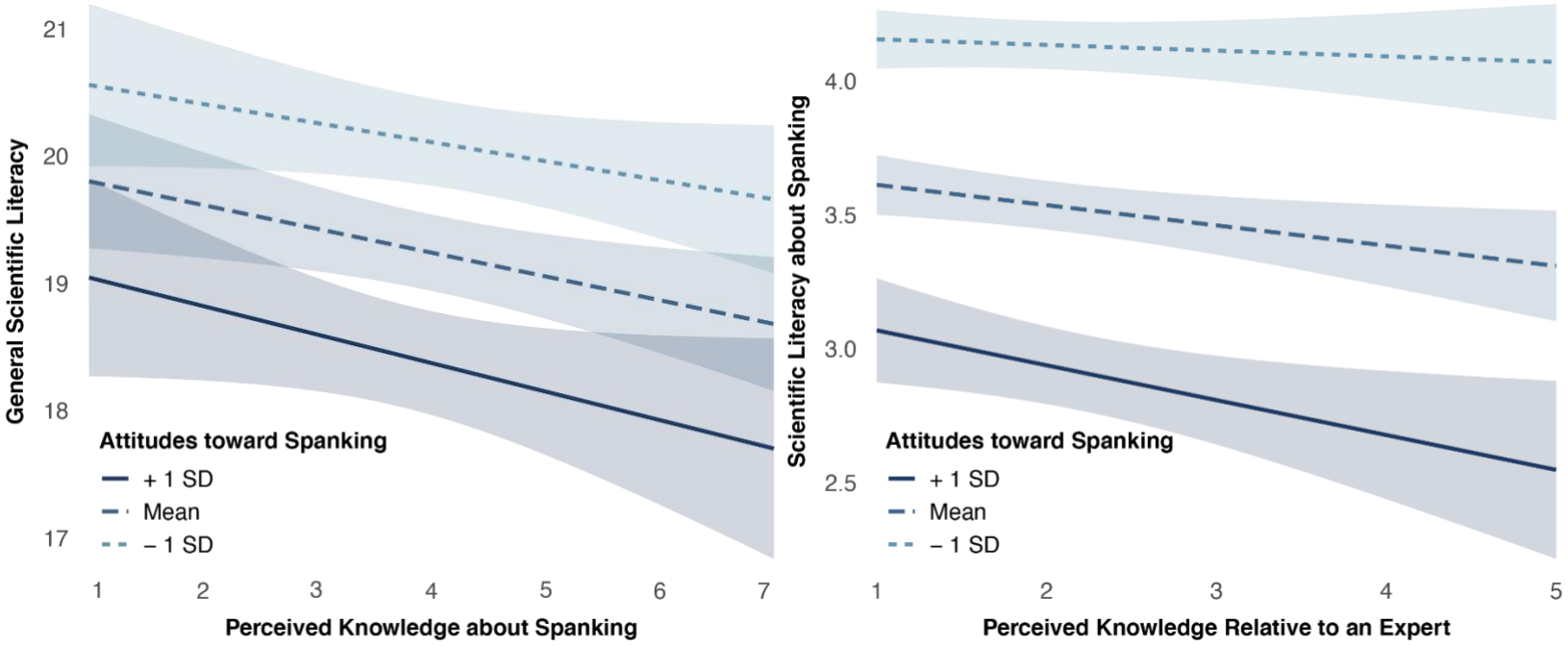
being more knowledgeable than a family scientist—someone who researches, studies, and teaches about parenting and child development. In other words, those who thought they knew the most about spanking actually had the least scientific understanding and those who thought they knew more about spanking than an expert actually knew the least about spanking. Future efforts to reduce attitudes toward spanking may need to consider parents' scientific understanding when designing messages meant to educate parents.

Table 8: Descriptive Statistics and Correlations Among Study Variables

Study variables	Mean	*SD*	Range	Correlations			
				2	3	4	5
1. Positive attitudes toward spanking	2.11	1.05	1-5	-.13**	.16***	-.44***	-.65***
2. Perceived spanking knowledge	4.02	1.48	1-7	—	.41***	-.05	.05
3. Perceived knowledge relative to expert	1.90	.92	1-5		—	-.22***	-.18***
4. General scientific literacy	19.13	2.87	9-24			—	.55***
5. Spanking-specific scientific literacy	3.49	.99	0-5				—

Note. ** $p < .01$, *** $p < .001$.

Figure 5: Relations between Perceived Knowledge about Spanking and Scientific Literacy by Attitudes Toward Spanking



Note. The left panel demonstrates that the more parents believe they know about spanking, the lower their scientific literacy; this was true regardless of whether parent had positive or negative attitudes toward spanking. The right panel demonstrates that the more parents think they know more than an expert, the less they actually know about research on spanking; this effect was primarily seen among parents who report high positive attitudes toward spanking.

Chapter 5: Conclusions

The three prior chapters contribute to the existing literature on spanking attitudes in the United States by demonstrating how parents could preserve their positive spanking attitudes by avoiding scientific information that could otherwise educate them about the risks of spanking. Taken together, my three studies suggest that a parent who holds attitudes that spanking will be effective may search for the benefits of spanking and choose websites that only promote the use of spanking. Even if such a parent did happen to encounter evidence-based recommendations against spanking, as in the policy statements published by the AAP and APA, they would likely ignore it completely, considering it to be untrustworthy and unbelievable. These relations may be even stronger in those who perceive themselves to be highly knowledgeable about spanking, as they may perceive that an expert with a differing perspective has no value to them. An overestimation of parents' scientific understanding could also decrease the likelihood parents search for information about spanking altogether, eliminating the possibility they would ever encounter evidence-based information. Why would anyone seek advice from an expert, when they perceive themselves to be the expert?

