# Behaviorální ekologie náboženství

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# Lidská behaviorální ekologie

Darwinian accountants

- Hlavní premisa:

  Lidské behaviorální strategie jsou **adaptivní napříč** mnoha **socioekologiemi.**

- Otázky:

  – Vykazují lidé optimální strategie při hledání potravy?
    - např. dieta současných lovců-sběračů – největší možné množství kalorií za hodinu obstarávání

  – Upravují lidé množství svých potomků v závislosti na prostředí?
    - Life history theory

  – Přizpůsobují lidé své chování flexibilně okolnostem tak, že maximalizují svůj reprodukční úspěch?

# adaptace vs adaptivní

| | | **Is the behaviour adaptive?** *Adaptive behaviour* is functional behaviour that increments reproductive success. | |
|---|---|---|---|
| | | Yes | No |
| **Is the behaviour an adaptation?** *An adaptation* is a character favoured by natural selection for its effectiveness in a particular role. | Yes | **Current adaptation** A *current adaptation* is an adaptation that has remained adaptive due to a continuity in the selective environment. | **Past adaptation** A *past adaptation* is an adaptation that is no longer adaptive due to a change in the selective environment. |
| | No | **Exaptation** An *exaptation* is a character that now enhances fitness but was not built by natural selection for its current role. | **Dysfunctional by-product** A *dysfunctional by-product* is a character that neither enhances fitness nor was built by natural selection. |

**Fig. 4.1** The difference between adaptive behaviour and adaptations.

# Lidská kultura

Většina sociálních vědců

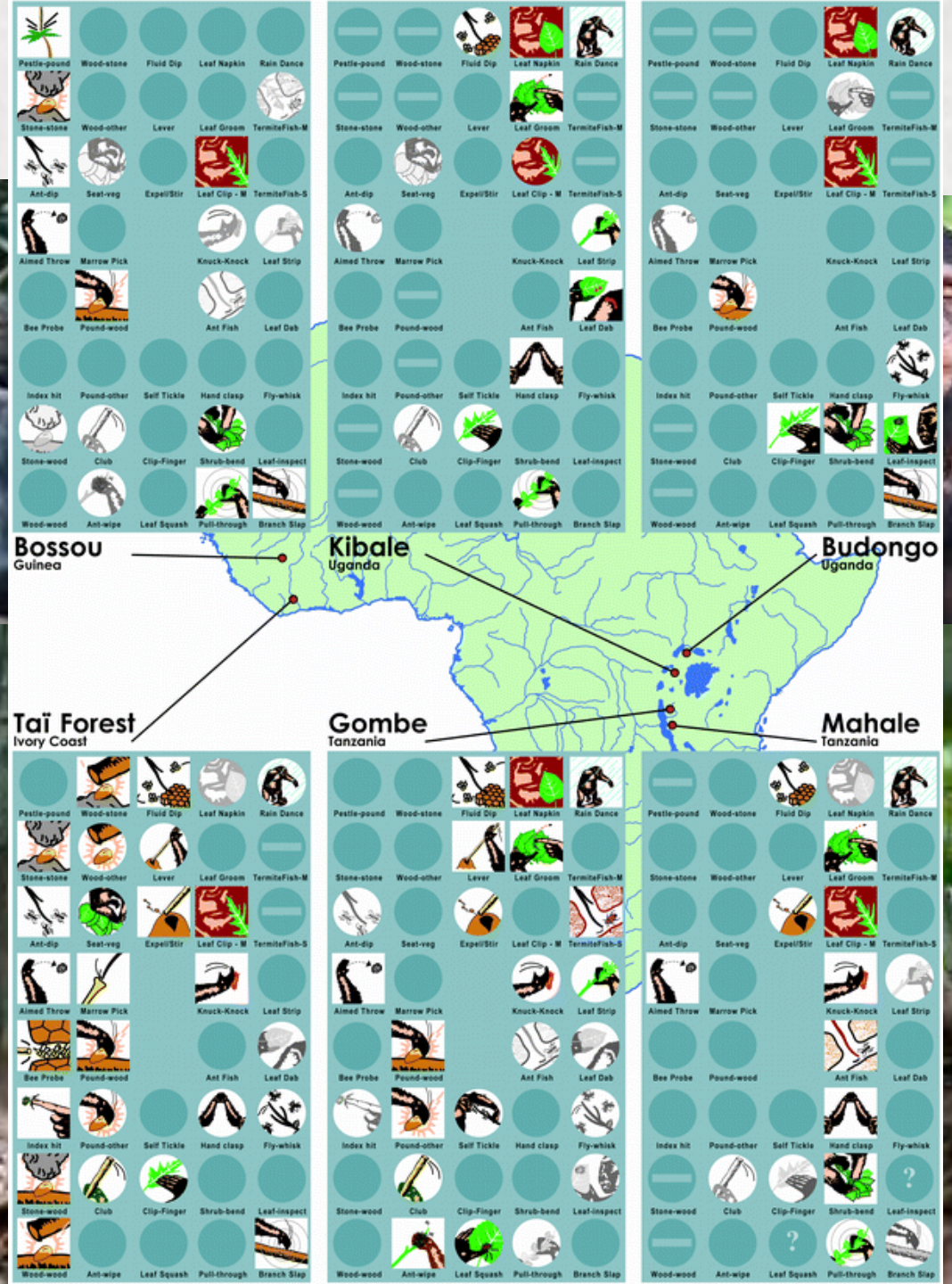
- kohezivní set věr, idejí a znalostí
  - primární vliv určující lidské chování
  - učené od jiných lidí
  - existující mimo říši biologie

