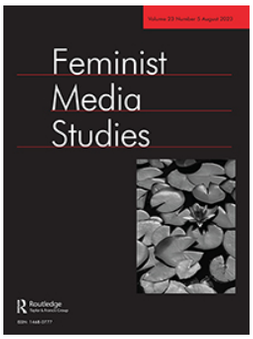

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Connecting infertility beliefs with viewership of teen pregnancy media: the role of morality in understandings of fertility

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ABSTRACT

Popular media often contain storylines focused on pregnancy and infertility. These storylines have the potential to perpetuate stigmatization related to these issues. According to the differential susceptibility to media effects model (DSMM), lay infertility beliefs could serve as either predictors or outcomes of pregnancy-focused media viewership, with moral sanction theory and cultivation theory supporting competing hypotheses. Further, viewership could impact fertility awareness, meaning knowledge of physiological and medical factors related to fertility. The current study tested how viewership of *16 & Pregnant* and *Teen Mom* is related to infertility beliefs and fertility awareness in an online survey. Participants ($N = 990$) were on average 39.5 years old, 53.9% female, 77.9% white, and 38.9% had more than a high school degree. Structural equation modeling revealed that infertility beliefs served as predictors, but not outcomes, of viewership. Participants with the stigmatizing belief that infertility is caused by being immoral, ungodly, or unmotherly/unfatherly were drawn to *16 & Pregnant* and *Teen Mom*. However, the outcome of viewership was improved knowledge of the biological/medical aspects of fertility. Although scholars have cited concerns about *16 & Pregnant* and *Teen Mom*, findings suggest that viewing these programs could have educational benefits beyond reducing teen pregnancy.

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infertility; morality; differential susceptibility to media effects model; moral sanction theory; fertility awareness

Storylines emphasizing infertility and pregnancy are common in popular media (Edge 2015; Lieberman 2018). Such media representations often present intended pregnancy (in the context of adulthood and, generally, heterosexual marriage) as an essential or desirable state that validates womanhood. Infertility, voluntary or not, is presented as a failing on the part of the woman, emphasizing her moral or physical shortcomings (de Boer, Archetti and Solbraekke 2019; Osborne-Thompson 2014; Shalev and Lemish 2013). Programs characterizing pregnancy as a sign of immorality, particularly teen pregnancy, are also common, and moral panic surrounding teen pregnancy permeates the media (Chmielewski, Tolman and Kincaid 2017). Specifically, teen moms are

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characterized as irresponsible and immoral for having engaged in unprotected sex outside of marriage at a comparatively young age. As a result, teen mothers themselves cast negative moral judgments on other teen moms for promiscuous behavior and attempts to trap boyfriends or gain money and housing through pregnancy (Jones, Whitfield, Seymour and Hayter 2019).

The American cable television network MTV created two programs, *16 & Pregnant* and *Teen Mom*, as an entertainment education effort to reduce teen pregnancy (Greyson, Chabot and Shoveller 2019). An ample body of research has assessed the effects of these programs on beliefs, attitudes, and behaviors related to teen pregnancy (Aubrey, Behm-Morawitz and Kim 2014; Behm-Morawitz, Aubrey, Pennell and Kim 2019; Kearney and Levine 2015; Trudeau 2016). However, entertainment education efforts can have unintended effects, positive or negative, on ancillary or related outcomes, as well as on primary outcomes (Cohen, Alward, Zajicek, Edwards and Hutson 2018; Cundiff and Murray 2020; Moyer-Gusé, Jain and Chung 2012; Simmons 2020). Therefore, we echo scholars like Cundiff and Murray (2020), arguing that it is vital to consider and assess entertainment education's effects on ancillary outcomes. Here, we are interested in how viewership of *16 & Pregnant* and *Teen Mom* is related to lay infertility beliefs and medical knowledge of fertility.

Due to the prevalence of infertility cases without definitive medical diagnoses or explanations (La Marca and Mastellari 2020), a number of lay theories, or infertility beliefs, have developed across time and context that identify infertility's potential causes. Here, we use the term "infertility beliefs" to refer to various, distinct belief sets about infertility causes which differ in their emphases on different moral judgments (e.g., female desire, motherliness, women's roles in the workplace) and theories about physical functioning (e.g., exercise, diet, toxins, stress). Often these beliefs deviate from the realm of scientific evidence in that they center on issues of morality, particularly women's morality, in terms of topics such as sexual activity, work, motherliness, healthfulness, and godliness or religiosity (Jensen 2016; Marsh and Ronner 1998; McLeod and Ponesse 2008; Moss and Baden 2015). For example, in the Bible, fertility can be gifted by God based on moral virtue and godliness whereas infertility is often a reflection of sin—resulting in the belief among some Christian groups that infertility is a sign of immorality and a lack of piousness (Moss and Baden 2015). There is growing evidence that infertility beliefs play a central role in the reproductive choices and behaviors of those who hear and uphold them (see, for instance, Bell and Hetterly 2014; Sedlander, Bingenheimer, Thiongo, Gichangi, Rimal, Edberg and Munar 2018).

