

Maternal Depression and Family Media Use: A Questionnaire and Diary Analysis

Anna M. Bank · Rachel Barr · Sandra L. Calvert ·
W. Gerrod Parrott · Susan C. McDonough ·
Katherine Rosenblum

Published online: 3 February 2011
© Springer Science+Business Media, LLC 2011

Abstract We describe the association between postpartum depression and the quantity and content of infant media use. Households with depressed mothers viewed twice as much television as households with non-depressed mothers did, and depressed mothers appeared to derive comparatively greater pleasure from television viewing. Maternal depression was associated with an increased exposure to child-directed content by 6–9-month-old infants, although it was not associated with an increased exposure to adult-directed programming. Depressed mothers also reported being less likely to sit and talk with their children during television use or to consult outside sources of information about media. This increase in television exposure without corresponding parental involvement could negatively affect developmental outcomes.

Keywords Maternal depression · Television · Infant · Media content · Decision-making

Introduction

Estimates for the percentage of new mothers who experience postpartum depression vary, but recent studies suggest that the number is between 8 and 15% (e.g., Robertson et al. 2004). Depression or anxiety during pregnancy, past

psychiatric illness, family history of psychiatric problems, absence of social support, marital problems, pregnancy complications, and low socioeconomic status are all predictors of postpartum depression (Robertson et al. 2004). For example, overall rates of severe maternal depression are 7% but rise to 11% for mothers who are living below the poverty line (Vericker et al. 2010). Previous studies have shown that maternal depression is associated with numerous cognitive, emotional, and behavioral deficits in infants and young children. Infants of depressed mothers score lower on cognitive and motor skill measures at 12 months; have more behavioral problems and insecure attachment to their mothers at 18 months; and exhibit less sharing, interactive behavior, concentration, and sociability to strangers at 19 months (for review see Murray and Cooper 1997).

While maternal depression is a known risk factor for negative developmental outcomes, early television exposure may also be detrimental to cognitive development (Christakis et al. 2004; Zimmerman and Christakis 2005a, b). The nature of this potential harm is closely linked to other risk factors including maternal education and socioeconomic status (Foster and Watkins 2010) and the type of programming involved (Barr et al. 2010; Zimmerman and Christakis 2007). Specifically, early exposure to adult programs is generally harmful (Anderson and Pempek 2005), whereas exposure to high-quality prosocial programming can have positive, negative, or neutral effects depending on the specific program (Barr et al. in 2010; Linebarger and Walker 2005; Linebarger and Vaala 2010). High levels of television exposure at ages 1 and 3 (over 7 h per day) accompanied by lower maternal education and socioeconomic status are associated with attentional problems at age 7 (Christakis et al. 2004; Foster and Watkins 2010). Increased overall television viewing during infancy

A. M. Bank · R. Barr (✉) · S. L. Calvert · W. G. Parrott
Department of Psychology, Georgetown University,
Washington, DC 20057, USA
e-mail: rfb5@georgetown.edu

S. C. McDonough · K. Rosenblum
Center for Human Growth & Development, University of
Michigan, Ann Arbor, MI 48109, USA

also correlates with cognitive deficits (Zimmerman and Christakis 2005a, b), poor language skill development (Zimmerman et al. 2007a, b), and learning difficulties (Johnson et al. 2007). On the other hand, infant exposure to certain educational preschool television programs can result in improved language skills over time (Linebarger and Walker 2005). Parental involvement during television viewing may be one determinant of whether television exposure is beneficial or detrimental (Bogatz and Ball 1971; Barr et al. 2008; Fidler et al. 2010). This involvement varies considerably among parents, with some providing a great deal of scaffolding, while others provide very little opportunity for interaction (Barr et al. 2008; Fidler et al. 2010).

Rutter (1989) described three major mechanisms by which maternal depression could produce adverse outcomes. First, infants are harmed by direct exposure to their mothers' depressive symptoms. Second, infants respond negatively to the parenting difficulties associated with the occurrence of maternal depression. Third, infants are affected by external variables that are correlated with depression, such as socioeconomic adversity or extensive television exposure. For example, maternal depression is associated with increased television viewing among low-income preschool children (Burdette et al. 2003), and particularly with viewing of age-inappropriate content (Conners et al. 2007). According to a 2002 survey of the primary caregivers (predominantly mothers) of 175 low-income rural pre-kindergarteners, children with depressed mothers were significantly more likely to be exposed to age-inappropriate programming in the form of PG-13 and R rated movies, even after controlling for ethnicity and maternal education (Conners et al. 2007).

