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Perinatal Sadness among Shuar Women

Support for an Evolutionary Theory of Psychic Pain

Psychiatry faces an internal contradiction in that it regards mild sadness and low mood as normal emotions, yet when these emotions are directed toward a new infant, it regards them as abnormal. We apply parental investment theory, a widely used framework from evolutionary biology, to maternal perinatal emotions, arguing that negative emotions directed toward a new infant could serve an important evolved function. If so, then under some definitions of psychiatric disorder, these emotions are not disorders. We investigate the applicability of parental investment theory to maternal postpartum emotions among Shuar mothers. Shuar mothers' conceptions of perinatal sadness closely match predictions of parental investment theory.

Keywords: [parental investment, postpartum mood, evolutionary psychology, psychopathology, depression]

Are Negative Emotions Normal or Pathological?

Mainstream psychologists and psychiatrists generally favor the view that “normal” psychological states can be objectively defined. Indeed, one popular definition, embodied in the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; American Psychiatric Association 1994), is that *normal* can be defined statistically: whatever most people experience and do is normal (see, e.g., Cohen 1981). Most people experience occasional sadness and low mood in response to negative events (such as the loss of a relationship). Additionally, the severity of these emotions seems proportional to event severity, and most people recover within a “reasonable” time, so these emotions are seen as normal (e.g., Nesse 2000). In contrast, most people do not experience deep and prolonged sadness or depression, and these emotions seem

“disproportional” to event severity, often lasting for months or even years. These emotions are therefore seen as “abnormal.”

Critics of Western conceptions of normal and abnormal psychology (e.g., Foucault 1965; Scheff 1966; Szasz 1960), however, regard these concepts as inherently value-laden social constructions created not to treat brain diseases but, rather, to control undesirable behaviors. Labeling undesirable behaviors and emotions such as aggression and depression abnormal allows them to be “treated,” with powerful drugs if necessary, and allows persons exhibiting them to be committed to institutions.

Wakefield’s widely influential work has provided an elegant definition of abnormal psychology—mental disorder—that neatly resolves the debate. Wakefield (see 1992a, 1992b, 1999) persuasively argues that both physical and mental disorders should be conceptualized as harmful dysfunctions, a two-part definition where the terms *harmful* and *dysfunction* both play distinct and important roles. Wakefield accepts that the brain comprises a suite of distinct parts that evolved by natural selection and thus have adaptive functions. If this is true, then dysfunction, the second part of Wakefield’s disorder concept, can be objectively defined, free from judgments of social value: “*Dysfunction* is a scientific and factual term based in evolutionary biology that refers to the failure of an internal mechanism to perform a natural function for which it was designed” (1992a:374). Yet dysfunctions are not necessarily disorders. A man who has chosen to have a vasectomy has a dysfunctional reproductive system, but one would not say that he is suffering from a disorder. Indeed, this dysfunctioning is exactly what the man desires. Under Wakefield’s definition, only those dysfunctions that are deemed harmful by society are disorders: “*Harmful* is a value term referring to the consequences that occur to the person because of the dysfunction and are deemed negative by sociocultural standards” (1992a:374). In Wakefield’s disorder concept, the social value-laden component of disorder classifications is made explicit and therefore more easily subject to debate and critique.

Thoughts, feelings, and behaviors deemed harmful by society, yet not the product of dysfunctioning mechanisms in the brain, are also not disorders. If aggression is the product of properly functioning, evolved brain mechanisms, it is not a disorder. Sadness and low mood are interesting because, although they can produce outcomes that are harmful to both self and others, it is not clear that they are the product of dysfunctioning brain mechanisms (Allen and Badcock 2003; Nesse 2000). If they are not, then they are not disorders under Wakefield’s definition (but they can still be treated; we briefly return to this issue later). If these emotions are not harmful dysfunctions, then they either (1) have evolved functions, (2) are the by-product of one or more evolved functional systems, or (3) reflect dysfunctions of one or more functional systems that are not judged to be harmful. Most evolutionary theorists have focused on the first possibility, seeking potentially adaptive functions for sadness and low mood—psychic pain—that parallel the adaptive functions of physical pain. Physical pain is not a disorder because it has an evolved function: informing an animal that its tissue is being damaged, providing information on the precise location of the damage, motivating the animal to withdraw from the damage-causing circumstances, and conditioning the animal to avoid similar circumstances in the future. Analogously, if psychic pain has an evolved function similar to that of

physical pain, it should function to inform individuals that life circumstances, such as a relationship failure, are imposing a biological fitness cost, motivate individuals to cease activities that are contributing to the fitness cost, and condition them to avoid similar circumstances in the future (Alexander 1986; Allen and Badcock 2003; Nesse 1991; Nesse and Williams 1995; Thornhill and Thornhill 1989; Tooby and Cosmides 1990a).¹

Although there has been little research on this evolutionary psychic pain hypothesis, several nonrevolutionary studies provide preliminary support. Many studies, for example, show that negative affect is closely associated with negative events (e.g., Nezlek and Plesko 2003 and references therein). There is also clear evidence of a relationship between affect and motivation (e.g., Martin and Tesser 1996). One evolutionary study (Keller and Nesse 2005) found subtypes of low mood that corresponded to predictions of the psychic pain hypothesis: social losses were associated with greater crying and arousal, whereas failures to reach goals were associated with greater fatigue and pessimism. These results suggest that symptoms are a functional response to particular social problems.

