

RECOGNIZING HARM: HOW WOMEN PERCEIVE THE
IMPACT OF PRENATAL EXPOSURE ON THEIR OWN
CHILDREN

by

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Given the known negative effects associated with prenatal exposure, it is imperative that babies presenting with symptoms are identified and receive treatment without delay. Women's perceptions of how their child is affected by prenatal exposure likely impacts seeking and engaging with support services. However, little research has been conducted investigating the beliefs of women who used substances during pregnancy about the way that their children were impacted.

The present study evaluates women's concerns about their baby's functioning, using a new measure. This measure, the Prenatal Exposure Concern for Functioning Scale (PECFS), identifies perceptions of baby's current functioning and worries about future functioning. Analyses explore factors associated with increased concern. Findings suggest that women who used illicit substances during pregnancy generally report less concern for the current impact on their child than concern reported about future functioning due to prenatal exposure. Results also suggest that women who used the combination of methamphetamines and heroin report higher concern than women who did not use this combination of substances in pregnancy. These women could be exhibiting more concern for their babies due to compounding reasons. One reason could

include cultural beliefs and stigmas associated with these two substances and the individuals who use them. These cultural beliefs could potentially impact a woman's perspective on how her use of these substances affected her child.

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Introduction

Decades of research document the negative impact of substance use during pregnancy on child outcomes. Using drugs while pregnant is detrimental to the health of both mother and fetus. Given the negative impact of continued substance use in pregnancy, it is imperative that women access the services and support systems that they need to stop using drugs and alcohol as soon as possible during pregnancy. Unfortunately, women who use drugs during pregnancy face uniquely difficult challenges to accessing these treatment services.

One of the most troubling barriers to care is simply that very few treatment programs exist to accommodate pregnant and parenting women. In 2005, only 19% of treatment facilities nationwide offered programs specific to the needs of pregnant or parenting women (Walz & Bleuer, 2015). For example, treatment centers do not offer beds reserved for parenting women, nor do they offer childcare. A lot of treatment programs do not allow children; if a pregnant woman gives birth while in treatment, her infant could be removed from her custody, in part due to lack of resources for having an infant stay at the treatment center.

For women who have young children already, accessing treatment programs that offer child-care services can also be difficult; availability of such services is frequently insufficient. When these services do exist, lack of transportation prevents many of them from accessing these programs (Marsh, D'Aunno & Smith, 2000). When services are either nonexistent or out of reach, mothers with drug abuse issues and their children are not offered adequate options for support.

Women who are pregnant also experience significant barriers to accessing prenatal care, vital for the health of both mother and child. Research suggests that many women who use substances during pregnancy recognize the importance of prenatal care, but fear the possibility of reporting maternal substance use to child welfare or criminal justice systems (Jessup et al., 2003). Receiving support or advocacy from healthcare providers for this population is difficult due to biases. This increases the risk of inadequate care for mothers with substance abuse issues seeking treatment options.

Women's fear of legal action is also well a well-founded and notable barrier to accessing care. July 1989 was the first time in the US that a woman was criminally convicted for exposing her baby to drugs in utero (Roberts, 1991). According to Wright and Walker (2007), women who use drugs during pregnancy are much more likely to become involved in the criminal justice and child welfare systems. Thirty-five states have criminally prosecuted women for substance abuse or alcohol use during pregnancy (Jos, Perlmutter & Marshall, 2003). Women report that threat of disciplinary action such as loss of infant custody; threat of arrest and incarceration presents a significant obstruction to pursuing care.

These concerns have increased during recent decades. Eighteen states now consider substance use during pregnancy to be child abuse. In Tennessee, women who use drugs while pregnant can be charged with criminal homicide, a Class A felony, if her actions result in the death of her baby (Paltrow & Flavin, 2013). If a pregnant woman discloses her use to a doctor in order to seek counsel in finding treatment services in this state, she could be arrested, and if convicted, be subject to a jail sentence of ten or more years.

However, regardless of the increased judicial system and child welfare consequences for substance use in pregnancy across the US, recent statistics indicate that the prevalence of substance use in pregnancy has increased (National Institute on Drug Abuse, 2011). Trends show that increased consequences of substance use during pregnancy occurred alongside a higher prevalence of this use. Thus, suggesting that harsh punishments are not encouraging women to cease use of substances while pregnant, which poses a greater risk to babies for prenatal exposure. Numerous researchers have written in opposition of increased consequences for women who use during pregnancy, noting that these consequences create greater unnecessary roadblocks to accessing services that help women address their addictions.

Many women decrease their use of substances over the course of pregnancy on their own. This indicates that some women who use illicit drugs are concerned enough about their babies that they are able to mitigate their use as the pregnancy continues. Recent studies have shown that many pregnant women who use substances employ harm reduction strategies such as tapering doses and attempting to get clean without outside help or seeking services (Flavin, 2002). Harm reduction relating to substance use refers to making intentional changes to lessen the negative consequences of drug use, often specifically and purposefully limiting use (Ritter and Cameron, 2005). Notably, women can engage in harm reduction strategies while not completely ceasing use. Even with continued use, at a lesser dose, this behavioral shift to reduce harm suggests that women are actively engaged in trying to protect their child from the effects of exposure.

It is particularly important to understand thought processes and perceptions of concern that impact women's continued substance use during pregnancy. Motivated women may be more likely to employ harm reduction strategies on their own, while not seeking or not being able to access treatment. While employing harm reduction strategies is significant, it is imperative that pregnant women cease using substances as soon as possible for maternal and fetal health. A big part of facilitating this progress is specific knowledge and education about effects of prenatal exposure; individuals must be able to recognize harm associated with behaviors before positive change can occur (Ajzen & Fishbein, 1977). Clearly women who are cutting back on their drug use are recognizing harm and facilitating positive change on some level, but it is important to delve further into women's perceptions of how illicit drugs are affecting their babies.

