Doctoral Dissertation Improvement Grant: Fathers or Uncles? Tourism and Men's Decision-Making among the Matrilineal Na

The ethnic Na are China's last extant matrilineal population. As such, they are the focus of much attention, among both scholars and, recently, tourists. Observers are especially intrigued by reports of an unusual coupling system, *sese*, in which men spend nights calling to women through their bedroom windows, coaxing women to concede to a single evening of romantic pleasure. Women are said to expect nothing further from their lovers, releasing them from providing support for any impending children. Accounts portraying the Na in this light have been criticized for radicalizing the Na as an outlier among human populations, for internal inconsistencies in ethnographic reports, and for a general lack of evidence substantiating these claims (e.g., Harrell 2002; McKhann 2003). Indeed, pilot work among the Na in 2006 revealed that many relationships are far more stable than previously reported and that men often provide substantial assistance to their lovers' households (Mattison, pilot study; see also Walsh 2001). To provide a more balanced view of the Na's social structure, this proposed research project intends to document the variation in coupling patterns among the Na, and specifically the extent to which men are expected to and do provide assistance to their lovers' households. In particular, this dissertation research will examine whether the emergence of a market economy, interacting with individual characteristics, affects whether and how men support their children. Several hypotheses derived from Human Behavioral Ecology (HBE) will be tested, using diverse methods including household censuses, ethnographic surveys and behavioral observation, to determine how individual factors interact with the local context to influence parenting and kinship among the matrilineal Na of Southwest China.

Intellectual Merit: This project synthesizes hypotheses drawn from diverse topic areas in evolutionary anthropology to determine factors affecting kinship and paternal care. This would represent one of the first analyses of how individual-level attributes affect kinship change in a contemporary population using HBE theory. Additionally, it would enrich our knowledge of cross-cultural variation in paternal behavior, while providing insights into the roots of this variation. This research would further enhance theoretical understanding by providing a basis for more complex modeling of how individuals come to agreements over reproduction. Moreover, this investigation extends HBE theoretical applications by examining behavior in a contemporary, non-hunter-gatherer population. The findings from this research would be relevant to diverse fields, including anthropological demography, gender studies, and studies of minority populations. Finally, through collaboration with local Chinese scholars, this dissertation would build new opportunities for inter-disciplinary research and provide new avenues for dissemination of results.

Broader Impacts: Debates over the nature of family composition could be informed by the results of this study. Understanding how social and economic factors influence family formation and parenting practices is critical for policy-makers interested in increasing individual welfare through changes in family structure. This dissertation would increase our knowledge of how changing opportunity structures affect the costs and benefits of raising children, and would be pertinent to many studies of child-rearing in developing countries. This project has special relevance to the people of the Na, who, in the face of a rapidly changing economy, consciously strive to educate themselves in the path to their success. Finally, this research supplements previous ethnographies of the Na by making use of observational and quantitative methods. These methods may provide less biased views on Na parenting and family composition, helping to sort out a contested ethnic identity.

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Problem Statement: What factors are responsible for low paternal involvement among the Matrilineal Na[1]? Will entrance into the market economy increase male support of offspring? Will this result in a shift away from the matrilineal kinship system?

Men among the matrilineal Na (a.k.a. Mosuo, Yongning Naxi) of Southwest China are famously depicted as taking little or no part in raising their biological offspring. Ethnographers of the Na believe that both men and women are content to engage in sexual relations without the promise of support by fathers in raising the children that result (Weng 1993; Shih 1993, 2000; Cai 2001). This intriguing system has been tied to matrilineal ideology, but there has been no systematic analysis of factors affecting individual decisions by men over the extent to which they engage in paternal care. Even though it has been claimed that the Na have neither fathers nor husbands, those making such claims acknowledge that some men do occasionally support their lovers' households (e.g., Cai 2001). The aims of this research project are to examine the variation in men's paternal behavior, and to determine how individual factors interact with local conditions to account for such variation. This project, by analyzing contemporary change in one population, could explain how changes at the level of the individual lead to larger changes at the level of society in kinship practices and family composition.

Whereas previous reports indicated little variation in Na paternal behavior, current evidence reveals that variation in paternal care is considerable. Some men are known to deviate substantially from the stated norms of Na society by devoting substantial sums of money to their children's education while others preferentially allocate time and energy to their sisters' children. A recent surge in ethnic tourism may be partially responsible for such differences. Control over increasing market resources by men and changing opportunity structures for Na children may promote increased paternal investment in children's education. As men increase investment in biological offspring, they may require, or women may offer, promises of paternity certainty. This could result in a shift away from a matrilineal household structure as reliance on male support of offspring increases. Access to resources, in addition to other individual attributes, may be critical to understanding men's decisions of how much to invest in their children. This, in turn, could explain apparent trends in kinship change away from a matrilineal ideal.

Hypotheses: This research project proposes to examine variation in Na paternal behavior using hypotheses derived from human behavioral ecology (HBE). HBE is a hypothesis-driven field, which focuses on explaining variation in behaviors as adaptive responses to contemporary environmental variation (Smith 2000). HBE analyzes social and ecological influences on human decision-making, expecting individuals to make decisions that enhance their survival, reproduction, and well-being in local social and natural environments (Winterhalder & Smith 2000). Its primary strength lies in its ability to make testable predictions based on local, contemporary cultural and ecological contexts. This research will synthesize seven HBE hypotheses in an attempt to understand influences on male parenting strategies among the Na. In turn, I hope to inform HBE theory by specifying how local constraints (e.g., social institutions) affect the general application of HBE hypotheses.