In resolving questions about the evolved functions of emotions, anthropology has a key role to play. Hypotheses about evolved psychology are generally hypotheses about human universals (Tooby and Cosmides 1990b). Studies in non-Western cultures are therefore crucial to demonstrating that an emotion or its manifestation is not culturally specific. A requirement of the psychic pain hypothesis is that psychic pain must be found in all societies when appropriate triggering conditions are present, and these triggering events or conditions should be similar across societies. Although numerous anthropologists have challenged Western universalist conceptions of emotions, linking emotional experience much more closely to specific cultural contexts (e.g., Lutz 1988; Rosaldo 1980), there is accumulating evidence that basic emotions like sadness are human universals (e.g., Ekman 1999). It is less apparent whether these emotions are elicited by similar circumstances across cultures (but see Boucher 1983).

The study described in this article was designed to test aspects of the psychic pain hypothesis in a non-Western culture. We first developed the rationale that the sadness that mothers often experience during pregnancy and postpartum could have an evolved function. We present results from interviews of women among the Shuar, a hunter-horticulturalist society in the Amazon lowlands of Ecuador, about their most recent pregnancy and childbirth.

Perinatal Mood as a Test Case of the Psychic Pain Hypothesis

New mothers, especially primiparas, face a wide range of acute stressors. Pregnancy and childbirth bring on dramatic physical and social changes, including changes in weight, sleep patterns, and appetite, and significant changes in mothers' social roles as wives, daughters, friends, and colleagues. Sadness, low mood, and other negative emotions caused by the stresses of a new pregnancy or child are typically seen as normal: "Many new mothers feel sadness, fear, anger, and anxiety after having a baby. This is normal. It does not mean that you are a failure as a woman or mother or that you have a mental illness. Having these feelings means that you are adjusting to the many changes that follow the birth of a child" (American College of Obstetricians and Gynecologists 1999). Negative reactions, however, are not just directed toward

these ubiquitous perinatal stressors. Frequently, they are aimed squarely at the new child. This is especially well documented in the 10–15 percent of mothers suffering postpartum depression (PPD). PPD is a major depressive episode that prominently features symptoms of sadness and low mood (American Psychiatric Association 1994). PPD and its sequelae are almost universally regarded as illnesses. One popular theory of PPD is the diathesis–stress model (O’Hara 1995), an illness model that has been applied to several psychopathologies, including general depression and schizophrenia (see, e.g., Monroe and Simons 1991). Diathesis–stress models propose that psychopathology is produced by the interaction of underlying constitutional predispositions or vulnerabilities (diatheses) with life stressors such as the birth of a new child. The diatheses predisposing to depression are widespread in the population, however (Monroe and Simons 1991), putting much of the explanatory weight on the stressors. Not surprisingly, some of the most potent predictors of PPD are child care stress, low social support, poor marital relationship, and infant colic (other strong predictors include depression during pregnancy and low self-esteem; see Beck 2001).

These stressors and the sad or depressed mood they engender are closely linked with negative feelings toward the new baby. Jennings et al. (1999), for example, found that 41 percent of depressed mothers admitted to thoughts of harming their child, compared with 7 percent of nondepressed mothers.² A meta-analysis of 19 other studies similarly found that PPD has a moderate to large negative impact on mother–infant interactions (Beck 1996).

Because negative maternal emotions toward new infants are common, clearly linked to a stressful event (pregnancy or childbirth), proportional to the severity of the stress caused by the event, and often resolve themselves in weeks or months (e.g., O’Hara 1995), one might expect mainstream psychology and psychiatry to view them as normal. Yet these emotions are regarded either as disorders (as in the case of PPD) or as excellent candidates for a disorder classification. In a recent review of postpartum psychiatric disturbance, a prominent expert on perinatal mood argues that negative attitudes or emotions toward the infant and other problems with mother–infant relationships should be recognized as disorders even while acknowledging that “this process will involve a difficult innovation” (Brockington 2004:304). The common perspective espoused by Brockington is reinforced by the severity of some of these negative maternal attitudes: “The most poignant manifestation is the wish that the baby disappear—be stolen or succumb to cot death. Rejection is accompanied in many cases by pathological anger, with shouting, cursing, or screaming at the infant, accompanied by impulses to strike, shake, or smother the child” (2004:304).