Both *16 & Pregnant and Teen Mom* emphasize the individual responsibility and supposed immorality of adolescent mothers, as well as the problems caused by their pregnancies (Murphy 2012). The link between morality and (in)fertility presented in popular media has been shown to impact viewers' beliefs about infertility, thereby encouraging stigmatization of infertility for adult women and pregnancy for adolescent girls (Coyne et al. 2019; Knobloch-Westerwick, Willis and Kennard 2016; Todd 2013). *16 & Pregnant* and *Teen Mom* may inadvertently nurture the belief that infertility (for adult women) and unwanted fertility (for teen girls) are the consequences of engaging in what society deems as immoral behavior. Therefore, we assess how viewership of *16 & Pregnant* and *Teen Mom* is related to various infertility beliefs.

Further, fertility focused media that perpetuates morality focused beliefs about infertility may hinder acquisition of knowledge about the physiological and medical factors related to infertility, termed fertility awareness (Hammarberg, Zosel, Comoy, Robertson, Holden, Deeks and Johnson 2017). Prior scholarship has found that both women and men often underestimate the influence of increasing age on the chance of conceiving and having a healthy child (Mills, Rindfuss, McDonals and Te Velde 2011; Schmidt, Sobotka, Bentzen and Nyboe Andersen 2012). Coupled with overconfidence in the ability of assisted reproductive technologies (ART) to overcome age-related infertility, this lack of fertility awareness can lead to involuntary childlessness (Gossett, Nayak, Bhatt and Bailey 2013; Maheshwari, Porter, Shetty and Bhattacharya 2008; Tough, Benzies, Newburn-Cook, Tofflemire, Fraser-Lee, Faber and Sauve 2006). Heteronormative relational ideals typically essentialize biological children as key to a successful marriage, carrying damaging social, relational, and emotional implications for childlessness. For example, just as adolescent pregnancy has been associated with a range of negative health outcomes for teens and their offspring (Jutte,Roos, Brownell, Briggs, MacWilliam and Roos 2010; Patel and Sen 2012), involuntary childlessness has been linked to depression, low self-esteem, and reduced quality of life (Cil, Turkgeldi and Seli 2015; Fisher, Baker and Hammarberg 2010). Numerous scholars have expressed concerns about the unintended consequences of *16 & Pregnant* and *Teen Mom* (e.g., Aubrey, Behm-Morawitz, and Kim 2014; Martins, Malacane, Lewis and Kraus 2016), which could include limiting fertility awareness for audience members of all ages. Therefore, we are interested in how viewership of *16 & Pregnant* and *Teen Mom* is related to fertility awareness.

Teen pregnancy programming and infertility beliefs

The differential susceptibility to media effects model (DSMM; Valkenburg and Peter 2013) explicates what factors impact and are impacted by media exposure, focusing on micro-level media effects. According to the DSMM, certain factors predispose individuals to select exposure to particular media including dispositional factors (e.g., gender, personality, attitudes, and beliefs), developmental factors (e.g., stage in life span), and social factors (e.g., family, church, and work). Developmental factors have the greatest influence in childhood and early adulthood, as larger leaps in cognitive capacity, education, and socialization occur during that time—with media preferences often stabilizing in adulthood (Valkenburg and Peter 2013). Infertility beliefs, while likely influenced by developmental factors and social factors such as church membership or larger social ideals, represent personal, internalized beliefs systems surrounding infertility. This would suggest that infertility beliefs serve as dispositional factors that drive selection of media, meaning infertility beliefs would predict viewership of *16 & Pregnant* and *Teen Mom*. Indeed, moral sanction theory (Zillmann 2000) supports this supposition.

Infertility beliefs are based largely on moral evaluations of women's behavior, with infertility serving as a moral sanction for being too sexual, too career-focused, or not spiritual enough (Basinger and Quinlan 2023; Jensen 2016; Marsh and Ronner 1998; McLeod and Ponesse 2008; Moss and Baden 2015). Moral sanction theory claims that individuals are drawn to and enjoy media differently dependent on their moral beliefs (Zillmann 2000). Individuals form morality subcultures with the same moral beliefs and therefore will judge the morality of individuals' and characters' actions

similarly (Raney 2005). Morality subcultures can represent larger values that cut across contexts, such as valuing purity or loyalty (Eden and Tamborini 2017), or that are context-specific, such as supporting the death penalty for individuals convicted of murder (Raney 2005). We argue that infertility beliefs constitute distinct moral subcultures that apply broad moral values (Eden and Tamborini 2017) to the context of infertility. For example, believing infertility is caused by being overweight resonates with a general value of moralizing healthy behaviors (e.g., diet, exercise) and a specific belief that unhealthy behaviors should be punished with infertility (Basinger and Quinlan 2023). Research demonstrates that people will select and enjoy different media dependent on their morality subcultures (Eden and Tamborini 2017; Zillmann 2000). Following this logic, it makes sense that individuals with different infertility beliefs would be drawn to different types of media that align with those beliefs.