H1: Male Wealth is Associated with Number of Lovers and Children
Men in some economies lack the resources to make significant contributions to their children's upbringing due to their inability to generate surplus income (Holden and Mace 2003; Quinlan

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[1] The ethnic Na reckon descent both patrilineally and matrilineally in different areas. This dissertation research will focus on matrilineal Na, and, unless otherwise stated, "Na" in this proposal refers specifically to matrilineal groups.

2006). When choosing how to allocate their few resources, they may feel that acquiring new lovers, e.g., by gift-giving, is more rewarding than allocating similar resources to children. Additionally, women may not feel that they need or can rely on men's support under these conditions, and may rely on matrilineal kin instead to help in rearing offspring (Stack 1974; Geronimus 1992; Leonetti *et al*. 2004). As men acquire access to resources that are important to women, women may increasingly rely on male support for successful reproduction (Borgerhoff Mulder 1992). Increasing wealth should allow men to support more wives and children, all else equal. This hypothesis predicts that men with many resources have more lovers and children than men with fewer resources.

H2: Male Absences Lead to Decreases in Male Support of Biological Offspring
Certain aspects of the socio-cultural environment may be associated with subsistence conditions that further prevent men from being able to assist in child-rearing. In many matrilineal societies, men spend significant amounts of time away from home. For example, warfare is thought to be associated with matriliny via men's absence from their children's households (Holden *et al*. 2003). Men's absence prevents them from engaging in many types of childcare, and women may learn to rely on kin and friendship networks to overcome this difficulty. The effects of such protracted absences may be accentuated when absences occur in conjunction with other obstacles to acquiring resources.

H3: Low Paternity Certainty is Associated with Low Paternal Investment in Offspring
Another link through which matriliny may be associated with low paternal investment in offspring is paternity certainty (Caldwell 1986; Holden and Mace 2003; Anderson *et al*. 2006). The Na engage in a non-contractual visiting system *sese*, in which men and women are involved with multiple concurrent partners. By allowing women multiple concurrent partners, *sese* may confuse paternity to the extent that men are unwilling to invest in potentially unrelated children. Furthermore, men have reduced opportunity to monitor their partners' sexual behavior when away. Inability to acquire resources to provision children would leave men little bargaining power with women over exclusive conjugal rights (Borgia 1979). Increased provisioning of biological offspring could become more likely if men's bargaining power and paternity certainty were increased via accumulation of wealth in a market economy, all else equal.

H4: The Market Economy Drives Increases in Embodied Capital in Children
Men may choose to increase care in their children due to increasing costs of child-rearing in a market economy. The market economy creates an environment in which rewards are greatest for individuals with the highest "embodied capital" (Kaplan 1996). Embodied capital (EC) may be thought of as any of the products of investment in children, including skills, knowledge, strength and social status (Kaplan 1996; Kaplan *et al*. 2000; Kaplan and Lancaster 2003). The costs of embodying capital in children, including delayed reproduction and low productivity, are high early in life. These costs are compensated in later life through increased competitive ability in market economies (Kaplan 1996; Kaplan *et al*. 2000). Education is a form of EC that increases children's ability to succeed in a market economy (Kaplan 1996). This creates the need for cash to support schooling (Walsh 2001; Blumenfeld 2003), which may motivate men to devote resources to, and invest directly in, their children's education along with other forms of skills acquisition. Furthermore, if resources are held constant, increases in EC diminishes parents'

ability to invest in large numbers of offspring (Kaplan 1996, 2000). Therefore, this hypothesis also predicts decreases in fertility, all else equal, with increases in EC.

H5: Increased Paternal Investment Undermines Matrilineal Kinship
Growing economic disparity may create preferences for allies, including lovers, with stable futures; women may choose to form stable partnerships with men who are willing to support their children's education. If accumulated wealth and changing opportunity structures motivate men to devote resources to their children's education, they may try to ensure their paternity by limiting their lovers' sexual freedom (Caldwell 1986; Marlowe 2000), thereby limiting the freedom associated with the visiting system and potentially shifting the kinship system away from matrilineal.

H6: Increased Access to Resources Reinforces Matrilineal Kinship
In general, HBE predicts that individuals receive the highest benefits from investing in the most closely related kin (Irons 1979). This concept gives rise to many of the preceding hypotheses: because a given male is twice as related to his own children as he is to his nieces and nephews, he is predicted to shift investments to biological offspring when conditions allow (Holden *et al*. 2003). Inability to control where his resources are directed could compromise efforts to assist particular offspring, however. If a woman's offspring have multiple fathers, as is often the case among the Na, resources intended for a man's biological offspring could be easily directed by the woman to an unrelated child. In such instances, it could benefit a man to continue assisting his matrilineal household, reinforcing the bonds of matrilineal kinship. Moreover, if cultural definitions of relatedness override biological definitions, matrilineal kinship would not be expected to suffer due to changes in the economy and male resource control.