Psychiatry’s classification of maternal aversion, anger, and hatred toward an infant as disorders is vulnerable, however, to the critique of Szasz and others. This classification could be a social strategy for controlling undesirable behaviors—in this case, not loving or caring for an infant in a way that society deems proper. Brockington himself almost admits as much: “If hatred of a rival or political enemy is not an illness, why should a mother’s hatred and rejection of an infant be listed as a disease? But medicine has pragmatic rather than logical boundaries, and psychiatry often challenges the definition of disease” (2004:304). We will briefly argue later that classifying negative perinatal emotions as disorders has some potentially serious negative consequences.

Studies in other cultures suggest that lack of bonding with a new baby might not be atypical. In Schepers-Hughes's (1992) ethnography of a Brazilian shantytown, extremely poor mothers, whose children were often more likely to die than survive, typically did not form close, emotional bonds with their children for months or even years. These mothers believed that not all children who are conceived are meant to live. Mothers might even regard themselves as collaborating with nature, with God, to hasten the death of sickly babies, babies who "wanted" to die, by treating them with benign neglect. Only as a mother gained confidence that her child would survive did she bond with the child.

Parental Investment Theory

Standard evolutionary biological theory suggests that the negative responses toward their children found in Brazilian shantytown mothers and mothers suffering PPD might be the product of an evolved psychology designed to limit the costs of child rearing. In some circumstances, it might be normal or functional to not want a new baby. Reduced care, abandonment, and killing of offspring have been documented in a wide range of species. In many bird species, for example, both pre- and post-hatching abandonment of broods is common (Ackerman et al. 2003; Cezilly 1993; Gendron and Clark 2000). Studies like these provide increasing support for the predictions of an evolutionary biological framework called parental investment theory (Trivers 1972) that outlines when investing in offspring will increase biological fitness and when it will actually decrease fitness.

The ancestors of any extant species must have solved the problems of survival, growth, and development, on the one hand, and reproduction, on the other. Because time, energy, and resources are finite, organisms must optimally allocate these commodities between somatic effort (growth, development, and maintenance of the organism) and reproductive effort (producing offspring who survive to reproductive age or providing benefits to close kin who themselves produce offspring). Reproductive effort, in turn, should be optimally allocated between mating effort (locating and acquiring a mate) and parenting effort (e.g., gestation and raising offspring). Effort allocated to reproduction will decrease an organism's ability to survive, grow, and develop, whereas effort allocated to survival, growth, and development will decrease reproduction. If parental investment can only occur at the expense of somatic or mating effort, then parents need to decide, based on current environmental conditions, whether it is more advantageous to invest limited resources in offspring and other kin, mates, or themselves.

Crucially, if investment in one offspring decreases the investment available to other offspring, parents should optimize investment in current versus future offspring. This could involve reducing or eliminating investment in offspring that are unlikely to survive and reproduce or that impose especially high costs on the mother or her other offspring (Clutton-Brock 1991; Roff 1992; Stearns 1992).

Predictions of Parental Investment Theory Applied to Humans

Mammals are a diverse taxon of animals that are specialized to provide high levels of parental care (via nursing). Because human infants are born with unusually

Table 1 Circumstances When a New Human Offspring Might Lead to a Fitness Loss for the Mother

There is insufficient investment from the father or others to successfully raise the offspring. There are problems with pregnancy, with birth, or with the infant that indicate that this offspring may have low viability, that is, is unlikely to survive to reproductive age. Environmental conditions are poor for raising an offspring (e.g., harsh winter, insufficient resources).
There are large opportunity costs—investment in the offspring precludes investment in other beneficial activities. In this case, investment directed toward the offspring would be more profitably directed toward <ul style="list-style-type: none"> • other offspring or • the mother's own survival, growth, and development and thus her ability to invest in future offspring.

undeveloped brains, human parents must provide exceptionally high levels of investment to offspring, even compared with other mammals (Lancaster 1986). Unlike the case for most mammals, including most primates, a significant fraction of human parental care is provided by fathers and other family members. According to parental investment theory, under some circumstances a pregnancy or new baby would result in a fitness cost. These circumstances are outlined in Table 1.

Paralleling the arguments for other animals, reducing investment in a new infant (including neglect or abandonment) in any of the circumstances in Table 1 could significantly improve a mother's ability to care for other offspring or to ensure her own health and thus her ability to produce future offspring. Negative maternal emotions directed toward pregnancy or a new baby might reflect an evolved psychology designed to reduce investment in offspring under costly conditions.

Unlike most mammals, however, many humans can invest in the offspring, including the father and other family members. Human mothers, therefore, have an alternative to neglecting or abandoning the infant. With healthy infants, or those with only minor health problems, obtaining significantly increased investment from others such as the father would be even more beneficial to fitness than neglect or abandonment because mothers would gain the fitness benefit from a new, viable offspring.