Much research has been conducted on perceived risk and knowledge about use of cigarettes and alcohol while pregnant, but less is known about perceptions of dangers associated with prenatal exposure to illicit substances (Perry, Jones, Tuten & Svikis, 2003). Most women are familiar with risks associated with ingesting alcohol while pregnant because the federal government mandates that products containing alcohol have health-warning labels on them (Hankin et al., 1993). Illicit substances obviously do not contain such warnings and information. Women may understand that substances are not healthy for a developing fetus, but not the extent to which these drugs could be harming their babies. Learning more about how women conceptualize the effects of their drug use on their pregnancies may be helpful in elucidating ways to help women cease use, access treatment services, or access services for themselves and their children sooner.

Given the potentially deleterious effects of prenatal exposure, it is vital to understand how women perceive the risk of using substances while pregnant. It is key that these women are knowledgeable about specific effects of prenatal exposure, which include increased risk of miscarriage (Ness et al., 1999), low birth weight (Ostrea, Ostrea & Simpson, 1997), high risk of babies born with physical addiction (meaning they may go through withdrawal and require intensive neonatal medical treatment and extended hospital stays) (Pan & Yi, 2013), and developmental delays (Yip, Lacadie, Sinha, Mayes, & Potenza, 2016).

Specifically, women who use substances during pregnancy put their babies at risk for having Fetal Alcohol Syndrome and Neonatal Abstinence Syndrome. Fetal Alcohol Syndrome refers to the range of effects that can occur in an individual whose mother drank alcohol during pregnancy. Neonatal Abstinence Syndrome refers to a collection of problems that occur in a newborn that was exposed to addictive illicit or prescription drugs while in utero. The lesser-known effects of Fetal Alcohol Syndrome also include observable physical traits, malformation of skeletal and major organ systems, central nervous system complications and problems with adaptive behavior (Streissguth et al., 2004). Neonatal Abstinence Syndrome refers to babies born with prenatal exposure to opiates. Neonatal Abstinence Syndrome is characterized by a set of medical issues including withdrawal symptoms (including but not limited to muscle spasms, seizures, fever, sleep problems etc.) that a newborn may experience due to exposure to addictive substances. Fetal alcohol syndrome is perhaps the most recognized impact of prenatal exposure due to health warning label laws required in the late 1980s that have mandated labels of alcoholic beverages include Surgeon General

government warnings stating "...women should not drink alcoholic beverages during pregnancy because of the risk of birth defects" (Mayer, Smith & Scammon, 1991).

Unfortunately, despite negative consequences, the prevalence of substance use during pregnancy continues to increase. The number of infants born with Neonatal Abstinence Syndrome increased from 3.4 to 5.8 per 1000 hospital births from 2009 to 2012, cumulating in a total of 21,732 babies diagnosed with Neonatal Abstinence Syndrome in 2012 alone (Patrick, Davis, Lehmann & Cooper, 2015).

Given the poor outcomes that are associated with prenatal exposure, it is important that babies who present with symptoms receive treatment and support as early as possible. For children who have developmental or learning delays, access to intervention services can help support their development and enable them to thrive. Thus, it is important that the signs of prenatal exposure are recognized sooner rather than later by mothers who are caring for their babies so they are able to access care early in development to mitigate further negative consequences of prenatal exposure.

Goals of the Current Study

This research study was designed to identify the perceptions and concerns of recovering mothers related to prenatal exposure. More specifically, this study identifies women's perceptions of their own infants and young children given their drug use during pregnancy. This research will help to identify how women perceive the ways in which substance use during pregnancy has impacted their child while also identifying concerns women have about their child's future development.

Understanding women's perceptions of harm to their children will inform services designed to support women with addictions and their children. Women's perception of prenatal exposure likely strongly impacts seeking support services. If women do not perceive that their child is impacted by substance exposure, they may be less likely to seek support services for their child early on or to follow through with recommended referrals.

Women's perceptions of how their baby or young child is impacted may influence their concern about substance use during subsequent pregnancies. If women believe that their current child was not harmed by their use of substances during pregnancy, they may be less concerned about their use in later pregnancies. This may lead to decreased motivation to alter their use on their own or seek treatment services. In addition, women may find that their experiences sharply contrast with educational information about prenatal exposure offered by healthcare professionals. If women are warned that prenatal exposure leads to dangerous health concerns, yet they give birth to a child that does not have these problems, this could lead to undermined trust in

healthcare advice. This weakened trust may add to barriers associated with women seeking care for substance abuse.

In addition, this research will evaluate the utility of a new measure, the Prenatal Exposure Concern for Functioning Scale (PECFS). This measure was designed based upon our own preliminary qualitative research that identified, through interviews, the kinds of concerns women have about for their babies following substance use during pregnancy. The PECFS measures women's current level of concern based upon her perceptions and observations of her baby's current functioning while also measuring concerns about the way prenatal exposure may impact the child in the future.

The PECFS measure is the first measure to quantify maternal concern based purely upon mother's perceptions of impact due to prenatal exposure on their children. We hypothesize that mothers in treatment will perceive their babies as not having been affected by their drug use in pregnancy, but will express concern about the future development of their child. It is equally important to consider associations between concerns about prenatal exposure and other measures in order to possibly begin to understand factors associated with greater maternal concern.

With the goal of identifying factors associated with greater or lesser concern, we considered whether differences in personal characteristics (i.e. search for presence of meaning in life, feelings of gratitude and feelings of hope) were associated with greater concern. These positive psychology measures were included due to theoretical associations between how women conceptualize their world. For example, if women express higher levels of gratitude, this may indicate a more positive worldview. If mothers exhibit a more positive worldview, this may suggest that they express less

concern for their children. The impact of prenatal exposure is often particularly subtle, and we anticipated that maternal worldview might impact the way that women perceive their child as having been impacted.