H7: Increased Exposure to Mainstream Chinese Ideals Undermines Matrilineal Kinship
Pressure to embrace cultural values of the Han (majority) Chinese may influence paternal provisioning patterns. Television brings Han programming to many Na households and educational materials associated with compulsory education may influence Na beliefs and behaviors (Walsh 2001; Blumenfeld 2003). This hypothesis predicts that increased exposure to Han acculturating influences will promote cultural change towards a bilateral or patrilineal ideal.

Literature Review and Significance: Cross-culturally, there is extensive variability in the extent to which fathers assist in raising offspring. While mothers are important providers of childcare in all societies, who provides assistance to mothers varies according to the local socio-ecological environment (reviewed by Sear and Mace 2007). The maternal grandmother often offers significant assistance in raising her grandchildren (e.g., Hawkes *et al*. 1998; Sear *et al*. 2000; Lahdenpera *et al*. 2004; Leonetti *et al*. 2005; Gibson & Mace 2005), and this effect is present among most matrilineal societies. Direct parental care by fathers is apparent in many societies (e.g., Hewlett 1991) and fathers often provide indirect care such as food- and resource-provisioning (e.g., Anderson *et al*. 1999; Kaplan *et al*. 2000; Leonetti *et al*. 2004; Kaplan *et al*. 2007). Complementarity between the sexes (i.e., the extent to which each sex takes on complementary roles in raising children) may be an important determinant of how much each sex is willing to provide their offspring, where increases in complementarity make the sexes more reliant on each other for support (Kaplan and Lancaster 2003, but see Bird 1999). This research

would contribute to our existing knowledge of who assists in raising children by disentangling what factors affect when men invest in their families.

Environmental changes that cause increased payoffs in parental care may help to incite men to invest in their offspring. The importance of parental care overall depends on the opportunity structure of the environment in which a child is born. Life-history theory uses evolutionary logic to explain the timing of critical events during an individual's life and posits that the trade-off between quality and quantity of offspring is dependent on extrinsic risk in the environment (Hill 1993; Voland 1998; Mace 2000). With low extrinsic mortality and high future payoffs to current investments in embodied capital, parents should invest more in the quality of each offspring, with a reduction in the overall number of offspring, all else equal (Kaplan 1996; Kaplan *et al*. 2000). A number of studies have found results consistent with these predictions. Borgerhoff Mulder (2000) found that Kipsigis women achieved the highest life-time reproductive success if they had an intermediate number of children. Mace (1998), using a dynamic mathematical model, showed that increasing costs of children explained fertility reduction among Gabbra Pastoralists. Evidence for this hypothesis may also be garnered from studies of child productivity that show decreased productivity in environments favoring high embodied capital (Mattison & Neill, 2007). For example, Blurton Jones (1993) compared !Kung and Hadza foragers and found that high fertility among the Hadza could be explained by lower need for parental care of Hadza children. My research would add to this literature by examining paternal investment in the context of environmental change in opportunity structure for Na children. This research would further add to the literature on anthropological demography by examining how kinship, courtship and local economics interact to affect parenting and fertility. This could complement work by authors including Shih and Jenike (2002), who have linked the Na visiting system with low fertility. It would also supplement recent attempts by human behavioral ecologists to explain the demographic transition in evolutionary terms (e.g., Kaplan 1996; Mace 1998; Borgerhoff Mulder 2000) by analyzing whether increasing costs of child-rearing affects paternal investment and fertility in a new setting[2].

Biparental care is most likely to evolve when the benefits of such care are very high or the costs are very low (Maynard Smith 1977; Borgerhoff Mulder 1992). Where fathers are called upon to assist with their children's upbringing, they are likely to require paternity certainty to avoid squandering investment on unrelated children (Borgerhoff Mulder 1992; Anderson *et al*. 2006). Paternity confidence, the degree to which men are certain of their paternity, is associated with increased paternal care cross-culturally (Hartung 1985). Perceived resemblance to offspring is one way by which men may assess paternity, and has been shown to increase paternal investment (e.g., Apicella and Marlowe 2004). Mathematical models do not always implicate lower paternal involvement in raising offspring as paternity certainty decreases (e.g., Maynard Smith 1977). However, a recent study by Anderson *et al*. (2006) showed that decreases in paternity confidence increased the probability that a fetus was aborted or miscarried among Albuquerque residents. This research would be an important addition to the sparse empirical literature on how paternity confidence affects parenting in contemporary populations.

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[2] The one-child policy restricts fertility in many Chinese families to only one birth; however, minority Chinese are given more lenient quotas under this policy. Na (officially Naxi in Yunnan) are allowed up to three births per woman in a household; some women have even more children to compensate if their sisters have fewer than three. Many households average only two, indicating that fertility is still subject to the desires of individuals, not completely controlled by the government.