The Perinatal Psychic Pain Hypothesis

Adaptive behaviors, such as investing or disinvesting in offspring, must be produced by evolved psychological mechanisms (Tooby and Cosmides 1990b). It is possible that negative perinatal emotions might be just such mechanisms, with a function analogous to that of physical pain. Physical pain motivates sufferers to identify the source and nature of injury, to withdraw from the cause of the injury, and to learn to avoid similar circumstances in the future.

Analogously, we propose that the costly circumstances in Table 1 should cause the mother to experience perinatal sadness and, more generally, a lack of desire for the child. The mother's sadness, far from being pathological, instead motivates her

to evaluate her decision to get pregnant, decisions made during pregnancy, and any other costly circumstances that might be contributing to her sadness. It motivates her to evaluate her investment in the offspring, either causing her to seek additional social and material resources so that she can “afford” the new baby or causing her to reduce investment in the offspring. Finally, perinatal sadness will have a strong influence on her future reproductive decision making. We term this the perinatal psychic pain hypothesis. If perinatal psychic pain is observed to occur in conditions predicted by parental investment theory, this evolutionary hypothesis would gain support, as would the view that such emotions, although distressing and potentially harmful, should not be classified as disorders.

Study Goals and Population

When circumstances warrant, perinatal psychic pain should be found in all societies. In particular, it should be found in rural communities that share many features with ancestral human populations such as small size, kinship-based social organization, and a subsistence economy with limited access to food. The first aim of the present study was to determine whether perinatal sadness (not necessarily depression) exists among women in such a community. The second aim was to test the key prediction of the perinatal psychic pain hypothesis that perinatal sadness will be closely associated with a lack of desire for the new baby. The final aim was to explore whether indigenous mothers’ explanations for perinatal psychic pain, should it occur, could be reconciled with the perinatal psychic pain hypothesis or whether they could only be understood in terms of indigenous cultural concepts. We did not investigate whether perinatal psychic pain motivated mothers either to seek additional material and social resources or to reduce investment in the new baby (such evidence is available in other populations, however; see Hagen 1999, 2002).

The study was conducted in a village of Shuar hunter-horticulturists located on the western edge of the Ecuadorian Amazon and the lower, eastern slopes of the Andes. Plantains and sweet manioc are the principal dietary staples, supplemented by shotgun and blowgun hunting and fishing. Timber and cattle sales are important sources of cash; cash cropping is of limited but increasing importance. Several decades of contact with Protestant missionaries has precipitated a decline in traditional practices such as polygyny and warfare. All residents regularly spoke Shuar, but most under the age of 60 also knew Spanish. The majority of residents were closely related descendants of two brothers who helped found the village several decades ago.

The village had 306 residents during our study. About half lived in or very near the village center, mostly in wood-plank dwellings. The rest lived within a several kilometer radius. In this small, kin-based community, the average coefficient of relatedness between residents was 0.045, relatively high (for comparison, the coefficient of relatedness between second cousins—individuals with different grandparents but a shared set of great-grandparents—is 0.031). On average, each resident was related by blood to nearly half the village (mean number of consanguineal kin = 147, $SD = 74.7$).

A detailed study of child anthropometry in this village (Hagen et al. 2006) showed that the skeletal growth, weight, levels of body fat, and muscle development of

children in the largest families were about 1.2–1.4 standard deviations less than those of children in the smallest families. Thus, newly pregnant village women faced the likelihood that a new child would have a measurably negative effect on the nutrition and growth of any other children.

Method

Participants and Procedures

Recruiting an adequate sample of mothers with a new infant would have required either canvassing dozens of remote, dispersed, and difficult-to-access villages or spending years in the field. We therefore opted for a retrospective study in a single large village. Twenty-one of 45 village mothers consented to interviews on the pregnancy and birth of their most recent child. In some cases, the mother's youngest child was an infant, and in others, a teenager. Mothers were informed that the questions would explore their feelings and experiences of pregnancy and childbirth and that they could refuse to answer any or all questions. In most cases, we also needed to obtain permission from the women's husbands to interview them. The village president also approved the study. The sample was biased toward mothers who lived near the village center and with whom we had particularly good relations during our fieldwork. We arranged to interview mothers in private in their own homes. Interviews were loosely structured, with a small list of questions that mothers were free to expand on, or deviate from, if they chose. Interviews were conducted in Spanish and lasted between 30 minutes and three hours.