However, the DSMM also states that media use influences attitudes and beliefs downstream (Valkenburg and Peter 2013), meaning that viewership of pregnancy-related media, such as *16 & Pregnant* and *Teen Mom*, should alter infertility beliefs. Media consumption has been found to influence perceptions of morality over time, particularly when liked characters model or emphasize particular behaviors as moral or immoral (Eden, Tamborini, Grizzard, Lewis, Weber and Prabhu 2014). Cultivation theory proposes that repeated viewership of media messages over time will cause audiences to believe that what they are watching reflects reality (Gerbner 1967). From this perspective, viewership of *16 & Pregnant* and *Teen Mom* should predict infertility beliefs. Therefore, we ask:

RQ1: Will the various infertility beliefs (e.g., virtue, health) serve as outcomes or predictors of *16 & Pregnant* and *Teen Mom* viewership?

Whether specific infertility beliefs will be positively or negatively related to viewership is less clear. Historically, lay infertility beliefs in the United States and Western Europe have focused on concerns about: (a) general virtue, (b) motherliness/fatherliness, (c) energy being misallocated away from reproductive endeavors, (d) hormonal problems, and (e) psychological or physio-social abnormality (Jensen 2016). Most recently, concerns related to environmental toxins and pollution have also been identified as prevalent perceived causes of infertility (McCray, Thompson, Branch, Porter, Peterson and Perry 2020). The emphasis in *16 & Pregnant* and *Teen Mom* on pregnancy and immorality could pair these ideas in viewers' mental schema about infertility, leading to purely virtue-based infertility beliefs (Aubrey, Behm-Morawitz, and Kim 2014). Conversely, the fact that "immoral" teens could become pregnant could weaken the perceived link between virtue and fertility, possibly diminishing infertility beliefs centered on morality (or complicating them as pregnancy is viewed as a negative outcome at some stages of life and a positive one at others). The programs emphasize individual responsibility, meaning that an infertility belief focused on exposure to toxins, which is often out of the individual's control, could be negatively related to viewership. Therefore, we ask:

RQ2: In what direction (positive or negative) are the different infertility beliefs and *16 & Pregnant* and *Teen Mom* viewership related?

Teen pregnancy programming and fertility awareness

Viewership of entertainment education programs related to pregnancy, such as *16 & Pregnant* and *Teen Mom*, may influence fertility awareness. The concept of "fertility awareness" has come to refer to knowledge about reproduction, fecundity, and fecundability, as well as societal and cultural risk factors affecting individuals' options for achieving parenthood and family-planning goals (Shelus et al. 2018; Zegers-Hochschild et al. 2017). It is important to recognize that discussion of fertility awareness often focuses on involuntary childlessness in heterosexual individuals/couples, driven by and reinforcing heteronormative relational ideals necessitating biological children in marriage (Mertes et al. 2023). Therefore, discussion of both fertility awareness and infertility beliefs is heavily influenced by heteronormativity.

Studies have consistently found that participants' knowledge of nearly every aspect of female fertility is significantly lower than their self-reported awareness (Peterson, Pirritano, Tucker and Lampic 2012). Particularly, women and men vastly overestimate the age at which women experience decline in their fertility (Hammarberg, Setter, Norman, Holden, Michelmore and Johnson 2013), as well as the likelihood of pregnancy between couples following unprotected intercourse at the time of ovulation (Holton et al. 2016). Indeed, a fertility awareness survey evaluating over 10,000 women and men from 79 countries revealed an average score of only 56% on a 13-item fertility knowledge questionnaire (Bunting, Tsibulsky and Boivin 2013).

This significant lack of fertility awareness can lead to involuntary childlessness due to age-related fertility decline and/or pregnancy at an age or time when it is unwanted. As Peterson et al. (2012) warn, "the discrepancy between their perceived knowledge and what is known regarding the science of reproduction is alarming and could lead to involuntary childlessness if men and women's reproductive decisions are based on inaccurate perceptions" (p. 1380). Involuntary childlessness is important to mitigate as it has been psychologically and socially linked with higher rates of low self-esteem, depression, partner separation, and mortality in women (Cil, Turkgeldi, and Seli 2015; Fisher, Baker, and Hammarberg 2010). Similarly, the limited inquiry into men's experiences of involuntary childlessness indicates long-term grief, reduced quality of life, and feelings of loss, depression, exclusion, isolation, and risk-taking behavior (Fisher and Hammarberg 2012; Hadley and Hanley 2011; Wischmann and Thorn 2013). With more accurate knowledge regarding fertility issues, intentions for childbearing may well shift to more consistently achieve desired family compositions.