Because fathers benefit from high levels of paternity certainty, they may be motivated to restrict their lovers' activities to prevent cuckoldry (e.g., Caldwell 1986). Patrilineal or bilateral household structure would make those restrictions easier to enforce by sequestering women in households away from relatives (*ibid.*). Indeed, cross-culturally, matrilineal societies are associated with low paternity certainty (Holden *et al.* 2003) and low paternal investment in offspring (Stack 1974; Geronimus 1992; Leonetti *et al.* 2004). Mathematical models show that matriliny is likely when the benefits to parents and grandparents of investing in daughters outweigh the costs of non-paternity in sons' offspring (Holden *et al.* 2003). This is especially likely when men are not able to defend the resources necessary for reproduction (Hartung 1976, 1982, 1985; Borgerhoff Mulder 1992; Holden *et al.* 2003). Phylogenetic analyses of cultural evolution have shown that the introduction of livestock is causally linked to the disappearance of matriliny in the so-called matrilineal belt of Africa (Holden and Mace 2003). While matriliny and kinship systems have been catalogued and described by numerous scholars (reviews in Fox 1983; Harrell 1997), fewer attempts have been made to understand what lies at the root of matrilineal organization and what ecological and societal factors might induce kinship-system change (e.g., Holden and Mace 2003; Holden *et al.* 2003). Early analyses of matrilineal kinship contributed to our knowledge of what factors might be associated with matriliny (e.g., Aberle 1961) without explaining why it exists. Other accounts that have tried to explain the evolution of matriliny have done so using historic or phylogenetic approaches (e.g. Hartung 1976, 1982; Smuts 1994; Holden and Mace 2003). This study would be the first to employ human behavioral ecological theory to predict ongoing kinship change in an extant population.

Research Site: The ethnic Na comprise roughly 40,000 agropastoralists straddling the border of Yunnan and Sichuan Provinces in Southwest China (Walsh 2005). Traditionally, the Na practice subsistence agriculture as well as small-scale animal husbandry. The matrilineal Na have received much attention due to their unique position as China's last living matrilineal society and because they practice an unusual pairing system, *sese*. Typically, *sese* involves a man visiting his lover in her home at night for sexual relations and returning secretly to his natal household in the morning (Cai 2001). In contrast to "traditional" marriage systems, *sese* supposedly involves no explicit contract between lovers; men are not required to support their children, parents have no say in who visits whom, and relations are terminated easily without repercussions to either party (Shih 2000; Cai 2001). Relationships may last from one night to several years and multiple, concurrent relationships are permitted (*ibid.*).

Ethnic tourism came to the Na in the mid-1980s and became a major source of income for Na living in tourist areas in the mid-1990s (Walsh 2001, 2005). The heavily touristed region near Lugu Lake has been most affected, and Na living in this area have capitalized on the tourism industry. Shops, karaoke bars, and restaurants have sprung up (*ibid.*) and lakeside villagers may live almost entirely off profits garnered from the tourism industry (Mattison, pilot study 2006). While Na living in tourist areas insist that they maintain a "traditional" lifestyle, they are often seen as different by Na living in un-touristed regions (Walsh 2001). Because men are responsible for extra-household activities (Weng 1993), such differences may be driven primarily by men's participation in the market economy. This research will examine the impacts of the market economy on men's decision-making, specifically with regard to allocation of resources, by comparing men according to a variety of individual factors, including wealth, absences from their natal villages and local economic context.

The Na are an ideal study population in which to examine paternal investment in offspring and contemporary kinship change. Several aspects are particularly relevant to the hypotheses that will be tested by this dissertation research. It is known that Na men living in subsistence areas have few opportunities to acquire surplus income; thus, they often spend the little they have on gifts to lovers' households (Walsh 2001). Men living in tourist areas, however, often earn substantial sums of money, affording them greater opportunities to contribute to their children or to their sisters' children. The novelty of access to resources in certain areas provides a unique opportunity to analyze the roots of behaviors accompanying entrance into a market economy. Furthermore, Na men spend variable amounts of time away from home. Historically, men of the Na have engaged in long-distance trading and occasional warfare (Weng 1993; Cai. 2001) and now some men seek cash employment away from their natal villages (Walsh 2001). Finally, recent anecdotal evidence indicates that the structure of Na pairing has changed according to the hypotheses outlined above. *Sese* relations are increasingly stable among the Na (Walsh 2001), and ethnographic evidence suggests that women often form unions based on the perceived wealth of their male partners (Cai 2001). A systematic, hypothesis-driven analysis of these behaviors could evaluate the validity of previous reports and analysis of variability in these behaviors should facilitate delineation of underlying causal factors.

This research project, in addition to its theoretical contributions, could contribute to the ethnography of one of China's most controversial ethnic minorities. Though many Chinese scholars have analyzed Na pairing systems and gender issues (e.g., Shih 1993; Weng 1993; Cai 2001), these accounts have stressed sexual freedom and absence of paternal duties, and generally depicted the Na as an outlier among all other human populations (see critiques in Harrell 2002; McKhann 2003). Some have claimed that the Na stand as the only example of a human society without marriage (*ibid.*; Shih 2000). Other accounts have questioned the morality of the Na sexual pairing system (e.g. Rock 1947) while still others have used the Na system as evidence of Morganian evolutionism and primitive 'group marriage', a stage along the way of unilineal human progress from savagery to civilization (Yan 1984; Yan and Liu 1986; Yan and Song 1991, cited in Harrell 2001). The Na have contested many of these representations (Harrell 2001; Mattison, pilot data, 2006), warranting further examination of the issues surrounding Na kinship and courtship.