Measures

To determine whether Shuar women in our population ever experienced perinatal psychic pain and to devise a question or set of questions to measure it in our population, we first had extensive discussions with a small number of close informants. These discussions revealed that “being sad” during pregnancy or postpartum was a well-recognized condition. This sadness was not seen as transient, as in postpartum blues, but as a significant, prolonged state that might last for weeks or months. Villagers often knew which women were sad during these periods. Although this sadness probably overlapped significantly with perinatal depression, we did not have a depression instrument with a Spanish translation that we considered appropriate for a retrospective study. Pregnancy and postpartum states of sadness were therefore measured by straightforwardly asked all participating mothers if they were sad (*triste*) when they found out they were pregnant with their latest child and if they were sad after they gave birth. We recorded yes or no responses for each question.

To avoid overfitting our small data set, we could model our response variables—pregnancy and postpartum sadness—as functions of only a single predictor variable. We decided that the most theoretically relevant predictor variable was lack of desire for the child, which we measured by asking each mother, “Did you want the child?” Again, we recorded a yes or no response.

Also central to the perinatal psychic pain hypothesis are the predictions that lack of investment, low infant viability, lack of resources or poor environment, and opportunity costs should be strongly correlated with perinatal psychic pain (see

Table 1). Although we could have simply measured each of these variables, including them in our model was untenable given our small N . Further, it might have imposed our scientific and cultural biases on the conceptualization of perinatal sadness in this community while failing to explore indigenous conceptualizations. Instead, we asked mothers who were sad or who did not want their child to explain why, allowing a free response. All mothers provided a brief one- or two-sentence response, which we immediately wrote down. After mothers answered, we prompted them to provide more detail to ensure that we had correctly interpreted their answers. We took detailed notes on their responses. After the interview was complete, we summarized the mother's brief response in English, using details from her extended story to guide our summary if necessary.

When we prompted mothers to provide more detail about the reasons they gave for their sadness or lack of desire for the child, they often launched into long, meticulous accounts of their pregnancy and postpartum experiences. To maintain mothers' privacy we cannot describe these stories in any detail, but they almost invariably supported the direct and plain interpretation of their initial responses. To give a fictional example, a mother who reported that she was sad because her husband was gone during the pregnancy and she did not have enough food would then tell an extended and captivating story of her husband's failed business venture in a distant city. Mothers' lengthy responses to our questions assured us that questions about sadness during the pregnancy and postpartum were well understood and meaningful to them.

Results

Descriptive statistics of the variables included in the study are in Table 2. As with many rural populations, ages, particularly those of older adults, are often approximations. Given the small sample size, we adopted an $\alpha = 0.10$. Negative perinatal emotions were common in this population. Sixty-two percent of mothers reported pregnancy sadness, and 33 percent reported postpartum sadness.

Tables 3, 4, and 5 list all the reasons given by mothers for their sadness during pregnancy, for their sadness postpartum, and for not wanting their youngest child, respectively. These reasons were provided as "free" responses; that is, they were not responses to specific questions about, for example, social support or health. (One or two mothers did not provide reasons for pregnancy sadness or lack of desire for the

Table 2 Descriptive Statistics of Variables Included in the Study

Variable	N	Range	Mean	S.D.	Yes	No
Continuous Variables						
Maternal age (years)	21	18–48	28.7	7.6		
Youngest child's age (years)	21	0.15–18	3.35	4.27		
Dichotomous Variables						
Pregnancy sadness	21				13	8
Postpartum sadness	21				7	14
Child wanted	20				7	13

Table 3 Reasons Given by 11 of the 13 Mothers Who Reported Being Sad during Their Pregnancies

Reasons Given for Sadness during Pregnancy
Lack of Social Support
1. problems with relationship
2. husband left
3. husband left
4. poor relationship; bad timing
Poor Maternal Health
5. poor health prior to and during pregnancy
6. almost died during first pregnancy
7. Caesarean [that went badly during previous pregnancy] and didn't want more children
8. because we suffer when we're pregnant
Opportunity Costs
9. didn't want child because got pregnant too soon (short interbirth interval)
10. didn't want child because got pregnant too soon (short interbirth interval)
11. didn't want another child

Note. Reasons are organized into categories derived from parental investment theory (see Table 1).

child.) We organized these responses under categories derived from parental investment theory. (“Wrong sex” is an exception. Although there is a parental investment theory of sex bias [Trivers and Willard 1973], we did not collect the kinds of data that could test it. There are also other theories for sex bias [James 1987; Sieff 1990].)

Each line is the response of a single mother. Some mothers provided more than one reason; in these cases, both reasons are given, but the response is categorized

Table 4 Reasons Given by the Seven Mothers Who Reported Being Sad Postpartum

Reasons Given for Sadness Postpartum
Lack of Social Support
1. problems with relationship, worried about impact on other children
2. husband hadn't returned [from long trip]
3. husband left
4. father of child had left
Lack of Resources
5. child wouldn't have clothes or other things
Wrong Sex
6. Wrong sex
Infant Health Problems
7. Newborn had severe health problem

Note. Reasons are organized into categories derived from parental investment theory (see Table 1).