One potential reason for this is that depressed people rely on television as a coping strategy that allows them to escape from unpleasant feelings or events in their lives (Potts and Sanchez 1994). Another possible explanation is that depressed women may develop emotionally rewarding parasocial relationships, or one-sided perceived interactions with fictional or actual media personalities, with television characters, termed parasocial interactions (Horton and Wohl 1956). These interactions are theorized to be pleasurable because they provide continuing, dependable relationships that ensure a sense of comfort and predictability when real-life, bidirectional relationships cannot. If depressed mothers feel unfulfilled or insecure in their actual relationships, especially in their relationships with their newborn infants, they may turn to parasocial relationships for comfort.

The type of television programming that young children see may differ depending upon their mothers' reasons for choosing to watch. Depressed mothers may choose adult-directed programs, which serve as background television

for their infants; this background television may be detrimental to play development, which is instrumental in the development of cognitive skills (Schmidt et al. 2008; Barr et al. 2010). Furthermore, parent-infant interactions decrease during background television viewing (Kirkorian et al. 2009). Alternatively, depressed mothers may specifically choose to expose their very young children to infant-directed television, using the programming as a pseudo-babysitter.

The Present Study

Although the association of maternal depression with increased television viewing and increased exposure to inappropriate content has been demonstrated for preschool children, a number of questions remain. The first is whether very young infants (under one year old) are exposed to more television if their mothers are post-natally depressed; this is extremely relevant because of the higher rates of maternal depression during the postpartum period and the role that early exposure to television may play in the developmental trajectory. The second is whether the type of programming these infants are exposed to differs as a function of maternal depression. And the third, and perhaps most important from an intervention perspective, is what attitudes, decision-making rationales, and emotional responses depressed women have toward television. This study is the first to focus exclusively on infants, and to consider the rationales that depressed mothers provide for their media use.

Based on the findings of Burdette et al. (2003) and Conners et al. (2007), we hypothesized that depressed mothers and their infants would view more television than non-depressed mothers and their infants. Additionally, based on Conners et al.'s findings about age-inappropriate content, we predicted that depressed mothers would expose their children to more adult-directed programs. Based on the literature on coping (Potts and Sanchez 1994) and parasocial relationships (Horton and Wohl 1956), we predicted that depressed mothers would have different emotional responses to television and rationales for television use.

Method

Participants

Participants were 84 mothers of 6- to 9-month-old children ($M = 7$ months 24 days, $SD = 26$ days). 38 of the mothers lived in a Midwestern college town and were recruited during an intervention study on maternal depression.

The other 46 lived in a mid-Atlantic urban region and were recruited through a combination of flyers, direct mail, and word of mouth. Mothers were well-educated ($M = 16.18$ years, $SD = 2.09$). Participants were Caucasian ($n = 57$), African-American ($n = 15$), Latino ($n = 8$), Asian ($n = 1$), and Biracial ($n = 3$). Socioeconomic status was coded using Nakao and Treas' (1992) Socioeconomic Index (SEI). Educational attainment, occupational status, and annual income are the major components of socioeconomic status, and the SEI ranks 503 occupations listed in the 1980 US census on a scale of 1 to 100, with higher status occupations (e.g., professional) being accorded higher ranks. Socioeconomic status ranged widely ($M = 65.57$, $SD = 20.01$), and each socioeconomic quartile was represented in both the depressed and non-depressed groups, although there were more depressed mothers in the lowest quartile ($n = 16$) and more non-depressed mothers in the highest quartile ($n = 15$). For missing maternal education and socioeconomic status values, mean values (calculated by location) were substituted. Forty percent of the infants were in out-of-home childcare. Regression analyses controlled for socioeconomic status, maternal education, and out-of-home childcare.

Materials

Depression Measure

Mothers completed the Center for Epidemiologic Studies Depression Scale (CES-D), a 20-item self-report depression questionnaire (Radloff 1977), by circling the number of times since their child was born that they experienced a variety of feelings and behaviors. A score of 16 or above corresponds to the upper quintile of CES-D scores in the general population and indicates that the participant has experienced at least six depressive symptoms a majority of the time since her child was born, or a larger number of symptoms less frequently.

Attitudes About Media Use Scale

Participants completed a 7-item questionnaire in which they rated their attitudes about the educational value of different types of media (television, videos, books, and music) as well as whether or not these types of media were good ways to keep their children occupied. Participants rated their attitudes on a 5-point Likert scale ranging from "Strongly Agree" to "Strongly Disagree."