Pilot Work: I completed a month-long pilot project among the Na during the summer of 2006 where I employed focus groups to assist in operationalizing variables associated with parental investment and investigated parental investment strategies. Results from focus groups revealed the importance of education to villagers and the difficulties associated with rising education costs. I also obtained anecdotal evidence, through interviews and informal conversations, of paternal assistance in raising biological children. Some fathers appeared to allocate a substantial fraction of their time and money to their biological offspring. One informant explained that *sese* is becoming less typical in its freest form. He believed that men increasingly disparaged women who engaged in multiple concurrent *sese* relations. These observations led me to wonder whether previous accounts of the absence of male parenting (e.g. Weng 1993; Shih 1993, 2000; Cai 2001) were mistaken or whether recent changes in economy due to the influx of tourism or increasing exposure to mainstream Chinese values could have provided the impetus for these differences.

Pilot work also clarified some of the logistical requirements for dissertation research. I have already established contacts with cadres in the villages where this research will be conducted, who have assured me that my project will be feasible. Exchanges with these contacts have

reinforced the perception that the Na are willing to discuss topics of parenting and courtship. Villagers were also open to discussing their finances and candidly divulged salary and expenditure information. Furthermore, participants in focus groups appeared to habituate quickly to being filmed, so I am fairly confident that villagers selected to participate in the study will acclimate to the presence of researchers. Pilot work also illustrated that there are certain gender boundaries that will require me to hire male field assistants for certain segments of the project.

Methods: The goal of this research project is to determine whether, in association with entrance into a market economy, Na men shift resource allocations away from their matrilineal households. As per the hypotheses outlined above, I will test whether this shift occurs in response to: (H1) control over increasing resources; (H2) fewer or shorter absences; and (H4) increasing costs of education for children. I will further test whether these shifts are associated with: (H1, H3, H5) increasing female preferences for stable partnerships and (H3, H5) decreasing male acceptance of their partners' extra-pair sexual liaisons. These will be tested against the hypothesis (H6) that the same factors reinforce matrilineal kinship. Finally, I will examine whether (H7) exposure to acculturating influences are associated with individual parenting strategies.

This research will attempt to capture the entire range of variation in individual factors by sampling individuals from two village clusters, one touristed and relatively wealthy and the other un-touristed: Luoshui (LS) and Yongning (YN), respectively. All methods will be applied to both village clusters.

The first stage of research will involve gathering household censuses (Newell 1988) in order to obtain demographic information about each household and to create a sampling frame from which to sample individual participants. Demographic information will be used to examine the cost of child rearing (H4) by looking for evidence of lower fertility associated with increased prevalence of child education in LS compared to YN (Caldwell 1976; Kaplan 1996; Mace 1998). These data will also be analyzed to see whether household structures and kinship systems are changing in the predicted directions. These demographic data will also be cross-checked and supplemented with archival vital registration information, which will be collected from village heads, scholars, and local archives in order to give historical depth to this comparison (e.g., Shih 1993; Walsh 2001). During pilot work, I was informed by the village head in LS that historical household records could be made available for future study.

Ethnographic structured interviews (Converse and Presser 1986) will be used to gather information on cultural diffusion, parenting strategies, reproductive histories, including pairing type, and information on men's paternal behavior, including resource allocations and direct care, absences, and market share of resources (H1-7). Adult men and women will be asked to relate their reproductive histories, including number of partners, duration of partnerships, and reasons for entering into a given partnership. Stated reasons for dissolutions of partnerships will also be elicited. In addition, individuals will be asked to rank hypothetical desirable partners and to give the reasons for those partners' desirability. To the extent possible, these surveys will be confirmed by other members of a given household. Structured interviews will allow areas of interest to be discussed, while ensuring brevity and minimal respondent burden. Short surveys will permit collection of a large sample of individuals, increasing statistical power to detect subtle differences in multiply controlled analyses.

To become familiar with local individuals and customs, I will engage in participant observation (Hammersley and Atkinson 1983), including assisting in farm-work, domestic

activities and other events to which I am invited. To maximize opportunities to partake in local activities, I will live in a Na household, chosen to be as representative as possible of local households identified in each census. Two field assistants in each village cluster will be hired to assist in ethnographic inquiries both to accommodate the custom of discussing certain materials solely among members of the same sex (Weng 1993) and to facilitate discussions among familiar individuals. These field assistants will be chosen with help from Na scholars and cadres who have agreed to support my field endeavors. These data will allow me to confirm if and how preferences for partners and relationship stability differ according to local economy. Furthermore, these data will provide preliminary evidence of whether men are shifting resource allocation in the directions predicted by the hypotheses outlined above.

Observational methods (Borgerhoff Mulder and Caro 1985; Hames 1992) will be used to validate how men allocate time and resources. Sampled men in each household (see sampling scheme, below) will be joined by a research assistant for one day and men's activities, including productive work, resting periods, and social interactions, will be documented using "focal follows". In addition, men will be interviewed regarding their daily expenditures for a two-week period in order to ascertain whether monetary resources are allocated differently by men in touristed versus un-touristed areas. These data will complement ethnographic surveys by providing direct evidence of male resource allocation and childcare. This method is susceptible to confounding due to seasonal effects including yearly harvests and holidays. Such confounding effects will be eliminated as much as possible by following men on days that are most representative of an average day, and by noting the presence of potential confounders and controlling for those in subsequent analyses.