Table 5 Reasons Given by 12 of the 13 Mothers Who Answered No to the Question, "Did You Want Your Youngest Child?"

Reasons Given for Not Wanting Youngest Child
Lack of Resources
1. lack of money
2. too expensive
3. couldn't afford it, couldn't manage it
4. hard and expensive to have children
5. husband couldn't maintain another child
Lack of Social Support
6. bad relationship
7. husband left
Opportunity Costs
8. had kids (i.e., didn't want another)
9. got pregnant too soon (short interbirth interval)
10. got pregnant too soon (short interbirth interval)
Wrong Sex
11. Wanted a boy
Maternal Health Etc.
12. Fear of pregnancy; expensive; only wanted one child

Note. Reasons are organized into categories derived from parental investment theory (see Table 1). (One mother did not provide a reason; the reasons given by mother 12 included three categories of responses.)

according to the first reason. The response numbers do not represent participant ID codes. The mother who gave the first response in Table 4, for example, is not the same one who gave the first response in Table 5. With the exception of "wrong sex," each reason could easily be placed in one of several categories derived from the perinatal psychic pain hypothesis.

As predicted, there is a significant association between desire for the child and pregnancy sadness ($p = .052$, Fisher's exact test, one-tailed). Seventy-seven percent of mothers who did not want the child reported pregnancy sadness, whereas only 29 percent of mothers who wanted the child reported pregnancy sadness (see Figure 1).

Contrary to predictions, there is no significant association between desire for the child and postpartum sadness ($p = .34$, Fisher's exact test, one-tailed). The most dramatic change occurred in mothers who did not want the child: most were sad during the pregnancy but were not sad postpartum (see Figure 2).

Discussion

Consistent with the requirement that perinatal psychic pain be found in communities sharing important features with ancestral human communities, Shuar mothers did experience negative perinatal emotions, at relatively high rates (62 percent during pregnancy and 33 percent postpartum). As predicted, lack of desire for a new child is significantly associated with pregnancy sadness. The direction of causation could

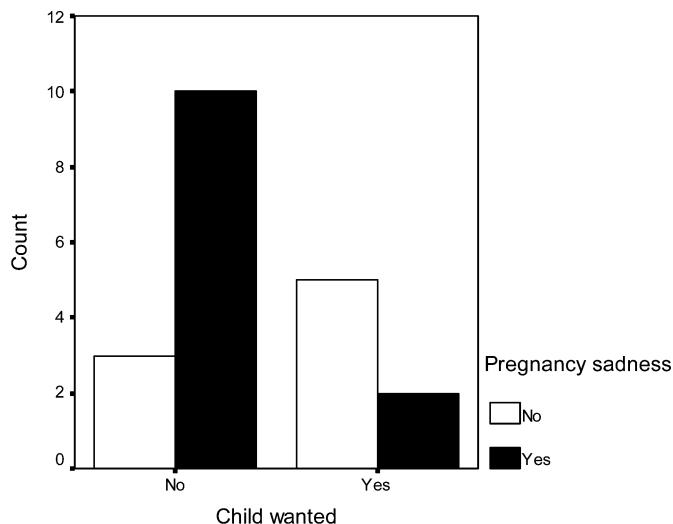


Figure 1 Association of desire for the child with pregnancy sadness.

not be determined. Most of the reasons given by mothers for sadness during pregnancy, for sadness postpartum, and for not wanting a new child (see Tables 3–5) are consistent with predictions of the perinatal psychic pain hypothesis. Almost all reasons could be interpreted as expressing lack of social support or resources, poor maternal or infant health, or opportunity costs. These results support the view that perinatal sadness might have an evolved function.

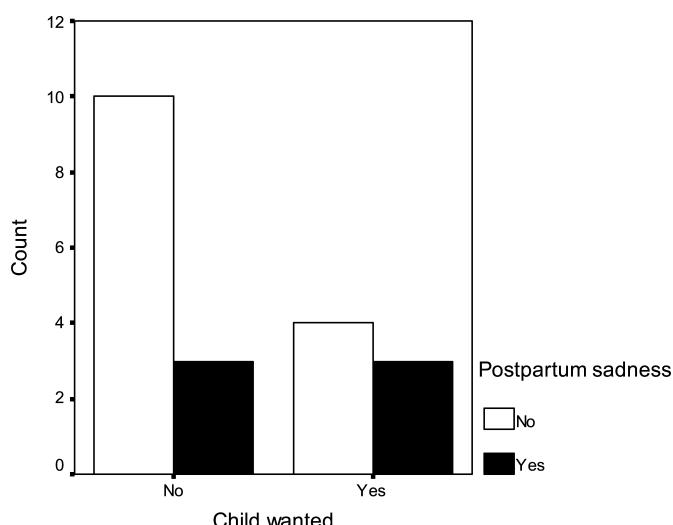


Figure 2 Association of desire for the child with postpartum sadness.