Media Use Questionnaire

During a half-hour phone interview, participants answered 64 questions about their families' behaviors and preferences

surrounding media use. For the participants from the Midwestern town, this was part of an attentional control condition for an intervention study. These questions included the amount of household television exposure on weekdays and weekends, the mothers' emotional responses during their favorite and least favorite television programs, the mothers' use of outside sources of information in informing their decisions about media, their use of television to keep their children occupied, and the frequency with which they sit and talk with their children during media use.

24 h Media Diary

At the conclusion of the phone interview, participants were asked to recall their family's media use over the last 24 h. We recorded the type of media that was used, the content viewed, duration of use, and who was in the room during use. If the infant was in the room during the reported media use, mothers were asked to report how much attention they thought the child had paid and how much they thought he or she had learned, using a 3-point Likert scale. All but two mothers completed the diary.

Procedure

Mothers who lived in the mid-Atlantic urban region were visited in their homes and completed an informed consent form along with two paper questionnaires: the CES-D and the Attitudes about Media Use scale. After these two measures were coded, participants completed the media questionnaire and diary via a 30 min phone interview between one and twelve weeks later ($M = 4.66$ weeks, $SD = 3.19$). After the completion of the interview, participants received a \$10 bookstore gift card as a token of appreciation for their participation.

Participants in the Midwestern study were recruited during well-baby check-ups in local pediatric offices when infants were between 4- and 6- months-of-age. Interested mothers completed screening questionnaires, including the CES-D. Mothers with cutoff scores of 16 or higher were invited to participate in a randomized controlled trial designed to test the efficacy of a dyadic relationship-focused intervention. Mothers were randomly assigned into a treatment condition or an attentional control "Baby Diary" condition. All mothers completed home and lab-based pre-assessments when their infants were between 7 and 8 months of age. Mothers completed self-report questionnaires that included the Attitudes about Media Use scale during the period between the home and lab visits, as part of a self-report packet. Following completion of the pre-assessment, mothers in the Baby Diary condition received weekly phone calls, the first of which included the media use questionnaire and diary.

Results

Coding

A cut-off score of 16 or higher on the CES-D was used to define the depression status of each participant. Each participant was defined as either “depressed” or “non-depressed” based on their scores. The depressed ($M = 27.60, SD = 8.74$) and non-depressed ($M = 8.83, SD = 5.16$) groups were then compared on several media-related measures. Ethnicity status was dummy-coded as Caucasian or minority for the regression analyses.

The depressed and non-depressed groups were compared on a number of measures from the media use questionnaire, including the amount of household television exposure on weekdays and weekends, the mothers’ emotional responses during their favorite and least favorite television programs, the mothers’ use of outside sources of information to inform their decisions about media, their use of television to keep their children occupied, and the frequency with which they sit and talk with their children during television viewing.

The groups were also compared on the child’s exposure to adult-directed and child-directed television programming in a 24-hour period, as measured by the 24 h media diary.

Child-directed programming was defined as programs created for preschool audiences and younger and included PBS preschool programs (e.g., *Arthur*, *Sesame Street*, and *Clifford*), Nickelodeon preschool programs (e.g., *Blues Clues* and *Dora the Explorer*), baby-directed videos (e.g., *Baby Mozart*), or Disney movies (e.g., *Finding Nemo*). Since many children’s programs, like *Power Rangers* and *That’s so Raven*, are created for an older child audience, these programs were coded as adult-directed programming. Other adult-directed television included news programs, game shows, situation comedies, and nature programs. One third of the diaries were double-coded for reliability purposes and coders were consistent with one another.

Amount of Television Exposure

Our analyses examined whether maternal depression was associated with television use, even when other maternal factors such as education, ethnicity, socioeconomic status, and the infant’s number of hours in childcare were considered. We conducted a linear regression on mothers’ weekday and weekend reported household television exposure, simultaneously entering maternal depression score, socioeconomic status, ethnicity, maternal education, and childcare hours. Having a depressed mother predicted a significant proportion of the variance in weekday television hours, $R^2 = 0.31, F(5,69) = 6.19, p < .001$ (see Table 1), while ethnicity, socioeconomic status, maternal education, and childcare hours did not. The same pattern held for weekend television exposure, $R^2 = 0.35, F(5,70) = 7.43, p < .001$. Maternal depression and socioeconomic status were associated with weekend household television use, while ethnicity, maternal education, and childcare hours were not.