As a purposeful effort designed in partnership with National Campaign to Prevent Teen and Unplanned Pregnancy to educate audiences about pregnancy, it would be expected that viewership of *16 & Pregnant* and *Teen Mom* would increase fertility awareness. Although not its primary purpose, an entertainment education program centered on pregnancy would reasonably be expected to include accurate medical information related to reproduction. *16 & Pregnant* in particular discusses how the pregnancy occurred, creating ample opportunity for inclusion of fertility information. However, scholars have cited numerous concerns about the programs, including unrealistic portrayals of teen pregnancy (Aubrey, Behm-Morawitz, and Kim 2014; Behm-Morawitz et al. 2019; Martins and Jensen 2014; Martins et al. 2016). Whether these programs have a positive influence on fertility awareness, despite their flaws, or produce

misunderstandings is important to determine. To allow individuals to make well-informed decisions about family formation and prevent the personal suffering associated with infertility, undesired pregnancy, and adverse obstetric and perinatal outcomes, Hammarberg et al. (2013) state that "awareness about modifiable factors that affect fertility is essential" (p. 503). Therefore, we ask:

RQ3: How is viewership of *16 & Pregnant* and *Teen Mom* related to fertility awareness?

Method

Participants and procedure

Following approval by the Institutional Review Board (IRB), participants were recruited via Qualtrics Panels. Qualtrics contacts potential participants and utilizes quotas to reflect United States demographics as closely as possible including age (18–34: 30%, 35–54: 32%, 55+: 38%) gender (female: 52%, male: 48%, non-binary: natural fall-out), and race/ethnicity (American Indian/Alaskan Native: 6%, Asian or Pacific Islander: 6%, Black/African American: 13%, Hispanic: 18%, White: 75%). Qualtrics compensates participants using various methods including gift cards, cash, miles, and points, depending on participant preference. Participants responded to items regarding infertility beliefs, fertility awareness, and teen pregnancy programming viewership (hereafter referred to as TPP). A total of 11,827 individuals followed the link from the Qualtrics recruitment message to the survey, 10696 did not finish the survey, and 141 were removed for rushing or non-differentiation. A final sample of 990 participants were included in the study. Participants were evenly split between female ($N = 534$, 53.9%) and male ($N = 456$, 46.1%). Participants had an average age of 39.5 years ($SD = 15.06$, Range: 18–89). Most participants had achieved a high school degree or less ($N = 605$, 61.1%), with 38.9% ($N = 385$) having more than a high school degree. The racial and ethnic composition of the sample is as follows: American Indian or Alaskan Native (1.2%, $N = 12$), Asian or Asian American (2.9%, $N = 29$), Black or African American (9.9%, $N = 98$), Hispanic or Latina/o (11.5%, $N = 114$), and White or Caucasian American ($N = 771$, 77.9%).

Measures

Infertility beliefs

Items for the infertility beliefs measure were generated based on prior literature regarding lay beliefs about infertility, representing distinct infertility belief sets such as work stress, health, and virtue (Jensen 2016; Jensen and Bute 2010; McCray et al. 2020). Participants responded to nineteen items that aligned with prevalent infertility beliefs, indicating how much they agreed on a scale from 1 (*strongly disagree*) to 7 (*strongly agree*) that fertility was impacted by each item. Items are intended to represent latent belief sets about infertility causes, meaning that common factor analysis, not component analysis, should be used (DeVellis 2017). Although infertility belief sets are distinct, it was expected that they would be correlated with one another because endorsement of any infertility belief

set signifies a degree of thought regarding (in)fertility and all belief sets are underpinned to some degree by views on morality and physical functioning—meaning an oblique rotation should be used. However, some belief sets (e.g., oversexed and toxins) may not be correlated. A direct quartimin rotation "places equal weighting of correlated and uncorrelated factors" (Howard 2016, 55). Therefore, following Howard's (2016) guidelines, principal axis factoring (PAF) with direct quartimin rotation was utilized to examine the infertility belief items. Parallel analysis was performed to identify meaningful factor retention cut-off values (Patil, Singh, Mishra and Donavan 2008, 2017). Parallel analysis revealed the following cut-off points: factor 1 (1.25), factor 2 (1.20), factor 3 (1.17), factor 4 (1.14), factor 5 (1.11). PAF revealed four factors with eigenvalues above the specified cut-off points, and a fifth factor that fell just below that cut-off. For this analysis, the fifth factor, healthy, was retained for exploratory purposes. The five factors were labeled virtue, oversexed, work stress, toxins, and healthy. Each factor represents a distinct infertility belief system. For items, eigenvalues, factor loadings, alphas, means, and standard deviations, see Table 1.

Fertility awareness

Fertility awareness was measured with items from Peterson et al. (2012). Participants responded to eight questions about fertility such as "at what age are women most fertile," "at what age is there a marked decrease in women's ability to become pregnant," and "couples that undergo treatment with IVF—what is their chance, on average, of getting a child." Items were multiple choice, with four possible answers per question based on

Table 1. Perceived causes of infertility scale.