The findings from Chapter 2 demonstrated that justifications for spanking are rampant online, perhaps even more so than justifications against vaccinations, which have been highlighted as a major health concern in the United States (Kata, 2010). These spanking justifications perpetuated ideas such as "spanking is effective at teaching children expected behavior"—statements that parents with positive spanking attitudes may agree with and find convincing. Parents who wish to find information

recommending spanking can easily do so, and as shown in the findings from Chapter 2, those who favor spanking indeed are more likely to search for the benefits of spanking rather than its risks. Although digital media can be an inexpensive way to quickly disseminate scientific information to the public, those needing education about the potential consequences of spanking may never receive it if their information-seeking behavior biases them toward websites that recommend spanking.

Parents with lower scientific literacy may not know how to search for information effectively or may have difficult distinguishing between evidence-based information and unfounded misinformation. When they do encounter quality information, such as the AAP and APA policy statements on child discipline, they may disregard it as untrustworthy and unbelievable. The findings from Chapter 3 suggest that although the majority of parents were previously unaware of the statements and although many of them perceived the information favorably, those with higher positive spanking attitudes found the statements to be untrustworthy and unbelievable. Because a majority of parents report that they trust their pediatricians and psychologists to provide childrearing advice (Taylor et al., 2012; Taylor et al., 2017), information about spanking and other parenting issues may be more effectively disseminated to parents by individual professionals with whom they've established relationships with over time.

The findings from Chapter 4 showed evidence of the Dunning-Kruger effect, such that parents with positive attitudes toward spanking overestimated their scientific understanding of spanking. Some even perceived that they knew more than an expert, someone who spends their entire career generating original research on child

development. If parents perceive themselves to be experts on spanking, they may completely disregard what any true experts say about spanking research.

Collectively, these three chapters uncover new barriers to reducing spanking attitudes and behavior in the United States. Although misinformation about spanking online is perhaps not as publicly infamous as misinformation about vaccinations (Kata, 2010) or political "fake news" (Guess et al., 2018), it potentially plays an important role in perpetuating anti-science attitudes about spanking and should be taken just as seriously as other controversial scientific topics. Some have argued that tech and social media companies have an ethical responsibility to moderate the information that is presented on their platforms to reduce the spread of misinformation (Anderson & Rainie, 2017). A contribution from tech companies as simple as labeling misinformation about spanking when it appears online could potentially help prevent spanking in the United States and perhaps reduce even more serious child physical abuse by reducing positive attitudes toward spanking.

Increasing the public's scientific literacy should be a primary goal of the United States for the coming decades. The American anti-science sentiment has become a recent concern of top experts (Hotez, 2020; Levine, 2017). For example, experts such as Dr. Fauci have suggested that a distrust in science could be dangerous (Howard & Stracqualursi, 2020), and as predicted, anti-science sentiments have been linked to non-adherence to COVID-19 safety guidelines (Plohl & Musil, 2020). It is currently unclear whether distrust in science reflects topic-specific distrust only or whether a person is likely to distrust research on several controversial topics simultaneously. Regardless, it

has become very clear that widespread anti-science sentiments pose a large threat to the future progress of the United States.

CONCLUSION

The studies presented in the previous three chapters highlight major challenges for changing attitudes toward spanking and reducing the use of spanking in the United States. Before a major societal shift is made away from favoring spanking, it may require the collaborative efforts of scientists, public officials, social media platforms, and search engine companies to develop ways to promote evidence-based recommendations about child rearing and other controversial topics. A combination of removing or labeling misinformation when it occurs and educating the public on how to distinguish between what is misinformation and what is not could potentially reduce positive attitudes toward spanking and prevent child physical punishment.

Appendix: Study 1a

WEBSITES RETRIEVED BY GOOGLE SEARCHES ON SEPTEMBER 4, 2019

Neutral Search Terms

"Spanking"

1. www.parents.com/toddlers-preschoolers/discipline/spanking/
2. www.cnn.com/2019/02/12/health/no-right-way-to-spank/index.html
3. www.wsj.com/articles/the-right-way-to-spank-a-child-11549410421
4. www.positiveparentingsolutions.com/discipline/the-spanking-debate-continues
5. www.aap.org/en-us/about-the-aap/aap-press-room/Pages/AAP-Says-Spanking-Harms-Children.aspx
6. www.iflscience.com/editors-blog/it-ok-spank-misbehaving-child-once-while/
7. www.fatherly.com/health-science/spanking-middle-class-income/
8. www.healthychildren.org/English/family-life/family-dynamics/communication-discipline/Pages/Where-We-Stand-Spanking.aspx
9. www.focusonthefamily.com/parenting/parenting-roles/to-spank-or-not-to-spank/is-spanking-biblical
10. www.nytimes.com/2018/11/05/health/spanking-harmful-study-pediatricians.html

"Physical Punishment"

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