Next, we conducted two t-tests to examine the extent of this difference by comparing the mean number of hours of household television exposure of the two groups. There was a significant difference between the average number of both weekday hours, $t(76) = -3.87, p < .01$, and weekend hours, $t(78) = -4.02, p < .01$, for the depressed (weekday, $M = 4.81$ h, $SD = 4.04$, weekend, $M = 5.61$ h, $SD = 4.16$) and the non-depressed mothers (weekday, $M = 2.26$ h, $SD = 1.60$, weekend, $M = 2.70, SD = 1.98$) (see Table 2).

Content of Television Exposure

In order to determine whether children with depressed mothers were more likely to be exposed to age-inappropriate adult-directed television programming, we compared the amounts of time that the mothers reported exposing their infants to the television programs that they themselves were watching, using the mean weekday and weekend

Table 1 Factors associated with weekday and weekend household television use

	Weekday			Weekend		
	Unstandardized coefficients		Standardized coefficients	Unstandardized coefficients		Standardized coefficients
	B	SE	Beta	B	SE	Beta
CES-D	.105	.034	.376**	.105	.035	.350**
SES	-.027	.021	-.160	-.044	.022	-.241*
Childcare Hrs	.029	.023	-.132	-.002	.023	-.007
Maternal education	-.057	.213	-.034	-.057	.221	-.031
Ethnicity	.742	.785	.100	1.204	.813	.115

† $p < .10$; * $p < .05$; ** $p < .01$

Table 2 Total infant exposure and adult-directed exposure to television programming

	Overall			Adult-directed		
	Unstandardized coefficients		Standardized coefficients	Unstandardized coefficients		Standardized coefficients
	B	SE	Beta	B	SE	Beta
CES-D	.047	.040	.148	.041	.032	.170
SES	-.020	.024	-.107	.041	.019	.285*
Childcare Hrs	-.004	.026	-.018	.015	.020	.077
Maternal education	-.622	.233	-.343*	-.411	.183	-.297*
Ethnicity	-1.67	.902	-.205 [†]	-1.31	.708	-.211 [†]

[†] $p < .10$; * $p < .05$; ** $p < .01$

numbers from the media use questionnaire. We conducted a linear regression on hours of television viewed by both mother and child, simultaneously entering the variables of maternal depression score, socioeconomic status, ethnicity, maternal education, and childcare hours. The regressions showed no associations between the amounts of time that depressed and non-depressed mothers reported that their infant watched what they watched, on either weekdays or weekends, $R^2 = 0.04$, $F(5,62) = 1.06$, $n.s$ and $R^2 = 0.08$, $F(5,61) < 1$.

We also compared the television content viewed by the infants as measured by the 24 h media diary. First, we conducted a linear simultaneous regression on the infants' total exposure to television programming, entering the variables of maternal depression score, socioeconomic status, ethnicity, maternal education, and childcare hours. The overall model was significant, $R^2 = 0.23$, $F(5,73) = 4.36$, $p < .003$ (see Table 2). Maternal depression was not associated with the infants' total exposure to television programming, depressed $M = 3$ h 19 min, $SD = 4$ h 39 min, non-depressed, $M = 1$ h 13 min, $SD = 1$ h 32 min. It is important to note that the large variation in the depressed group was due to the fact that 3 families reported that the television was on almost all the time at 14 h per day. None of the non-depressed mothers reported such high usage. As reported previously with older children (Mendelsohn et al. 2008; Rideout and Hamel 2006), however, higher infant exposure to television was associated with lower maternal education. There was also a trend, but not a significant association, with minority status.

Next, we examined whether exposure to adult programming, as reported in the 24 h media use diary, was associated with maternal depression and the other regression variables. We conducted a linear regression on infant exposure to adult-directed programming, simultaneously entering the variables of maternal depression score, socioeconomic status, ethnicity, maternal education, and childcare hours. The overall model was significant, $R^2 = 0.19$, $F(5,73) = 3.32$, $p < .01$ (see Table 2). Maternal depression

was not associated with higher infant exposure to adult programming. It is important to note that both lower socioeconomic status and lower maternal education were associated with increased exposure to adult programming. Once again, there was a trend for minority infants to be exposed to higher levels of adult-directed programming on the 24 h media use diary (see also Rideout and Hamel 2006; Zimmerman et al. 2007a, b).