A person's fertility is impacted by	Virtue (F1)	Oversexed (F2)	Work stress (F3)	Toxins (F4)	Healthy (F5)
1a. Not being motherly/fatherly enough	.653				
2a. Not being devoted to faith/God	.821				
3a. Being immoral	.890				
4a. Being unethical	.903				
5a. God/a higher power	.528				
1b. The number of abortions they had		.668			
2b. The number of sexual partners they had		.674			
3b. Whether they have terminated a pregnancy		.836			
4b. Whether they have had lots of unsafe sex		.649			
5b. Whether they have contracted a sexually transmitted disease		.525			
1c. Their stress level			.575		
2c. Working too hard			.831		
3c. Being too focused on their job			.647		
1d. Pollution				.720	
2d. The amount of toxins in their environment				.906	
3d. Their exposure to toxic chemicals				.769	
1e. Eating unhealthy foods					−.732
2e. Failing to exercise					−.887
3e. Not getting enough sleep					−.766
Eigenvalue	3.21	6.12	1.84	1.30	1.00
% of Variance	16.91	32.21	9.70	6.83	5.28
M(SD)	2.85 (1.49)	3.89 (1.40)	4.57 (1.45)	4.49 (1.57)	4.14 (1.57)
A	.87	.82	.78	.87	.86

Notes: Principal axis analysis with direct quartimin rotation (N = 990).

Peterson et al. (2012) coding of open-ended responses to these questions. Fertility awareness scores were calculated by adding up the total number of correct answers, with a possible score of 0–8 ($M = 2.46$, $SD = 1.37$).

TPP—viewership of 16 & pregnant and teen mom

Participants indicated how often they watched 14 different television programs, such as *Gilmore Girls* and *Reba*, on a scale of 1 (*not at all*) to 5 (*a great deal*). Embedded within the list were *Teen Mom* and *16 & Pregnant*. Teen pregnancy programming (TPP) viewership was calculated by averaging participant responses to the *16 & Pregnant* and *Teen Mom* items ($M = 1.55$, $SD = 1.05$; $\alpha = .90$). The two programs are considered together to signify greater exposure to and interest in teen pregnancy programming, as opposed to viewership of just one program. Further, the programs are linked—both are supported by the National Campaign to Prevent Teen and Unplanned Pregnancy and the teen moms starring in the first season of *Teen Mom* had appeared on *16 & Pregnant*.

Results

Bivariate correlations

Bivariate correlations were calculated between all study variables (see Table 2). All five infertility beliefs were positively correlated, with the strongest correlations between toxins and healthy ($r = .56$, $p < .001$). Correlations suggest that demographic factors like age, gender, education, and race/ethnicity influence which infertility beliefs individuals endorse. Virtue-based infertility beliefs were higher for those with a higher education, men, those with a lower income, Black participants, and Hispanic participants, and were lower for White participants. Work stress-based infertility beliefs were higher for those with a higher education, women, and those with a higher income, and were lower for Black participants. Toxins-based infertility beliefs were higher for those with a higher education, older individuals, those with a higher income, and White participants, and were lower for Black participants. Health-based infertility beliefs were higher for those with a higher education, younger individuals, and those with a higher income, and were lower for Black participants. Oversexed-based infertility beliefs was not significantly related to demographic variables.

TPP was positively related to all infertility beliefs except toxin-based. Additionally, TPP was higher among younger individuals, women, and Hispanic participants. Fertility awareness was greater for those with higher endorsement of oversexed-based and work stress-based infertility beliefs. Fertility awareness was also higher for those higher in TPP, along with those who were younger, had more than a high school education, and had a higher income.

Structural equation modeling

To assess the research questions, the researchers employed structural equation modeling using Amos version 27. Two separate structural models were tested with (a) infertility beliefs as predictors of TPP and (b) infertility beliefs as outcomes of TPP. In both models, fertility awareness was included as an outcome of TPP, with gender and age included as

Table 2. Correlation matrix.

		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
1.	Virtue	–––													
2.	Oversexed	.35*	–––												
3.	Work Stress	.19*	.41*	–––											
4.	Toxins	.11*	.35*	.43*	–––										
5.	Healthy	.27*	.34*	.44*	.56*	–––									
6.	Fertility A.	.01	.08*	.11*	−.01	.02	–––								
7.	TPP	.15*	.11*	.09†	.00	.10†	.07†	–––							
8.	Education	−.10*	.01	.18*	.19*	.10*	.07*	.05	–––						
9.	Age	−.02	.01	.04	.07*	−.12*	−.12*	−.23*	.19*	–––					
10.	Sex	−.11*	.00	.13*	.03	.01	.09*	.18*	.46*	.07*	–––				
11.	White	−.10*	.00	.05	.08*	.01	.03	−.04	.05	.19*	.07*	–––			
12.	Black	.08*	.01	−.06*	−.08*	−.05†	−.04	.06	−.01	−.09*	−.04	−.63*	–––		
13.	Asian	.03	−.02	−.01	−.03	.03	.00	.01	.06†	−.11*	.06*	−.33*	−.06†	–––	
14.	Am. Ind.	.04	.01	−.02	.01	.01	−.01	.00	−.07*	−.05	−.05	−.21*	−.04	−.02	–––
15.	Hispanic	.07*	−.02	−.02	−.03	.03	.04	.07†	−.06†	−.10*	−.07*	−.26*	−.01	.07*	.08*

Note: Bivariate correlations between all study variables; sex coded as 0 = male, 1 = female.
* $p < .001$; †$p < .05$.