Contrary to our predictions, lack of desire for the child is not associated with postpartum sadness. Perhaps mothers interpreted our question about wanting the child to refer to the discovery that they were pregnant and not to the birth of the child (we did not ask this question separately for pregnancy and postpartum). Or it might have been that mothers who were sad during the pregnancy were motivated by that sadness to take actions and make decisions that allowed them to “afford” a new child by the time it was born, thus abating their sadness. As we noted above, most mothers who did not want the child were sad, but only during pregnancy; by the postpartum period their sadness was gone. These conjectures will have to be tested in future studies.

One of the more provocative and influential cross-cultural theories of perinatal mood has been advanced by Stern and Kruckman (1983). They point out that, although common in the West, PPD seemed to be fairly rare in societies with elaborate postpartum rituals. These rituals involve the structuring of a distinct postpartum period, with protective measures reflecting the presumed vulnerability of the new mother. Social seclusion, mandated rest, assistance in tasks from relatives or a mid-wife, and social recognition through rituals, gifts, and the like of the new social status of the mother all serve to protect and support her during a culturally recognized period of vulnerability. Similarly, Harkness (1987) has argued that culture is a powerful mediator of PPD. She found little evidence of PPD among the Kipsigis, whose cultural traditions place other women as the primary sources of social support for the mother while distancing the father. Within this framework, Harkness found that mothers received adequate emotional and instrumental support, which probably buffered them from PPD.

Under the perinatal psychic pain hypothesis, lack of social support should be an important cause of sadness and low mood. Consequently, postpartum rituals and cultural traditions that ensure that social support is provisioned should help prevent perinatal psychic pain. Our interviews with Shuar mothers revealed that there were few, if any, postpartum rituals in this village, and the cultural structuring of the postpartum period did not ensure that mothers received adequate social support from either other women, their husbands, or their families. Stern and Kruckman’s and Harkness’s perspectives dovetail nicely with the perinatal psychic pain hypothesis; together, these might explain why the rate of perinatal sadness was high in this population.

Our results are also quite similar to those found for PPD in Western, urban populations. Hagen’s (1999) review of the literature concludes that PPD closely conforms to the predictions of the perinatal psychic pain hypothesis. PPD is caused, in part, by perceptions of low social support. It is associated with (and, in part, perhaps caused by) poor infant health, lack of resources, and opportunity costs. Sad or depressed mood and loss of interest are important symptoms of PPD, and these symptoms are frequently directed toward the new baby. Mothers with PPD significantly reduce their investment in the new baby. And improved circumstances, such as increased social support, are associated with PPD remission.

Many studies of PPD measure it on a continuum using self-report measures; these studies thus include postpartum sadness in the spectrum of PPD. Other studies divide mothers into depressed and nondepressed groups based on a clinical diagnosis; these studies would exclude many cases of postpartum sadness as cases of PPD. A

meta-analysis of 59 PPD studies of both types (O'Hara and Swain 1996) includes clinical diagnosis as a variable characterizing each study. It found that, across studies, this variable has no impact on the findings for PPD—studies measuring PPD on a continuum using self-report identified the same predictors of PPD as did those using clinical diagnosis. This suggests that postpartum sadness (as we have defined it here) and PPD might overlap substantially, hinting at universal psychological processes across the range of postpartum low mood, justifying our comparison of postpartum sadness with PPD, and challenging the mainstream view that strongly negative maternal postpartum emotions are qualitatively different from milder postpartum negative emotions.

The results of the current study must be interpreted with caution. The many reasons mothers gave for being sad or not wanting the new child might have different interpretations than the ones we assigned. For example, we interpreted not wanting another child as concern about opportunity costs (i.e., the negative impact this would have on older children or on mothers' other fitness-increasing activities). Although many mothers explicitly voiced such concerns, this interpretation could be wrong for mothers who did not. Similarly, the statement "Because we suffer when we're pregnant" may not be related to maternal health, as we assumed. All reasons given by mothers might also be consistent with other theories of perinatal mood, such as the diathesis-stress model (e.g., O'Hara 1995). Our sample size was also small.