Finally, we examined whether exposure to child programming was associated with maternal depression and other demographic variables. We conducted a linear regression on infant exposure to child-directed programming simultaneously entering the variables of maternal depression score, socioeconomic status, ethnicity, maternal education, and childcare hours. The overall model was significant, $R^2 = 0.20$, $F(5,73) = 3.53$, $p < .01$ (see Table 3). Infants of depressed mothers were exposed to significantly more children's programming ($M = 1$ h 36 min, $SD = 3$ h 36 min) than infants of non-depressed mothers ($M = 18$ min, $SD = 40$ min). The ratio of exposure to adult versus child-directed television was almost 50/50 for infants of depressed mothers but the ratio was 80/20 for infants of non-depressed mothers. Finally, when infant exposure to children's books was entered as the outcome variable in the same regression, maternal depression and other demographic variables were not

Table 3 Infant exposure to child-directed television programming

	Unstandardized coefficients		Standardized coefficients
	B	SE	Beta
CES-D	.091	.028	.425**
SES	.020	.017	.157
Childcare hours	.009	.018	.056
Maternal education	-.201	.161	-.163
Ethnicity	-.418	.626	-.07

[†] $p < .10$; * $p < .05$; ** $p < .01$

associated with infant exposure to children’s books, $R^2 = 0.05$, $F(5,73) < 1$.

Attitudes, Decision-Making, and Emotional Responses

There was no significant difference in the mothers’ self-reported attitudes about whether or not television, videos, and DVDs were good ways to keep their children occupied, $\chi^2(1, N = 79) = 1.42$, *n.s.* Attitudes did not vary significantly by maternal education or socioeconomic status. However, depressed mothers were significantly more likely than non-depressed mothers to report that they use television to entertain their children, $\chi^2(1, N = 65) = 4.45$, $p = .05$ with Yates correction (see Table 4). There were no significant differences between the two groups of mothers in their frequency of reporting that they use television to educate or calm their children.

Depressed and non-depressed mothers reported different degrees to which outside sources of information influenced their decisions about their children’s media use. A chi-square test demonstrated that non-depressed mothers were more likely to be influenced by other parents, $\chi^2(1, N = 74) = 24.06$, $p < 0.01$ and to seek other resources to obtain information about media, $\chi^2(1, N = 74) = 10.43$, $p < 0.01$ than depressed mothers were, as shown in Table 4.

The degree of parental involvement during children’s television exposure is another important aspect of maternal decision-making about media use, and depressed mothers were significantly less likely to sit and talk with their infants during media use on either weekdays, $\chi^2(1, N = 67) = 6.025$, $p < .05$, or weekends, $\chi^2(1, N = 67) = 5.211$, $p < .05$ (see Table 4).

Finally, we compared the mothers’ emotional responses to their favorite and least favorite programs. The mothers

reported their emotional responses to their favorite and least favorite television programs on a 1 to 10 scale, with 10 being the best and 1 being the worst. We conducted two t-tests to compare the mothers’ mean favorite and least favorite program ratings and found that there were no significant differences between the depressed (favorite, $M = 7.69$, $SD = 1.75$, least favorite $M = 2.24$, $SD = 1.57$) and non-depressed groups (favorite, $M = 7.74$, $SD = 2.08$, least favorite $M = 3.18$, $SD = 3.07$) in the mothers’ self-reported emotion ratings for favorite, $t(70) < 1$ and least favorite shows, $t(62) = -1.53$, *n.s.* Depressed and non-depressed mothers also named similar types of programs as their favorites and least favorites.

In summary, households with depressed mothers had more exposure to television on both weekdays and weekends than did households where the mothers were not depressed. However, maternal depression was not associated with infants’ total exposure to television, or with infants’ exposure to adult programs that are most detrimental to young children’s development. Instead, infants whose mothers were depressed were exposed to significantly more children’s programs. Non-depressed mothers had a higher degree of involvement with their children during television viewing, and were more likely to consult outside sources of information in order to make decisions about media use. Depressed and non-depressed mothers had similar emotional responses to television.

Discussion

Our overall goal was to examine how much and what kind of television infants of depressed mothers are exposed to. As expected, the households where mothers were depressed reported more television usage than did the households of non-depressed mothers. These findings are consistent with the television usage patterns of depressed and non-depressed mothers found for preschool-aged children (Burdette et al. 2003; Conners et al. 2007).

However, the mothers’ usage patterns did not carry over to their infants’ viewing experiences; infants of depressed mothers were not more likely to view adult-directed content. It is important to note, though, that exposure to adult-directed programs was associated with poorer maternal education and lower socioeconomic status, indicating that children in these populations are at higher risk for the negative developmental outcomes arising from adult-directed programming.