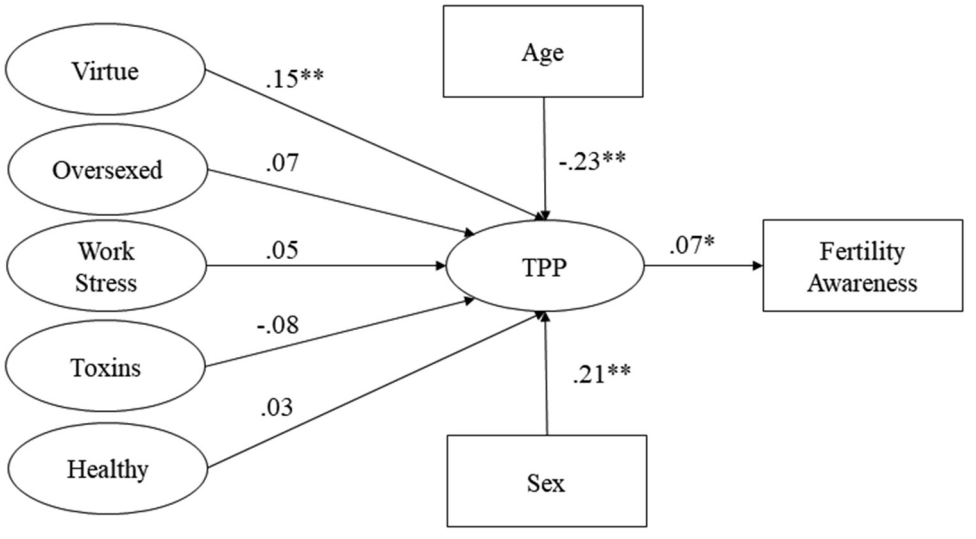

Figure 1. Infertility beliefs as predictors of TPP. Standardized regression weights reported. * $p \leq .05$, ** $p \leq .001$

controls (both were significantly correlated with TPP, see above, and are dispositional factors included in the DSMM).[1]

Before testing the structural models, measurement models including all variables were assessed, following Anderson and Gerbing's (1988) two-step modeling technique. The comparative fit index (CFI) and root mean square error of approximation (RMSEA) were used to assess model fit. Acceptable fit was determined based on RMSEA < .08 and CFI > .90. Fit was considered excellent if CFI > .95, RMSEA < .05, and χ2/df < 3 (Hu and Bentler 1999; Schermelleh-Engel, Moosbrugger and Müller 2003). The measurement model exhibited acceptable fit with the data: CFI = .93, RMSEA = .06, $\chi 2 = 896.64$, df = 193, $p < .001$, χ2/df = 4.65[2].

Regarding the competing structural models proposed in RQ1, the model including infertility beliefs as predictors of TPP achieved acceptable fit with the data, CFI = .93, RMSEA = .06, $\chi 2 = 937.16$, df = 201, $p < .001$, χ2/df = 4.66 (see Figure 1). The model with infertility beliefs as outcomes of TPP did not fit the data, CFI = .83, RMSEA = .09, $\chi 2 = 2017.36$, df = 221, $p < .001$, χ2/df = 9.13 (see Figure 2). Therefore, the model with infertility beliefs as predictors was used to answer RQ2 and RQ3. Regarding RQ2, virtue-based infertility beliefs were positively related to TPP, standardized coefficient = .15, $p < .001$. Regarding RQ2, TPP was positively related to fertility awareness, standardized coefficient = .07, $p = .035$, meaning that greater viewership of *16 and Pregnant* and *Teen Mom* was associated with more accurate understanding of the medical factors that influence fertility.

Discussion

The current study examined how viewership of pregnancy-related media, specifically *16 & Pregnant* and *Teen Mom*, is related to infertility beliefs and fertility awareness. Findings