In addition, we investigated aspects of substance use during pregnancy hypothesizing that greater substance use would be related to greater concern. In particular, we considered the specific substances women reported using during pregnancy including whether or not women used alcohol, methamphetamines, heroin, marijuana and opiates. We hypothesized that mothers who used a combination of illicit substances would express higher concern about the effects of their drug use during pregnancy. Research suggests that policymakers and the general public often wrongly assume that the legal status of a drug is associated with the extent that the substance impacts the developing fetus (Thompson, Levitt & Stanwood, 2009). Thus, strong social stigmas associated with use of illicit substances while pregnant may influence women's perception of whether or not their child is impacted by prenatal exposure.

Therefore, a central goal of this study is to identify and quantify how women perceive their children as being affected by their drug use during pregnancy. Specific perceptions investigated include concerns about baby's current functioning and concerns about future functioning and development. A subsequent goal of this research is to reveal associations between maternal concern about the effects of prenatal exposure and other measures in order to examine factors associated with greater concern.

A long-term goal of this research is to develop information that can inform services that are designed to support mothers with addictions. Specifically, this research

is designed to facilitate availability of information to women who may be less likely to seek services. Comprehending women's perceptions enables services to build upon women's current beliefs about the ways in which their children have been impacted, thus lending greater relevance to women's true experiences.

Methods

Participants

Participants include 33 women who used substances during a pregnancy within the past 4 years. Many of these women have more than one child; on average women have between two and three children besides the child who was a newborn around the time of entry into treatment ($M=2.72$). Women ranged from 19 to 39 years of age. The mean age for this sample ($N=33$) was 28.66 ($SD=5.63$). Women were recruited from an inpatient treatment center where they were currently receiving services. This treatment center is located in a medium-sized city in the Pacific Northwest. This integrated treatment facility focuses on addressing both substance abuse issues as well as providing pregnancy and parenting support. Most participants represented a high risk and low SES demographic, and were receiving Medicaid at the time that this research was conducted. 87% of participants completed high school or have a GED. One woman completed an associate's degree and none of the mothers have completed a college/university bachelor's degree. 69.7% of women report an annual gross household income of less than \$4,999.

When women entered treatment they indicated on their original intake paperwork whether or not they were interested in future research opportunities. Eligible women who expressed interest were presented with the option of participation. Participants were required to be conversant in English, at least 18 years old and currently receiving inpatient substance abuse treatment, have a history of using substances during a pregnancy in the past four years.

Informed consent was acquired in order to explain potential risks associated with participation and to discuss confidentiality. Given the sensitive nature of researching substance use in pregnancy, a National Institute of Health Certificate of Confidentiality was obtained for this research. The Certificate of Confidentiality was explained to participants, emphasizing extra measures of confidentiality. Women were informed that any identifiable information was kept within a locked office, in a locked building at all times. Instances in which it would be necessary to break confidentiality were clearly explained, citing cases of suspected use or neglect of a child or elderly person. The University of Oregon's Institutional Review Board approved the study's protocol and consent forms.

Researchers set up times to meet with participants in private rooms within the treatment center in order to maintain confidentiality and facilitate comfortable child care for mothers with infants. Mothers were offered the option of childcare during participation. Participation in its entirety took approximately two and a half to three and a half hours and participants were compensated \$35.

Participants were offered the choice to complete the online questionnaire either by themselves, in a structured interview style, or using a combination of styles to ensure full comprehension of questions. At least one researcher accompanied each participant at all times.

Polysubstance Use During Pregnancy

Participants were asked about their use of tobacco, alcohol, marijuana, methamphetamine, heroin and other opiates during pregnancy. All participants reported polysubstance use in that they used at least two of these substances. Looking at

substances individually, tobacco was the most commonly used substance in this population; 87.9% of participants reported that they were smoking cigarettes while pregnant. 78.8% of women reported using methamphetamine; making this substance the second most commonly used substance as well as the most commonly used illicit substance (see Table 1).

	Number of Women who used substance during pregnancy	Percentage of women who used substance during pregnancy
Tobacco	29	87.9%
Meth	26	78.8%
Marijuana*	22	66.7%
Opiates	15	45.5%
Alcohol	13	39.4%
Heroin	12	36.4%

Table 1: Frequencies of substance use

*Illicit substance at time of research

The Prenatal Exposure Concern for Functioning Scale

We developed a novel questionnaire, the Prenatal Exposure Concern for Functioning Scale, which was designed to identify and typify concerns that recovering mothers may have for their infants and young children given exposure to substances during pregnancy. This measure was informed by our preliminary qualitative research with women who used substances during pregnancy which suggests that women are aware of the dangers of using substances while pregnant, but do not necessarily currently perceive their child as having been affected by their use in pregnancy. This questionnaire includes two subscales as well as a free-response question.

The first subscale is concentrated around concerns about the baby's current functioning and the second subscale is focused on concerns about future functioning. The free response question asks women to consider ways in which their child has been affected by their drug use during pregnancy. All questions are self-report based upon individual perceptions, offering a parallel structure to the quantitative questions. The subscale focusing on baby's current functioning includes questions about how the child acts, how the child thinks and how the mother perceives the child's brain to be working. The subscale designed to measure concerns about future functioning includes questions focused around worries about future harm, worries about school, as well as concerns about how the baby is acting and thinking. Theoretically we had anticipated there being two different subscales to the PECFS questionnaire due to two different kinds of questions being asked. The first subscale relating to the baby's current functioning includes the following three items; "My child acts differently because I used substances during pregnancy," "My child's brain works differently because I used substances during pregnancy," and "My child thinks differently because I used substances during pregnancy."

The second subscale, measuring concerns about future functioning, contains six items, including "My substance use during pregnancy harmed my child," "My child acts differently because I used substances during pregnancy," "My child's brain works differently because I used substances during pregnancy," "My child thinks differently because I used substances during pregnancy," "I worry that my child is going to have difficulties in school because I used substances during pregnancy," and "I worry about

how my use of substances in pregnancy harmed my child.” (See Appendix A for the full questionnaire).

Measures of Positive Psychology that may be associated with Maternal Concern for Prenatal Exposure

In addition to administering the PECFS, we also asked participants to complete a number of positive psychology questionnaires designed to identify how women conceptualize their world. Thus enabling identification of whether positive affectivity impacted level of concern for impact of prenatal exposure. Positive affectivity is defined as positive emotional experience. Maternal concern for prenatal exposure was predicted to be associated with a number of other measures. These measures were considered due to theoretical relationships between women’s worldview and their level of concern for their babies.