Children of depressed mothers were not exposed to any more adult-directed television than their peers, but they were exposed to more child-directed programming. While there is considerable controversy about exposing children to any programming prior to the age of two (American

Table 4 Maternal responses regarding media use as a function of maternal depression status

	Depressed (%)	Non-depressed (%)
Reason for infant television exposure (%)		
Entertainment	46.4	19.4*
Education	42.9	25.0
Relax or calm infant	21.4	11.1
Sources of information (%)		
Other parents	12.8	67.5*
Own research	23.1	65.0*
Frequency mothers sit/talk with infants during TV/Video use*		
Rarely/sometimes	23.2	7.7
Often	62.5	56.4
Always	14.3	35.9

* $p < .05$

Academy of Pediatrics 1999), Linebarger and Walker (2005) found that infant exposure to certain educational television programs is associated with better language outcomes over time. Indeed, Vandewater and Bickham (2004) argued that exposure to children's educational programs may potentially supplement the language environment of young children whose own homes do not provide sufficient stimulation. Depressed mothers use less parentese and respond less consistently or rapidly to their infant's vocalizations than non-depressed mothers, reducing language stimulation (Bettes 1988; Kaplan et al. 1999).

However, child-directed television programming may only be beneficial when combined with an appropriate degree of parental involvement. Maternal involvement in general (Bogatz and Ball 1971), and verbal labels in particular (Friedrich and Stein 1975; Hart and Risley 1995) help preschool-aged children understand television programs and learn cognitive lessons. Similarly, the language in a video can help infants learn a difficult imitation task (Barr and Wyss 2008) and parental scaffolding is associated with increases in infant attention to infant-directed content (Barr et al. 2008; Fidler et al. 2010). The depressed mothers in our study reported that they were less likely to talk about program content with their infants than the non-depressed mothers. While benefits can be gained by preschoolers who view without adult scaffolds (Wright et al. 2001), it is less likely that infants can navigate these viewing experiences as readily as preschoolers without adult assistance.

Depressed mothers were also less likely to talk to other mothers or seek other information about appropriate media use. There are at least two possible explanations for why depressed mothers do not seek out information about media use. One reason is that they do not realize that their household media use is so high because they are too preoccupied with their negative feelings of sadness or anxiety, and thus they do not consult outside resources to determine what levels of media use are appropriate. Another possible explanation is that these mothers do realize that their families watch more television than their non-depressed peers do, but because television is one source of comfort, relaxation, and normalcy, they do not want to expose themselves to sources of information that may make prescriptive comments regarding media usage.

The data on depressed mothers' attitudes about media shed some light on these possible explanations. Depressed and non-depressed mothers share similar attitudes about whether or not television is a good way to keep children occupied, with about a third of mothers in both groups agreeing with this statement and about two-thirds disagreeing or having neutral sentiments. Depressed mothers are also more likely to report that television would entertain their infants. However, depressed mothers are less

likely to sit and talk with their children while the children are watching television than non-depressed mothers are. This finding suggests that although depressed mothers are equally likely to say that they do not use television as a babysitter, their infants are more likely to view television alone or without active parent-child interaction. Depressed mothers may not realize that they are doing this, or they may realize it but be unwilling or unable to change the pattern because using television as a babysitter helps them to cope with their negative feelings. A recent sample examining a low income Latino study showed a link between exposure to television in the presence of parent-infant interaction during infancy and higher language scores (Mendelsohn et al. 2010). This finding was more closely associated with exposure to child-directed programming.

Overall, infants who grow up in homes with depressed mothers during the first year of their lives are exposed to more child-directed television and less parental interaction during television viewing. Maternal decision-making surrounding media use is also apparent. Although exposure to adult programs leads to poorer developmental outcomes, the literature on exposure to child programs is mixed (e.g. Barr et al. 2010; Zimmerman et al. 2007a, b). It remains to be seen if educational programs designed for children could compensate for some of the lost maternal interaction, or if exposure to child programs without adult scaffolds could lead to negative developmental outcomes, regardless of educational content.