Finally, a sample of children from selected fathers will be observed via focal follows to determine the relative importance of different care-takers in LS versus YN. For all follows, I will continuously monitor participants, noting initiation and changes in behaviors. The inclusion of both men and children will allow me to analyze not only men's shifts in parenting strategies according to local economy, but also which care-takers emerge as the most significant providers of care of and resources to individual children.

IRB review of this proposal has been initiated, and care will be taken to ensure the confidentiality of study participants and minimize risk.

Analysis and Sampling Scheme: I determined the sample size necessary to detect a 50 yuan difference in resource allocation, assuming a mean income of 300 yuan/ month and a standard deviation of 100 yuan[3]. This was computed to be 63 individuals in each population. To be conservative, I will randomly sample (Kalton 1983) at least 80 individuals from different households in each population for follows and monetary-allocation interviews. The number of households present in a given village ranges from approximately 10 to 25 (Weng 1993; Walsh 2001), which may result in sampling individuals from several villages in a given cluster to avoid sampling bias from repeated sampling of the same household. This should not present a problem, however, as villages are not far from the cluster's center (i.e., LS, YN). For allocation studies and follows, eligible subjects will comprise adult men claiming to have fathered at least one child. Up to 30 children of both sexes aged 17 or younger will be sampled for follows of children. Finally, ethnographic interviews will be conducted among as many individuals as possible (up to 200 in each village cluster), to allow for statistical comparison using multivariate analysis. Eligible participants for ethnographic interviews will be adults of either gender, aged 18

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[3] These figures are based on conversations with villagers about their salaries. Computations based on Rosner (2000).

and over; they will only be asked to answer questions that pertain to their individual circumstances (e.g., women without children will not be asked about time and energy allocations to biological children).

All data will be analyzed according to their statistical properties in Stata (Statacorp LP, College Station, Texas) or R (Ihaka and Gentleman 1996), using either least-squares regression for continuous outcomes (Rosner 2000) or maximum likelihood estimation for categorical outcomes with different underlying distributions (Long 1997). I anticipate building at least three statistical models to examine my hypotheses (Table 1). Each model will be explored first using univariate analysis of the main predictor of interest against each outcome, followed by multivariate analysis to control for important potential confounders.

Table 1: Model Estimation for Hypotheses

Model	Hypotheses	Outcome Variables[1]	Covariates
M1	H1/5-Resource Control H2-Male Absence H3-Paternity Certainty H7-Cultural Diffusion	(1) Monetary Allocations (MI) (2) Measures of Paternal Care (FF; ES)	Absence* Stable Relation* Acculturating Influnces* Wealth* Economy* Num Biol Children Num Sisters' Children WealthXEconomy*
M3	H4-Embodied Capital	(1) Child Educat Attain (ES)	Economy* Wealth Father's Employment Uncle's Employment
M3	H6-Kinship Change	(1) Relationship Stable (ES) (2) Extra-Pair Tolerance (ES) (3) Household Structure (HC)	Monetary Allocations* Measures of Paternal Care* Economy Wealth Num Biol. Children Num Sisters' Children Employment

*Main predictor of interest
[1]Parentheses Indicate Source of Information; ES=Ethnographic Survey; FF=Focal Follows; MI=Monetary-Allocation Interviews; HC=Household Census

Model 1 will examine the effects of resource control, male absences, paternity certainty and cultural diffusion on male parenting strategies. Monetary allocations obtained from interviews and measures of parental investment obtained from focal follows and ethnographic surveys will be tested against wealth, frequency of male absences, relationship stability as a proxy for paternity certainty, acculturating influences and the presence of a market economy. This model will control for the number of biological children and the number of sisters' children because they may be associated with the amount of care a father is able to give to any given child. This model will also test to see whether the presence of a market economy provides the context for increased investment in biological children among wealthy men with use of an interaction term. The cost of raising children will be examined in model 2, by testing whether children's educational attainment is associated with presence of a market economy, controlling for wealth, father's employment and uncle's employment, which will be determined during household censuses. Model 3 will test whether the politics of kinship and courtship are associated with

paternal care, examining variation in relationship stability, tolerance and number of concurrent, extra-pair partnerships and structure of the household (e.g., patrilineal, neolocal v. matrilineal, matrilocal) against paternal care, controlling for presence of a market economy, wealth, number of biological children and number of sisters' children. Additional interaction terms including individual factors and the presence or absence of a market economy will be tested in the models to allow relationships between predictors and outcomes to vary by local economic context.

Timeline: I propose to conduct this research beginning in September 2007, following completion of an intensive third-year summer program in Chinese language under the following timeline:

Stage 1, Yongning: September,2007 – mid-October, 2007: Survey validation; research-assistant training; initial censuses of village households.
Stage 2, Yongning: mid-October 2007 – mid-February, 2008: Focal follows (children and adults); ethnographic interviews; monetary-allocation interviews.
Stage 3, Break: mid-February 2008 – mid-March 2008: Visa renewal, if necessary; preliminary analysis of results.
Stage 4-5, Luoshui: Repeat stage 1 and 2 in Luoshui.