Meaning in Life Questionnaire

The positive psychology measure Meaning in Life Questionnaire was considered. The Meaning in Life Questionnaire is a 10-item questionnaire that measures the extent to which individuals feel their lives have meaning and to what extent individuals endeavor to find and attribute meaningfulness to their lives. Responses to individual items are recorded on a 7-point Likert scale ranging from 1 (Absolutely True) to 7 (Absolutely Untrue) (Steger, Frazier, Oishi & Kaler, 2006). Combining scores on individual items develops an overall scale.

Gratitude Questionnaires

The Gratitude questionnaire used to explore this framework was the Gratitude Questionnaire-Six Item Form, a short questionnaire designed to measure the experience of gratitude in individuals. The questionnaire is positively related to optimism, life satisfaction and empathy, while negatively related to depression, envy and anxiety. This questionnaire is comprised of six self-report measures which participants are required to answer on a 1 (strongly disagree) to 7 (strongly agree) Likert scale (McCullough, Tsang & Emmons, 2004).

Adult Hope Scale

The Adult Hope Scale was also used in order to explore whether women who scored higher on the scale would exhibit more maternal concern or less concern. The Adult Hope Scale is comprised of 12 items intending to measure participant's level of hope. The scale is divided into two subscales; (1) agency toward hope, as defined by action taken towards goals and (2) hope pathways defined as plans to take actions towards goals. Subscales are combined to calculate a raw hope score. Responses are coded in an eight-point Likert scale ranging from 1 (definitely false) to 8 (definitely true) (Snyder et al., 1991).

Results

Exploratory Analyses of Prenatal Exposure Concern for Functioning Scale

Variables in Sample

Forty-six women completed this questionnaire which consisted of fourteen total items, nine of which required the response format in a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) with a median of 3 (neither agree nor disagree). Mean responses ranged from 1.42-4.7 for individual items. See Table 2 for details on specific items.

There is notable variation from one item to the next, with two items standing out of the normal distribution. Responses to the “My child looks differently...” and “I am very lucky to have such a healthy child...” items were non-normally distributed, with kurtosis of 3.47 ($SE = .41$) and 2.54 ($SE = .41$) respectively.

The item that asks whether women believe their children look differently due to their use of substances in pregnancy reveals that few women believe that their child is physically impacted by prenatal exposure. No participants report strongly agreeing that their child looks differently. Two women report agreeing with this statement (6.1%), and two women are unsure (6.1%) whereas the majority of the sample (87.9%) disagree or strongly disagree). See Figure 1 for a visual representation of women’s responses to this question. To see a representation of an item that is more normally distributed, see Figure 2. Similarly, almost all women agree that they are “very lucky to have such a healthy child...” despite using substances. Only two women are unsure of whether or not they feel lucky to have a healthy child. See Figure 3 for an exact breakdown of this

item. Given the way in which these two items differed from the other more normally distributed items, these two items were considered separately from the other items on the questionnaire that have a normal distribution.