Our results suggest that depressed mothers may use television as a coping mechanism, both in terms of their own emotions and as a parenting tool. A key diagnostic symptom of depression is anhedonia, or an inability to experience pleasure from normally pleasurable events. Thus, the fact that these depressed mothers report enjoying TV to the same extent that non-depressed mothers do indicates that they may derive comparatively more pleasure from it. The role of parasocial relationships in this comparative pleasurable activity was not clear from the findings. There were no differences in the types of favorite shows as a function of depression status. Future research is necessary to examine whether parasocial relationships are associated with derived pleasure from media expressed by depressed mothers. Additionally, even though they are less likely to interact with their infants during television viewing, depressed mothers provide more child-directed exposure to television than non-depressed mothers and report that they use television to entertain their infants. Although they might not feel personally able to entertain their children, they seek an alternative method. Future research should attempt to untangle whether depressed mothers' increased media use is acting as a potential coping mechanism, is due to an inability to monitor their

television use, is due to an unwillingness to change their existing patterns, or a combination of these factors. Taken together, the present results and those of Mendelsohn et al. (2010) suggest because depressed mothers are already very comfortable with television use, media-based strategies aimed at increasing parent-infant interactions could potentially be used as an entry point for intervention with this depressed population.

Acknowledgments We wish to thank the research participants. Research supported by our study was supported by National Institute of Mental Health RO1 MH066318 to Susan McDonough, by Georgetown University Graduate School and a summer fellowship from the Georgetown University Research Opportunity Program to Anna Bank. We thank Katherine Salerno and Lauren Shuck for their assistance in data collection.

References

- American Academy of Pediatrics. (1999). Media education. *Pediatrics*, *104*, 341–342.
- Anderson, D. R., & Pempek, T. (2005). Television and very young children. *American Behavioral Scientist*, *5*, 505–522.
- Barr, R., Lauricella, A., Zack, E., & Calvert, S. L. (2010). The relation between infant exposure to television and executive functioning, cognitive skills, and school readiness at age four. *Merrill Palmer Quarterly*, *56*, 21–48.
- Barr, R., & Wyss, N. (2008). Reenactment of televised content by 2-year-olds: Toddlers use language learned from television to solve a difficult imitation problem. *Infant Behavior and Development*, *31*, 696–703.
- Barr, R., Zack, B., Garcia, A., & Muentener, P. (2008). Infants' attention and responsiveness to television increases with prior exposure and parental interaction. *Infancy*, *13*, 30–56.
- Bettes, B. A. (1988). Maternal depression and motherese: Temporal and intonational features. *Child Development*, *59*, 1089–1096.
- Bogatz, G., & Ball, S. (1971). *The second year of "Sesame Street."* A continuing evaluation. Princeton, NJ: Educational Testing Service.
- Burdette, H. L., Whitaker, R. C., Kahn, R. S., & Harvey-Berino, J. (2003). Association of maternal obesity and depressive symptoms with television-viewing time of low-income preschool children. *Archives of Pediatric and Adolescent Medicine*, *157*, 894–899.
- Christakis, D. A., Zimmerman, F. J., DiGiuseppe, D. L., & McCarty, C. A. (2004). Early television exposure and subsequent attentional problems in children. *Pediatrics*, *113*, 708–713.
- Connors, N. A., Tripathi, S. P., Clubb, R., & Bradley, R. H. (2007). Maternal characteristics associated with television viewing habits of low-income preschool children. *Journal of Child and Family Studies*, *16*, 415–425.
- Fidler, A., Zack, E., & Barr, R. (2010). Television Viewing Patterns in 6- to 18-month-olds: The Role of Caregiver-infant Interactional Quality. *Infancy*, *15*, 176–196.
- Foster, E. M., & Watkins, S. (2010). TV viewing and attention problems: A reanalysis. *Child Development*, *81*(1), 368–375.
- Friedrich, L. K., & Stein, A. C. (1975). Prosocial television and young children: the effects of verbal labeling and role playing on learning and behavior. *Child Development*, *46*, 27–38.
- Hart, B., & Risley, T. R. (1995). *Meaningful differences in the everyday experience of young children*. Baltimore: Brookes Publishing.
- Horton, D., & Wohl, R. R. (1956). Mass communication and parasocial interaction: Observations on intimacy at a distance. *Psychiatry*, *19*, 215–229.
- Johnson, J. G., Cohen, P., Kasen, S., & Brook, J. S. (2007). Extensive television viewing and the development of attention and learning difficulties during adolescence. *Archives of Pediatric and Adolescent Medicine*, *161*, 480–486.
- Kaplan, P. S., Bachorowski, J., & Zarlengo-Strouse, P. (1999). Child-directed speech produced by mothers with symptoms of depression fails to promote associative learning in 4-month-old infants. *Child Development*, *70*, 560–570.
- Kirkorian, H. L., Pempek, T. A., Murphy, L. A., Schmidt, M. E., & Anderson, D. R. (2009). The impact of background television on parent-child interaction. *Child Development*, *80*, 1350–1359.
- Linebarger, D. L. & Vaala, S. E. (2010). Screen media and language development in infants and toddlers: An ecological perspective. *Developmental Review*, *30*, 176–202.
- Linebarger, D., & Walker, D. (2005). Infants' and toddlers' television viewing and language outcomes. *American Behavioral Scientist*, *48*, 624–645.
- Mendelsohn, A. L., Berkule, S. B., Tomopoulos, S., Tamis-LeMonda, C. S., Huberman, H. S., Alvir, J., et al. (2008). Infant television and video exposure associated with limited parent-child verbal interactions in low socioeconomic status households. *Archives of Pediatric and Adolescent Medicine*, *162*, 411–417.
- Mendelsohn, A. L., Brockmeyer, C. A., Dreyer, B. P., Fierman, A. H., Berkule-Silberman, S. B., & Tomopoulos, S. (2010). Do verbal interactions with infants during electronic media exposure mitigate adverse impacts on their language development as toddlers? *Infant and Child Development*, *19*, 577–593. doi: 10.1002/icd.711.
- Murray, L., & Cooper, P. J. (1997). Effects of postnatal depression on infant development. *Archives of Disease in Childhood*, *77*, 99–101.
- Nakao, K., & Treas, J. (1992). *The 1989 socioeconomic index of occupations: Construction from the 1989 occupational prestige scores (No. 74)*. Chicago, IL: NORC.
- Potts, R., & Sanchez, D. (1994). Television viewing and depression: No news is good news. *Journal of Broadcasting and Electronic Media*, *38*, 79–91.
- Radloff, L. S. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement*, *1*, 385–401.
- Rideout, V., & Hamel, E. (2006). *The media family: Electronic media in the lives of infants, toddlers, preschoolers and their parents*. Menlo Park, CA: Kaiser Family Foundation.
- Robertson, E., Grace, S., Wallington, T., & Stewart, D. E. (2004). Antenatal risk factors for postpartum depression: A synthesis of recent literature. *General Hospital Psychiatry*, *26*, 289–295.
- Rutter, M. (1989). Psychiatric disorder in parents as a risk factor for children. In D. Shaffer, I. Philips, & N. B. Enger (Eds.), *Prevention of mental disorder, alcohol and other drug use in children and adolescents*. Rockville, Maryland: Office for Substance Abuse, USDHHS.
- Schmidt, M. E., Pempek, T. A., Kirkorian, H. L., Lund, A. F., & Anderson, D. R. (2008). The effects of background television on the toy play behavior of very young children. *Child Development*, *79*, 1137–1151.
- Vandewater, E. A., & Bickham, D. S. (2004). The impact of educational television on young children's reading in the context of family stress. *Journal of Applied Developmental Psychology*, *25*, 717–728.
- Vericker, T., Macomber, J., & Golden, O. (2010). Infants of depressed mothers living in poverty: opportunities to identify and serve. *The Urban Institute*, *1*. Retrieved from