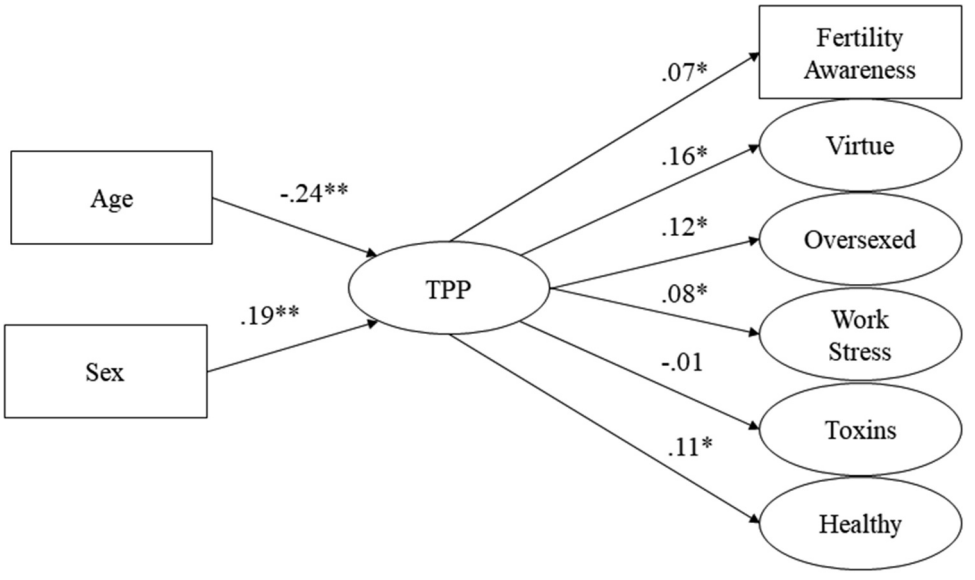

Figure 2. Infertility beliefs as outcomes of TPP. Pathways are not interpretable because the model does not adequately fit the data. * $p \leq .05$,** $p \leq .001$

suggest that infertility beliefs serve as dispositional susceptibility factors (Valkenburg and Peter 2013), potentially supporting moral sanction theory (Zillmann 2000), rather than as outcomes of teen pregnancy programming (TPP) viewership. Virtue-based infertility beliefs predicted greater TPP viewership, as did being younger and female, and TPP viewership was related to more accurate fertility awareness. Additionally, fertility awareness was higher for those who endorsed work stress-based infertility beliefs and lower for those who endorsed toxin-based infertility beliefs. These findings have implications for media theory, understanding lay perceptions of infertility, and the influence of popular media on fertility awareness.

Infertility beliefs and TPP

Virtue-based infertility beliefs positively predicted TPP viewership. Therefore, from a differential susceptibility to media effects model (DSMM; Valkenburg and Peter 2013) perspective, virtue-based infertility beliefs serve as a dispositional susceptibility factor, driving media viewership. Interestingly, the model with TPP predicting infertility beliefs did not fit the data, suggesting that TPP viewership did not influence infertility beliefs. However, longitudinal data are needed to truly determine causality. That virtue-based infertility beliefs specifically predicted TPP viewership could be explained by two different theoretical perspectives: moral sanction theory and anti-hero narratives.

According to moral sanction theory, people often consume media that allow them to enjoy seeing people they deem immoral receiving what they perceive to be a just punishment (Zillmann 2000). Both *16 & Pregnant* and *Teen Mom* were created to demonstrate the negative ramifications of teen pregnancy (Behm-Morawitz et al. 2019). These programs may serve a cathartic function by showing immoral others receiving just

punishment. For members of an (in)fertility virtue subculture, early pregnancy could be considered a just punishment for adolescents, whereas involuntary childlessness may be considered a just punishment for adults. On the other hand, TPP may function instead as an escape into a fantasy world where immoral individuals avoid punishment. Viewers holding virtue-based infertility beliefs may not perceive themselves as behaving virtuously enough, making TPP a welcome escape (Perry, Grubbs and McElroy 2021). Researchers have expressed concerns about *16 & Pregnant* and *Teen Mom*, finding that the shows actually depict an easier life for the moms than the average teen mom experiences (Martins et al. 2016), and that teen viewers perceive teen pregnancy more favorably after watching the programs (Aubrey, Behm-Morawitz, and Kim 2014; Martins and Jensen 2014). Although viewers may deem the teen moms' behavior unvirtuous, other aspects of their personalities or experiences may make them likeable or relatable, causing viewers to enjoy watching them escape punishment.

There has been an increase in television programming that features immoral or villainous characters as protagonists, such as *Breaking Bad* and *Dexter* (Schubert 2017). Notably, the blockbuster *Deadpool* was met with popular acclaim, featuring the story of an antihero who is motivated by vengeance and vanity and is ultimately rewarded for his actions (Triana 2018). Shafer and Raney (2012) argued that audiences learn to process these types of stories differently by repeated viewership over time, relying on moral disengagement cues to prompt a different type of message processing than that used for stories with moral, heroic protagonists. Further, identification is a key mechanism through which audiences enjoy antihero narratives (Janicke and Raney 2018), and has been found to predict favorable attitudes towards teen pregnancy after viewing TPP (Lewis, Norris and Martins 2020). Therefore, TPP may serve as a type of anti-hero narrative in which viewers holding virtue-based infertility beliefs can watch a liked other "getaway with" immoral activity. A reasonable next step in this trajectory of investigation would be evaluating TPP for the presence of moral disengagement cues, as well as assessing the relationship between virtue-based infertility beliefs and identification with teen moms.