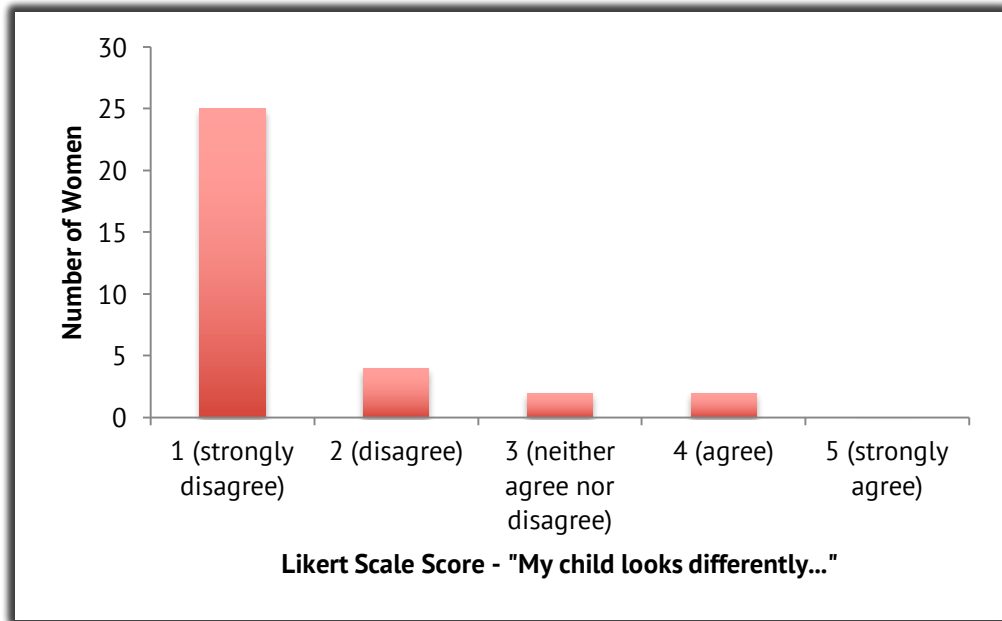


Figure 1: Women do not always see their children as having been affected

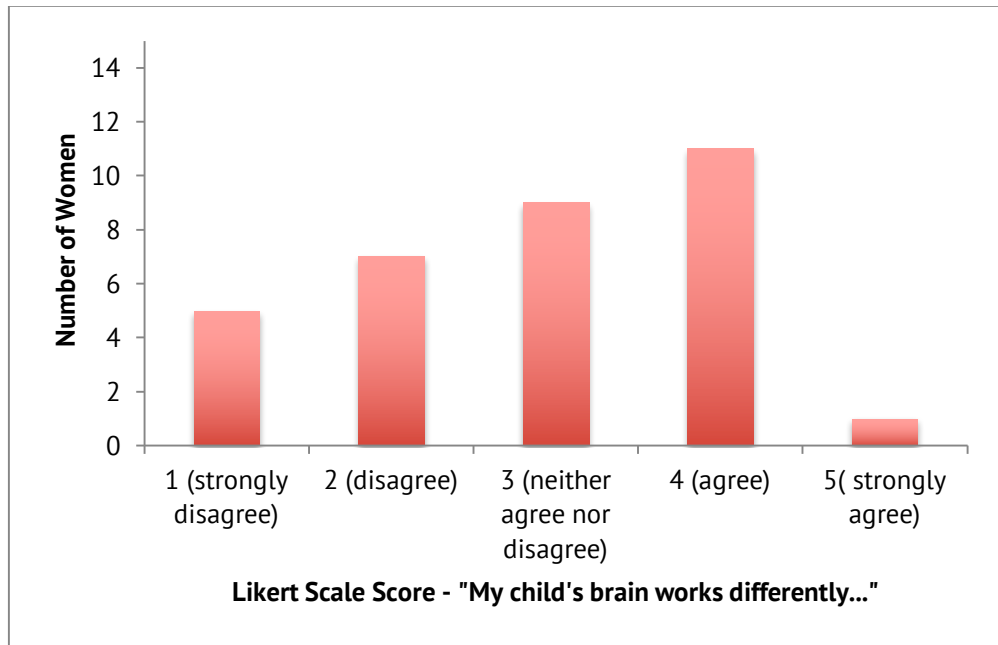


Figure 2: Normal distribution of women that perceive effects of drug use while pregnant

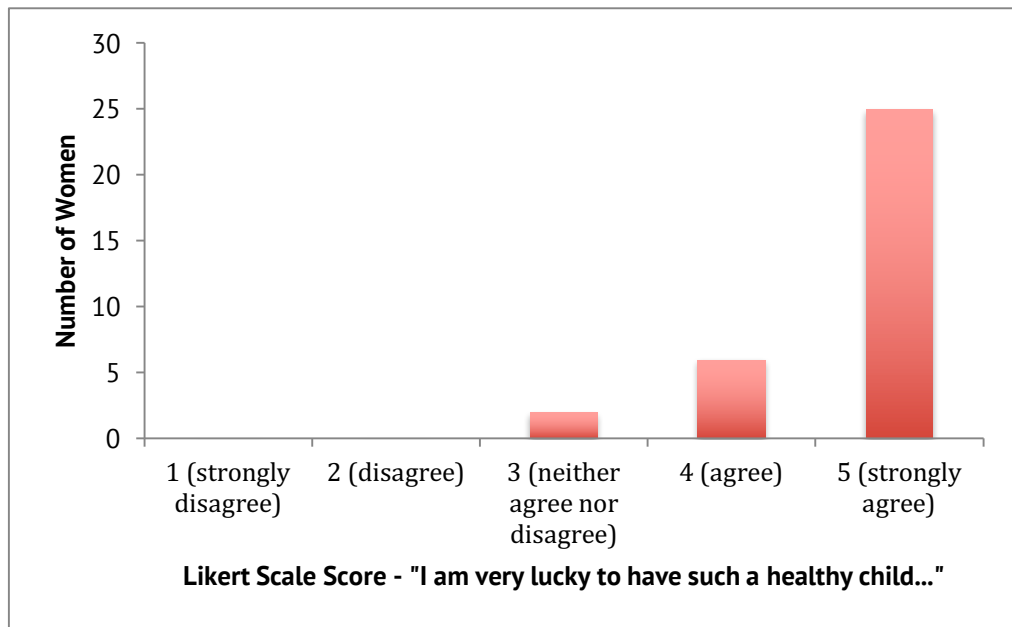


Figure 3: Women feel lucky to have a healthy child despite use of substances in pregnant

Item*	Do not express concern	Undecided	Express concern	Mean Response	Standard Deviation
“My substance use harmed my child”	10	9	14	3.15	1.25
“My child acts differently...”	18	11	4	2.24	1.06
“My child’s brain works differently...”	17	11	5	2.36	1.06
“My child thinks differently...”	18	11	4	2.24	1.06
“I worry that my child is going to have difficulties in school because I used...”	12	9	12	2.88	1.14
“I worry about how my use of substances...harmed my child.”	7	10	16	3.36	1.34
“I worry my child is going to have an addiction because I used...”	11	13	9	2.79	1.19
“My child looks differently due to my substance use during pregnancy”	29	2	2	1.42	.87
“I am very lucky to have such a healthy child...”	31 (strongly agree/agree)	2	0	4.7	.59

Table 2: Women who express concern

*Data has been collapsed across items.

‘Do not express concern’ represents Strongly Disagree or Disagree responses.

‘Undecided’ represents Neither Agree nor Disagree responses. ‘Express concern’ represents Agree or Strongly Agree responses.

Reliability of the Prenatal Exposure Concern for Functioning Scale

Cronbach’s alpha for the nine multiple-choice variables was .84, indicating that this scale is acceptably reliable. Alpha increases to .87 when the following items are removed; “My child looks differently...” “I am very lucky to have such a healthy child despite my use...” When these questions were removed, there were seven items remaining with an alpha of .87. Although the alpha of the original nine items was already quite high, these items were left out in order to create more cohesive subscales. Items addressing baby’s looks and luck for health were left out due to their non-normal distribution, which will be discussed further.

Reliability of Sub-scales of Prenatal Exposure Concern for Functioning Scale

Cronbach’s alpha for the subscale measuring concern for baby’s current functioning was .89, suggesting strong reliability. According to Button et al. (2013), with such a small sample size, the possibility of undermined reliability must be acknowledged, however an alpha reaching almost .90 is still significant. Cronbach’s alpha for the second sub-scale, measuring maternal concerns about future functioning, was .86, suggesting good reliability.

Qualitative Question

Data Analysis and Coding

There is one free response question included in the PECFS, which asks “In what ways do you believe your child has been affected by your drug use during pregnancy?” This question provides the opportunity for participants to express specific ways that they believe their child may have been harmed due to their substance use during pregnancy that quantitative questions do not address.