- http://www.urban.org/UploadedPDF/412199-infants-of-depressed.pdf?RSSFeed=UI_ChildrenandYouth.xml.
- Wright, J. C., Huston, A. C., Murphy, K., St. Peters, M., Pinon, M., & Scantlin, R. (2001). The relations of early television viewing to school readiness and vocabulary of children from low-income families: The Early Window Project. *Child Development, 72*, 1347–1366.
- Zimmerman, F. J., & Christakis, D. A. (2005a). Children's television viewing and cognitive outcomes. *Archives of Pediatric and Adolescent Medicine, 159*, 621–625.
- Zimmerman, F. J., & Christakis, D. A. (2005b). Children's television viewing and cognitive outcomes: A longitudinal analysis of national data. *Archives of Pediatric and Adolescent Medicine, 159*, 619–625.
- Zimmerman, F. J., & Christakis, D. A. (2007). Associations between content types of early media exposure and subsequent attention problems. *Pediatrics, 120*, 986–992.
- Zimmerman, F. J., Christakis, D. A., & Meltzoff, A. N. (2007a). Associations between media viewing and language development in children under age 2 years. *Journal of Pediatrics, 151*, 364–368.
- Zimmerman, F. J., Christakis, D. A., & Meltzoff, A. N. (2007b). Associations between media viewing and language development in children under 2 years. *Journal of Pediatrics, 151*, 364–368.