Nonetheless, we were surprised that most statements were so easily interpreted in terms of parental investment theory; few, if any, reasons were obscure or reflected clearly culture-bound concepts, and virtually all followed in a commonsense fashion from mothers' accounts of their perinatal experiences. This contrasts with the case for U.S. mothers. In addition to providing reasons for their emotional distress that closely parallel those of Shuar mothers, U.S. mothers often also attribute it to hormones or chemical imbalances, reasons that are very culture bound.³

Perhaps if we had interviewed mothers in the Shuar language, more culture-bound concepts would have emerged. Yet, over many years of fieldwork by the second author, villagers had become accustomed to answering detailed questions in Spanish about particulars of Shuar culture. Further, the Shuar have a strong, frequently expressed ethic of truth telling; informants would usually refuse to speculate about something if they did not know the facts for fear of misspeaking. Finally, we never discussed the perinatal psychic pain hypothesis with anyone in the community, so we find it unlikely that mothers were telling us what we wanted to hear. Our clear impression during the interviews was that mothers readily recalled the events and emotions surrounding their pregnancies and were able to provide many details. For these reasons, we trust the mothers' accounts of their own experiences. The study was retrospective, however, another limitation suggesting a cautious interpretation of its results. Mothers were asked to recall emotions about experiences that had occurred, on average, three to four years in the past.

Improved access to abortion and birth control could potentially reduce the high prevalence of maternal pregnancy sadness among village women. During our interviews, it became apparent that, although some mothers knew how to get safe abortions, many did not. Often mothers would describe dubious abortion procedures they had tried (e.g., riding a horse). Many mothers also disapproved of abortion or had husbands who disapproved. Mothers were acutely aware of the costs that a

new baby could impose on older children and how it could hinder their ability to improve their families' lives. Our interviews revealed that an unwanted pregnancy caused mothers deep concern about older children and their own futures. A similar phenomenon was found in U.S. mothers: for most (but not all) mothers with unwanted or unplanned pregnancies, increasing perceived social costs of abortion were associated with increasing levels of PPD symptoms (Hagen 2002).

Conclusion

The perinatal psychic pain hypothesis derived from parental investment theory predicts that (1) pregnancies and newborns whose fitness costs outweigh their benefits will elicit perinatal sadness; and (2) this sadness will motivate mothers to take actions that, at least in ancestral environments, would have increased biological fitness, such as arranging for increased social support or reducing investment in offspring. We found support for prediction 1 in a population of hunter-horticulturists, where increasing family size has been documented to have a significant negative impact on child nutrition and growth. The results of this study do not address prediction 2. Evidence for prediction 2 in urban populations can be found in work by Hagen (1999, 2002; see also Hagen 2003, n.d.).

Scheper-Hughes's ethnography of Brazilian shantytown mothers is framed as a critique of universalist, Western biological conceptions of maternal "bonding." Stern and Kruckman and Harkness also critique "biological" models that see PPD as an endocrine problem. But their findings support the modern evolutionary biological view developed here: mothers are not predicted to bond with infants who are unlikely to survive or who are too "costly" to the mother and her other offspring. Additionally, this view predicts that postpartum rituals and cultural traditions that ensure that mothers receive adequate social support will be effective in reducing or eliminating PPD.

Were the perinatal psychic pain hypothesis to be upheld, it would have important implications for clinical psychology and psychiatry. Most significantly, it would suggest new treatment options. The association of PPD with lack of social support has been replicated in over 60 studies (Beck 2001; O'Hara and Swain 1996), yet, under the mainstream illness model, the commonsense idea that many PPD sufferers really need more social support is rarely considered. Proof of the psychic pain hypothesis would also undermine the ethical basis for treating these functional but socially undesirable emotions as a medical (as opposed to social or personal) problem because, using the "harmful dysfunction" definition, negative emotions toward a pregnancy or infant would no longer be considered an illness. Rejecting the harmful dysfunction concept in favor of other illness concepts (e.g., Lilienfeld and Marino 1995), however, could allow these emotions to be classified as disorders.

In either case, the treatment of perinatal psychic pain with current or future psychopharmacological agents has potentially serious pitfalls. Intense negative emotions toward a pregnancy could motivate a mother to take a range of corrective actions, including renegotiating her marriage, arranging for increased social support, seeking family therapy, reordering life priorities, or having an abortion. These negative emotions could also provide important feedback to the mother about her circumstances and decisions. Blunting or abolishing these emotions might inhibit a mother's

motivation to act in her own interest and the interests of her older children, and it could interfere with her ability to learn from experience; yet it could also prevent her from committing crimes such as child neglect, child abuse, or infanticide.

Treating psychic pain might require considerations that are similar to those for treating physical pain. Physical pain is not a disorder. The treatment of physical pain, like that from a broken arm, is therefore contingent on treatment of the underlying disorder, if possible (in this case, the broken arm itself). The treatment of perinatal psychic pain might hypothetically be contingent on assessments of, and possible interventions to improve, mothers' social relationships, access to resources, and so forth. Medicine, we believe, must confront these issues sooner rather than later.

Notes

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1. Technically, "biological fitness cost" refers to what would have been a fitness cost during human evolutionary history.

2. This study involved 100 clinically depressed mothers with a child under three years of age and a control group of 46 nondepressed mothers.

3. This is a personal observation of Hagen, who has interviewed many U.S. mothers in the postpartum period.

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