This research schedule would allow ample time (1.5 months) to set up in each village, including making housing arrangements, hiring and training research assistants, testing methodologies, initial censusing and sampling. In 120 days, I believe I can feasibly conduct 200 interviews (2/ day) and 110 focal follows (80 adult and 30 children) with help from two field assistants. I have allowed 4 months to accomplish focal follows, monetary-allocation interviews and surveys as well as a 3-week buffer period before transferring villages.

Support: My committee consists of three anthropologists whose expertise are particularly relevant to this work: Eric Alden Smith (chair) is an expert in human behavioral ecology and the intersection of productive and reproductive decisions; Donna Leonetti is an anthropological demographer and behavioral ecologist with expertise in matrilineal kinship systems; and Stevan Harrell is a well-known scholar of Chinese ethnic minorities, particularly in the study region. Christopher Adolph, who serves as the Graduate Student Representative on my committee, is an expert in statistical theory and applications, and will help to guide the analyses of my hypotheses. I have been promised support by Yang Fuquan, the Vice President of the Yunnan Academy of Social Sciences, who will act as my local advisor during my time in the field.

Conclusion: Controversy over the uniqueness of the Na revolves partly around whether Na men take active roles in raising their biological offspring. Previous accounts of this system may have been politically charged or have relied exclusively on qualitative methods to draw conclusions about the nature of the visiting system. This research would be the first among this population to employ rigorous observational and analytical techniques to evaluate anecdotal ethnographic accounts of parenting behavior. This would also be the first research to use theory from human behavioral ecology and cultural evolution combined with direct observation to understand contemporary change in kinship. The results of this research will help to elucidate the role of fathers in parenting, and, by increasing understanding of how families are formed and change across different cultures, have direct relevance to ongoing debates in the United States and abroad about the definition of marriage and family.

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FOR NSF USE ONLY	
PROPOSAL NO.	DURATION (months)
	Proposed / Granted
AWARD NO.	

ORGANIZATION
University of Washington

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR
Eric A Smith

A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)	NSF Funded Person-months			Funds Requested By proposer	Funds granted by NSF (if different)
	CAL	ACAD	SUMR		
1. **Eric A Smith - none**	**0.00**	**0.00**	**0.00**	$ **0**	$
2. **Siobhan Mattison - none**	**0.00**	**0.00**	**0.00**	**0**	
3.					
4.					
5.					
6. (**0**) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	**0.00**	**0.00**	**0.00**	**0**	
7. (**2**) TOTAL SENIOR PERSONNEL (1 - 6)	**0.00**	**0.00**	**0.00**	**0**	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (**0**) POST DOCTORAL ASSOCIATES	**0.00**	**0.00**	**0.00**	**0**	
2. (**0**) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)	**0.00**	**0.00**	**0.00**	**0**	
3. (**0**) GRADUATE STUDENTS				**0**	
4. (**0**) UNDERGRADUATE STUDENTS				**0**	
5. (**0**) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				**0**	
6. (**0**) OTHER				**0**	
TOTAL SALARIES AND WAGES (A + B)				**0**	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				**0**	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				**0**	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
TOTAL EQUIPMENT				**0**	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				**0**	
2. FOREIGN				**10,386**	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ _____ **0**					
2. TRAVEL _____ **0**					
3. SUBSISTENCE _____ **0**					
4. OTHER _____ **0**					
TOTAL NUMBER OF PARTICIPANTS (**0**) TOTAL PARTICIPANT COSTS				**0**	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				**0**	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				**0**	
3. CONSULTANT SERVICES				**0**	
4. COMPUTER SERVICES				**0**	
5. SUBAWARDS				**0**	
6. OTHER				**4,400**	
TOTAL OTHER DIRECT COSTS				**4,400**	
H. TOTAL DIRECT COSTS (A THROUGH G)				**14,786**	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE)					
(Rate: , Base:)					
TOTAL INDIRECT COSTS (F&A)				**0**	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				**14,786**	
K. RESIDUAL FUNDS (IF FOR FURTHER SUPPORT OF CURRENT PROJECTS SEE GPG II.C.6.j.)				**0**	
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ **14,786**	$
M. COST SHARING PROPOSED LEVEL $ **0** AGREED LEVEL IF DIFFERENT $					

PI/PD NAME	FOR NSF USE ONLY		
Eric A Smith	INDIRECT COST RATE VERIFICATION		
ORG. REP. NAME*	Date Checked	Date Of Rate Sheet	Initials - ORG
Elroy Carlson			

1   ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

SUMMARY PROPOSAL BUDGET

Cumulative

ORGANIZATION	FOR NSF USE ONLY		
University of Washington	PROPOSAL NO.	DURATION (months)	
		Proposed	Granted
PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR	AWARD NO.		
Eric A Smith			