Qualitative analyses of responses identify that responses can be grouped into four themes. These themes include: 1 concerns about the physical impact of prenatal exposure, 2 concerns about the baby’s observed current functioning, 3 concerns about the child’s future and 4 little to no concern.

Ten women responded that this question was not applicable to them. Eight women responded in their own words that they had either not observed their child as having been affected by their drug use or did not believe their child had been affected. See Table 3 for exact quotes from individuals that have been grouped thematically.

Theme 1: Physical Impact of Prenatal Exposure

Participant	Concern
2006	Low birth weight, extra/many days in NICU, trouble gaining weight
2033	n/a, other children have been effected; they had to withdrawal from methadone. Have not noticed anything beyond withdrawal.
2039	I wonder if my kid was affected because she had a brain tumor, difficulties breast feeding

Theme 2: Maternal concerns about baby's observed current functioning

Participant	Concern
2006	Exaggerated startle reflex, slow to meet milestones
2022	Kind of ADHD ...he's not bipolar, but he's got problems, some days he spaces out, and some days he's really crazy; sensory integration problems
2026	Doesn't seem to experience pain the way most children do
2029	Not talking as much as he should
2037	I believe my daughter has been affected and has some learning disabilities
2052	ADHD

Theme 3: Maternal concerns for child's future

2018	Mentally, because she has been [will be] in foster care
2023	More likely to try smoking weed when older, at risk for [developing] ADD
2030	...[afraid my child will be] put into harmful situations
2041	...they all grow up to be like us.
2050	...believe any type of drug use [during pregnancy] will affect the child [negatively], not sure how.
2051	Neglect, not having basic needs met, not having stable place to live or the same caretaker watching him all the time

Theme 4: No observed impact; little to no concern

Participant	Concern
2014	So far no...he sleeps good, he eats good, he's big, he's 100% healthy
2020	The baby is too young to tell
2034	I don't think she is old enough yet to tell if any of the drugs I had used affected her in any way
2036	I haven't seen any signs, but they may come later
2039	None of my [other] kids came out with anything wrong with them.
2050	...no worries right now
2053	No
2054	Because I was an addict, I was able to access more care than I would have without treatment...She was affected positively by me being able to enter treatment early.

Table 3: Ways in which mothers conceptualize how their babies have been harmed due to prenatal exposure

Exploratory analyses of factors associated with the Prenatal Exposure Concern for Functioning Scale

To understand more clearly why some women had greater concern about the impact of prenatal exposure than others, exploratory analyses were conducted. We were interested in identifying whether higher concern for baby's current functioning and future development was associated with either women's history of substance use during pregnancy or with personal attributes. Analyses indicated that when considering personal attributes with positive psychology measures, there were no significant correlations between women's concerns for their babies given prenatal exposure and these measures.

The Gratitude scale was neither significantly correlated with maternal concern for baby's current functioning, $r = -.272$, $n=33$, $p > .1$, nor significantly correlated with mother's concerns about future functioning, $r = -.208$, $n=33$, $p > .1$. There was also a

nonsignificant correlation in the adult agency toward hope subscale, which measures goal-directed energy driven by feelings of hopefulness, and baby's current functioning, $r = -.068$, $n=33$, $p > .1$ as well as concerns about baby's future functioning, $r = -.015$, $n=33$, $p > .1$. The adult hope pathways subscale, which measures capabilities pertaining to planning to accomplish goals, also showed a similar nonsignificant relationship with baby's current functioning; $r = -.037$, $n=33$ $p > .1$ and concerns about baby's future functioning, $r = -.033$, $n=33$, $p > .1$. The Meaning in Life Questionnaire, which measures the extent to which mothers feel their lives have meaning, was also not significantly correlated with baby's current functioning, $r = -.169$, $n=33$, $p > .1$ nor with concerns about future functioning, $r = -.112$, $n=33$ $p > .1$.

Analysis of substance abuse history in relation to the Prenatal Exposure Concern for Functioning Scale

Additional analyses considered whether maternal concern about effects of prenatal exposure is associated with maternal history of substance use in pregnancy. We anticipated that women who had a history of greater substance use would be more concerned about the impact of prenatal exposure. This could be related to cultural beliefs about the dangers of specific substances as well as the legal status of different substances. One way that we were able to test the amount of prenatal exposure was by considering the substances that women reported using during pregnancy. We grouped women based upon whether they used alcohol, methamphetamines, heroin, marijuana and opiates. We hypothesized that women who used both heroin and methamphetamine would have particularly high concern about the impact of their use on the baby due to cultural beliefs and stigmas associated with using these two substances, and because

this combination of substances may represent particularly detrimental illicit polysubstance use and lifestyle choices.

T-test analyses indicate that when considering baby's current functioning, women who used both meth and heroin while pregnant report greater concern ($M=2.9$, $SD=.70$) than women who did not use this combination of substances during pregnancy ($M=2.0$, $SD=.95$) $t(32)=2.7$, $p=.01$. This indicates that on average women who use the combination of methamphetamine and heroin report neither agreeing nor disagreeing with whether their baby's current functioning is impacted by their substances use in pregnancy, whereas women who did not use the combination of methamphetamine and heroin while pregnant on average report that they disagree that their child's current functioning is impacted by their substance use in pregnancy.

Regarding concerns about the baby's future functioning, these women reveal a marginally significant increase in worry ($M=3.1$, $SD=.60$) in comparison to women who did not use both methamphetamine and heroin during pregnancy $t(32)=1.97$, $p=.06$ (Mean=2.5, $SD=.94$). This suggests that on average women who use the combination of methamphetamine and heroin report neither agreeing or disagreeing with having concern for whether their baby's future functioning will be impacted. In contrast, women who did not use this combination of substances express greater disagreement.