Fertility awareness

The current study provides some evidence that entertainment education efforts can influence ancillary knowledge outcomes. Here, TPP viewership was positively related to fertility awareness. Consideration of possible ancillary benefits (or harms) is important for entertainment education. TPP was initiated as an entertainment education effort and may educate viewers on the biological aspects of conception and pregnancy. Entertainment efforts have been found to increase fertility awareness, particularly through information-seeking after media consumption (Shelus et al. 2018). Past research has identified an increase in internet activity, specifically via Google and Twitter, related to contraception and other fertility-related topics following the airing of *16 & Pregnant* episodes (Kearney and Levine 2015). Even if the episodes themselves do not emphasize fertility, they may prompt further information-seeking by viewers. Considering how entertainment education is embedded in the broader information environment—particularly, in the age of social media—is valuable.

Work stress-based infertility beliefs were positively related and toxin-based infertility beliefs were negatively related to fertility awareness. Yet, these beliefs were unrelated to TPP viewership. In the current study, having a higher income and education level were positively related to endorsement of work stress-based infertility beliefs, suggesting that work stress-based infertility beliefs are likely upheld among professionals. Their experiences may make them especially tuned-in to the harms of work-related stresses, and higher levels of education would better position them to have garnered more information about a range of topics including fertility. Toxin-based infertility beliefs may be more common among those who express a higher degree of medical skepticism, thus making them skeptical also of medically validated information related to fertility awareness. Future research should explore the role that medical skepticism plays in the development of specific types of infertility beliefs, and how this relates to consumption of fertility-related media.

Infertility beliefs scale

Five distinct infertility belief subscales emerged, representing varying degrees of moral and biological or physiological attributions. Interestingly, items related to faith and the intervention of God/a higher power formed part of the virtue-based infertility beliefs subscale. Given that religiosity in general tends to be based on adherence to specific modes of faith-based moral codes and systems of ethics, that relationship makes sense. It may also help to explain why motherliness is also part of virtue-based infertility beliefs. Many faith-based morality codes are grounded in traditional beliefs about sex roles and gender, with men taking on the role of breadwinner and outside-of-the-home worker and women taking on the role of homemaker and domestic worker (Blyth and Landau 2009). In many religions, such dictates are upheld as divinely mandated and therefore as worthy of reward or punishment according to individual's level of adherence. Those women who do not take on the role of homemaker are thereby more likely to be upheld in this system of beliefs as unmotherly and therefore as deserving of divine retribution via infertility and childlessness in adulthood.

Women were less likely to endorse virtue-based infertility beliefs than were men. Some previous studies (though, it should be noted, not the study at hand) have shown that women tend to have higher fertility awareness and knowledge in general than do men (e.g., Meissner, Schippert and von Versen-Höynck 2016), so perhaps it follows that women would also be less likely than men to subscribe to beliefs that do not align with medically endorsed information. This consideration is somewhat confounded by the finding in the present study that women are more likely to watch TPP and that watching these types of shows aligns with having virtue-based infertility beliefs. Additionally, Black and Hispanic participants were more likely, and white participants were less likely, to endorse virtue-based infertility beliefs. This finding warrants consideration in future research on reproductive beliefs and media consumption due to the significant racial/ethnic health disparities in reproductive medicine (Owen, Goldstein, Clayton and Segars 2013).

Conclusion, limitations, and future research

The current study serves as an important first step in understanding the relationship between media consumption and both infertility beliefs and fertility awareness. Five distinct infertility beliefs were identified, including virtue, being oversexed, having experienced undue work stress, exposure to toxins, and overall health. Virtue-based infertility beliefs were positively related to TPP, and TPP was subsequently positively related to fertility awareness. These findings invite compelling future directions for research, particularly in light of the present study's limitations.

The current study asked about infertility beliefs and fertility awareness after the airing of both *16 & Pregnant* and *Teen Mom*. Evaluation of entertainment education programs ideally includes pre- and post-tests or a control. Future research should assess the effects of more recent teen pregnancy and fertility entertainment education as viewership is occurring. Further, evaluation of fertility-related fictional programs, such as *The Handmaid's Tale* or *Dead Ringers*, would have great value.

The current sample included slightly more white participants (77.9%) compared to the target (75%). Findings from the current study suggest that infertility beliefs differ based on race/ethnicity, and disparities in reproductive health persist. Therefore, a study sampling equal portions of different racial/ethnic groups would offer important insight into this process. Additionally, the health-based infertility beliefs subscale requires further psychometric work and development. Interpretation of findings related to the health-based infertility beliefs subscale should, therefore, be done with prudence and attention to the complexity of the issues at hand.

Notes

1. Education was considered as a control. However, model fit fell below acceptable thresholds when it was included in the model.
2. The residuals for particular items were correlated with one another. Correlating residuals is acceptable if the items would theoretically be related beyond the variance explained in the model and if each latent variable has at least one uncorrelated residual (R. B Kline 2016). Five pairs were correlated (see Table 1 for items) including 2a and 5a (god), 3a and 4a (ethics), 1b and 3b (abortion), 2b and 4b (amount of sex), and 2c and 3c (work).

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