A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)	NSF Funded Person-months			Funds Requested By proposer	Funds granted by NSF (if different)
	CAL	ACAD	SUMR		
1. **Eric A Smith - none**	0.00	0.00	0.00	$ 0	$
2. **Siobhan Mattison - none**	0.00	0.00	0.00	0	
3.					
4.					
5.					
6. ( ) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	0.00	0.00	0.00	0	
7. (**2**) TOTAL SENIOR PERSONNEL (1 - 6)	0.00	0.00	0.00	0	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (**0**) POST DOCTORAL ASSOCIATES	0.00	0.00	0.00	0	
2. (**0**) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)	0.00	0.00	0.00	0	
3. (**0**) GRADUATE STUDENTS				0	
4. (**0**) UNDERGRADUATE STUDENTS				0	
5. (**0**) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				0	
6. (**0**) OTHER				0	
TOTAL SALARIES AND WAGES (A + B)				0	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				0	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				0	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
TOTAL EQUIPMENT				0	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				0	
2. FOREIGN				10,386	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ 0					
2. TRAVEL 0					
3. SUBSISTENCE 0					
4. OTHER 0					
TOTAL NUMBER OF PARTICIPANTS (**0**) TOTAL PARTICIPANT COSTS				0	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				0	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				0	
3. CONSULTANT SERVICES				0	
4. COMPUTER SERVICES				0	
5. SUBAWARDS				0	
6. OTHER				4,400	
TOTAL OTHER DIRECT COSTS				4,400	
H. TOTAL DIRECT COSTS (A THROUGH G)				14,786	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE)					
TOTAL INDIRECT COSTS (F&A)				0	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				14,786	
K. RESIDUAL FUNDS (IF FOR FURTHER SUPPORT OF CURRENT PROJECTS SEE GPG II.C.6.j.)				0	
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ 14,786	$
M. COST SHARING PROPOSED LEVEL $ **0**	AGREED LEVEL IF DIFFERENT $				

PI/PD NAME	FOR NSF USE ONLY		
Eric A Smith	INDIRECT COST RATE VERIFICATION		
ORG. REP. NAME*	Date Checked	Date Of Rate Sheet	Initials - ORG
Elroy Carlson			

C *ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET

Siobhán Mattison, Budget Justification
Fathers or Uncles? Tourism and Men's Decision-Making among the Matrilineal Na

Travel
Funds are requested for the following itinerary:

Seattle, WA to Beijing	6/20/2007	United Airlines	$2084
Beijing to Kunming	8/29/2007	China Eastern	$502
Kunming to Lijiang	8/31/2007	Air	$90
Lijiang to Yongning	9/1/2007	Hired Car	$90
Yongning to Lijiang	8/27/2008	Hired Car	$90
Lijiang to Kunming	8/28/2008	Air	$90
Kunming to Beijing	8/29/2008	China Eastern	*
Beijing to Seattle	8/31/2008	United Airlines	*

*Fare not applicable; included in price of round-trip ticket.

NB: Though fieldwork is scheduled to begin on 9/1/2007, I anticipate traveling to China at the end of June to engage in intensive language training before beginning fieldwork. No funds are requested to accommodate the training period. These quotes are derived from Expedia.com or personal experience.

Total Itinerary: $2946

Living expenses during the research period are projected at $200/ month for lodging and $420/ month ($14/day) for subsistence. These figures are based on conversations with locals and personal experience during pilot work in 2006.

Total Living Expenses: $7440

Total Travel: $10,386

Other Direct Costs

$2000 are requested to fund the purchase of a motorcycle with sidecar, including gas and accessories (co-PI is a licensed motorcycle driver). The price was quoted by the head of Luoshui village, during pilot work in 2006.

A motorcycle and sidecar would greatly facilitate collection of data for this research project. During the rainy season, the roads often render travel by passenger automobile impossible. Motorcycles are often agile enough to handle the terrain; the purchase of a motorcycle would be more cost-effective than a four-by-four and the sidecar would enable transport of field equipment to research areas. This research will likely require trips to Ninglang (the county seat – a three-hour journey from Yongning) and Lijiang to obtain provisions and visit financial institutions. The purchase of a motorcycle and sidecar would be more cost-effective than hiring a car and driver for each journey.

Finally, a motorcycle would allow us to travel quickly among villages (up to 1.5 hours' walk) to conduct interviews and follows.

I anticipate hiring 2 field assistants in each village cluster for the duration of the study. A male research assistant will be hired to conduct focal follows of men and another field assistant will aid in conducting interviews and child follows. I anticipate payment of $100/ month to each field assistant, based on pilot work, for 6 months each.

Total Personnel: $2400

Total Other Direct Costs: $4400

Total Budget: $14,786

Message 54 of 201

Date: Fri, 29 Sep 2006 11:55:08 +0800
From: Yang fuquan <yangfq83@hotmail.com>
To: smc56@u.washington.edu
Subject: Re:research support (fwd)

Dear Ms. Mattison,

Thank you very much for your email. Your research topic is very interesting and
important. As the vice president of Yunnan Academy of Social Sciences, I would
like to invite if you get support from Fulbright for your research in Yunnan,
China. I also would like to be your advisor when you stay in China for your
fieldwork to give you more detail and academic help. Please contact me if you
need further support. Best wishes,   Fuquan Yang

Prof. & Dr. Fuquan Yang
Vice President
Yunnan Academy of Social Sciences
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Tel. 0871-414-2394
Email: yangfq83@hotmail.com

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