Discussion

This study's findings suggest that women who used illicit substances during pregnancy generally perceive their child as not being currently impacted by their use of substances during pregnancy. For example, when asked about whether women believe their baby has been affected by their drug use during pregnancy, the majority of women report that their babies have not been affected. Women did not report high levels of concern for their baby's current functioning nor for their baby's future functioning. When given the opportunity to list specific concerns about their child's functioning related to exposure to substances use during pregnancy, some mothers expressed specific concerns in their own words. Example topics of concern include worries about their child having future difficulties in school, having mental health issues and having future drug abuse issues.

The Prenatal Exposure Concern for Functioning Scale identifies concerns that recovering mothers have about their infants or young children who were exposed to illicit substances in utero. Statistical testing demonstrates reliability of the measure through evidence of a high Cronbach's alpha. In addition, women's responses to an open-ended question about their concerns reflect specific items on the PECFS.

The PECFS was typified into two subscales. One subscale related to concern about baby's current functioning. The second subscale related to future concerns about functioning. These subscales were also found to have high internal reliability. These subscales and therefore the measure in its entirety is mirrored in the responses to the open-ended qualitative question, "In what ways do you believe this child has been affected by your drug use during pregnancy?" The natural way the responses broke

down thematically within this qualitative question mirrors the construction of the PECFS. These results indicate that the PECFS holds promise as a measure for obtaining source information about maternal concern related to current and future functioning of their babies given prenatal exposure.

As hypothesized, women did not exhibit particularly strong beliefs about the effects that their drug use had on their babies. While women did address principle concerns about their baby's current and future functioning when asked in a qualitative style, many of the questions in the PECFS yielded relatively neutral responses, clustered around women responding that they neither agree nor disagree with individual items. This held true for items that asked about concern for children having future addictions, observed differences in functioning such as acts differently and brain works differently as well as worry about ways that use of substances harmed the child.

In contrast there were two items in which women expressed stronger opinions. These included the items, "My child looks differently..." and "I feel very lucky to have such a healthy child despite my use..." The majority of mothers (25 of 33 mothers) identified that they strongly disagree (represented by a 1 on the Likert scale) that their child looks differently due to their substance use in pregnancy. Almost all women strongly agree (5 on the Likert scale) that they feel very lucky to have a healthy child. These specific opinions are important to examine theoretically in order to discover what differentiates these topics from other perceptions of prenatal exposure impact.

The lack of concern about the current impact of prenatal exposure could be related to a number of important factors and is an area ripe for further consideration. The fact that most women disagree that their child looks differently given prenatal

exposure could be due to women having an inaccurate view of the impact of prenatal exposure.

Specifically, women may expect that prenatal exposure profoundly impacts the developing baby, not understanding that, in most instances, the impact of prenatal exposure is subtle in nature.

This observation is significant because it may impact whether or not women seek out support services for their children. It may also influence the timing of seeking support. If mothers believe that prenatal exposure is related to dramatic physical differences in their baby's appearance and are not seeing these differences, they may assume their child has not been affected by their use. This may impact access to early intervention, as mothers may be less likely to seek out these types of services if they believe that their child has not been impacted by their substance use.

When asked about differences in how their babies look and when asked about whether or not they feel lucky about having a healthy baby, mothers' responses showed a similar pattern. This pattern potentially stems from expectations mothers have of symptoms of prenatal exposure. All women agreed and most women felt strongly (5 on the Likert scale) about both items. If women are reporting that they strongly disagree that their children look differently given prenatal exposure and that they are lucky to have a healthy child, this suggests that women believe their child is not impacted by their substance use. In the case of perceiving their children is being unaffected, women may be less inclined to seek out early intervention support services for their children.

These perceptions were investigated further through the qualitative question, "In what ways do you believe this child has been affected by your drug use during

pregnancy?” In some cases, women did describe visible signs of exposure in conjunction with medical diagnoses, such as the baby going through withdrawal after birth. However, only three women specifically expressed concerns about the physical impact of prenatal exposure. This may be related to most babies not being impacted physically by prenatal exposure. For example, it is unlikely that most babies would go through this kind of withdrawal. This relatively low rate of concern may also relate to mothers not associating known complications at birth to prenatal exposure (Perry et al., 2003).

When creating the qualitative question, which asked women to list any concerns they have about their baby related to prenatal exposure, diction was considered carefully in order to produce maximum clarity and singularity of interpretation. Women expressed concerns that fit in with concerns surrounding the four themes addressed after the questionnaire was administered. Themes included concerns about physical impact, concerns about baby’s observed current functioning, concerns about child’s future functioning, and little to no concern.

Four women identified with the theme of physical impact, citing observations such as low birth weight and low muscle tone. A greater number of women reported concerns about observed current functioning of their babies, such as being “kind of ADHD”. An equal number of women reported concerns about their child’s future. The responses that fit into subsequent themes become more diverse; from concerns about mental health issues, their babies being involved with social services, to future behavior and choices surrounding drug use. The fact that more women reported a greater number of concerns about their baby’s functioning and future rather than their child’s health of

physical well-being helps support the claim that the two items “My child looks differently...” and “I am very lucky to have such a healthy child despite my use of substances in pregnancy” did not fit in with the either subscales of the PECFS. Within the context of the qualitative question specifically, women appear to be focusing more on future problems with their children because they do not identify with *seeing* effects of exposure at the time of research.

Participant 2050 presented a distinctive response, indicating that she believes her use will have an effect at an unforeseen time, representing future concern, yet she also expressed that she has “no worries right now”. This participant exemplifies one of the dissonant thought patterns investigated; from this response, it would seem reasonable to deduce that women who have similar beliefs may not feel it necessary to access early intervention services for their babies. This sentiment appears to communicate the potential relationship of mothers experiencing concerns and seeing signs of prenatal exposure. It is necessary to begin to understand what could lead to feelings of greater concern in order to further explore how women perceive their children as being affected by prenatal exposure and subsequently access early intervention services.

In order to begin trying to understand predictors of concern, analyses identifying the relationship between maternal concern and personal attributes were conducted. The Adult Hope questionnaire was used in order to analyze a potential relationship between concern and feelings of hopefulness. The Meaning in Life scale, which measures the extent to which individuals feel meaning and seek meaning, was also used to investigate mothers’ well being. Research suggests new mothers experience greater meaning in life,

which could be associated with more positive outlooks directed towards outcomes for their children (Taubman-Ben-Ari, Shlomo & Findler, 2012). Feelings of optimism, life satisfaction and empathy were also measured via a Gratitude Questionnaire. Our analyses did not find any significant relationships between positive psychology measures and concern. This finding was surprising, as we had anticipated that women with more positive affectivity would report less concern for their babies. This finding suggests that positive affectivity and outlook on life is unrelated to amount of concern women have on their babies given prenatal exposure. This also suggests that mothers could be basing their concern less on general emotion and affectivity and more on concrete logical reasons such as substance use history.

Although this research suggests positive psychology measures are not significantly associated with maternal concern, the study identified that women who use both methamphetamine and heroin have greater concern about their baby's current functioning as well as baby's future functioning than women who do not use this combination of substances. This difference is clinically significant in that on average women who use both of these substances report that they neither agree nor disagree with whether their baby's functioning is impacted by their substance use in pregnancy while women who do not use these two substances report disagreement on average that their child's functioning has been affected by their use.

Women who used a combination of methamphetamine and heroin specifically could be exhibiting more concern for their babies due to many reasons; for example, cultural beliefs and stigmas against these two drugs and individuals who use them, or education about the dangers of these illicit substances on a fetus, could alter a woman's

perspective on how her use of these two substances impacted/will impact her child. While this is a significant finding, this pattern could be problematic if women who are using substances or other substance combinations that are potentially dangerous to a developing fetus are experiencing less concern. If women who report less concern are less likely to seek out early intervention services, this may suggest that women who report greater concern (i.e. women who used a combination of methamphetamines and heroin) may seek out these services earlier. Women expressing more concern may also be more vigilant about observing symptoms of prenatal exposure.

Limitations

Although results of this research were significant, there are clear limitations to this study. Principally, the small sample size must be noted. Increasing the sample size of the study would add power to statistical analyses, which could help to identify the associations between maternal concern and substance use patterns. A second limitation of this study is that results may not generalize to other women who use substances during pregnancy. Participants were recruited from a single treatment center in the Pacific Northwest that provides services for primarily low-income women.

Additionally, the majority of women in this sample used methamphetamine. Use of this substance varies considerably across the United States. Thus, the participants in this study may differ from other women who used substances during pregnancy. It is of note that most women were Caucasian, low SES and primarily methamphetamine users. Due to these reasons, results should not be overgeneralized.

Extended Investigation

In light of the fact that this is the first study we know of specifically addressing level of maternal concern for prenatal exposure, there are multiple possibilities for future research. Replicating or conducting similar research in varying community environments and regions is necessary to understand suggested trends further. This is necessary due to demographics associated with the specific area research was conducted. It would be compelling to explore potential differences in maternal concern for babies given prenatal exposure with differing population attributes, such as women of color or women struggling with addictions to different substances.

As it is likely that women's' perceptions of prenatal exposure impact seeking support services, it is paramount to find ways to better support women in addressing specific concerns for their babies given prenatal exposure. A logical next step would be to investigate a potential relationship between maternal concern and when or how women begin seeking services. Research investigating the impact of maternal concern for babies due to prenatal exposure and beneficial behaviors to seek out services to mitigate these effects is lacking.

Results of this research suggest that women perceive their children as not impacted by prenatal substance exposure, women may be less likely to seek support services for their children early on. Future research can investigate whether maternal concern for effects of prenatal exposure is related to the likelihood of mothers seeking out support services, the timing of seeking out these services, and whether they follow through with these beneficial behaviors.

If polysubstance use, and the combination of heroin and methamphetamine in particular, were a strong predictor for maternal concern as this research suggests, it would be particularly beneficial to see if women who express more concern are seeking out services earlier or later than women who are using other substances or other substance combinations. Beginning to understand trends in women's concerns for their children given prenatal exposure is the first step in supporting them in seeking early intervention services for their children.

Appendix A

Prenatal Exposure Concern for Functioning Scale

Item	Response
1. My substance use during pregnancy harmed my child.	1 – strongly disagree 2 – disagree 3 – neither agree nor disagree 4 – agree 5 – strongly agree
2. My child looks differently because I used substances during pregnancy	1 – strongly disagree 2 – disagree 3 – neither agree nor disagree 4 – agree 5 – strongly agree
3. My child acts differently because I used substances during pregnancy	1 – strongly disagree 2 – disagree 3 – neither agree nor disagree 4 – agree 5 – strongly agree
4. My child’s brain works differently because I used substances during pregnancy	1 – strongly disagree 2 – disagree 3 – neither agree nor disagree 4 – agree 5 – strongly agree
5. My child thinks differently because I used substances during pregnancy	1 – strongly disagree 2 – disagree 3 – neither agree nor disagree 4 – agree 5 – strongly agree
6. I worry that my child is going to have difficulties in childhood because I used substances during pregnancy	1 – strongly disagree 2 – disagree 3 – neither agree nor disagree 4 – agree 5 – strongly agree
7. I worry about how my use of substances in pregnancy harmed my child	1 – strongly disagree 2 – disagree 3 – neither agree nor disagree 4 – agree 5 – strongly agree
8. I think that my child is	1 – strongly disagree

going to have an addiction because I used substances in pregnancy	2 – disagree 3 – neither agree nor disagree 4 – agree 5 – strongly agree
9. My child was not harmed by my substance use in pregnancy	1 – strongly disagree 2 – disagree 3 – neither agree nor disagree 4 – agree 5 – strongly agree
10. I am very lucky to have such a healthy child despite my use of substances in pregnancy	1 – strongly disagree 2 – disagree 3 – neither agree nor disagree 4 – agree 5 – strongly agree
*In what ways do you believe this child has been affected by your drug use during pregnancy?	(open response, with option of “I don’t believe that my child was affected by my use of substances in pregnancy)

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