VS

Většina evolučních vědců

- produkt evolučního procesu
  - mnoho zvířat vyrůstá s jedinci stejného druhu a mají komplexní společnosti
  - Učí se dovednosti a znalosti od jiných
  - 39 kulturních tradic u populací šimpanzů (Whiten et al., 1999)

# ~~Lidská~~ kultura


Bossou
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Gombe
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# Lidská kultura

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  - učené od jiných ~~lidí~~
  - ~~existující mimo říši biologie~~

VS

*Kultura je soubor praktik, technik, heuristik, nástrojů, motivací, hodnot, věr, postojů, které se učíme od ostatních (jsou předávané sociálně).*

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BEHAVIOR

# Local convergence of behavior across species

Toman Barsbai[1,2*†], Dieter Lukas[3*†], Andreas Pondorfer[4,5*†]

**Behavior is a way for organisms to respond flexibly to the environmental conditions they encounter. Our own species exhibits large behavioral flexibility and occurs in all terrestrial habitats, sharing these environments with many other species. It remains unclear to what extent a shared environment constrains behavior and whether these constraints apply similarly across species. Here, we show that foraging human populations and nonhuman mammal and bird species that live in a given environment exhibit high levels of similarity in their foraging, reproductive, and social behaviors. Our findings suggest that local conditions may select for similar behaviors in both humans and nonhuman animals.**

Wherever they live, animals display diverse behaviors to cope with the many challenges they face—from foraging for food to finding shelter and protection to meeting with mates for reproduction (*1*). In any particular environment, a diversity of behavioral solutions might be expected given the differences in how animals experience and exploit their environment, especially if species fill specific niches to reduce resource competition (*2*). At the same time, local ecological constraints might only permit a certain range of behaviors. In this case, species with similar behaviors would be expected to assemble in a given environment. Convergence of behavior to ecological conditions has been found among closely related species (*3*–*5*), and consistent influences of ecological conditions on evolutionary patterns across distantly related taxonomic groups have been described for morphology [e.g., Bergman's rule (*6*) or Allen's rule (*7*)] and life history (*8*). On the basis of this interplay of competition and adaptation, we predict that a limited subset of behaviors will exist at each locality, with similar behaviors found in similar environments around the world.

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†These authors contributed equally to this work.

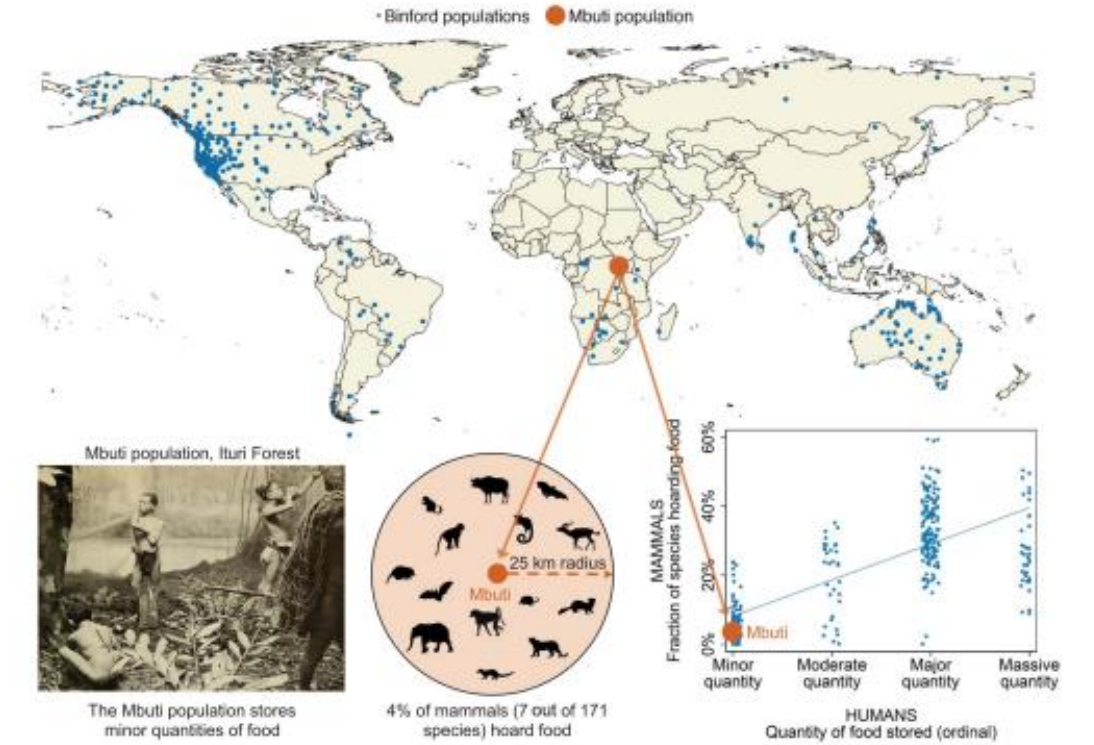
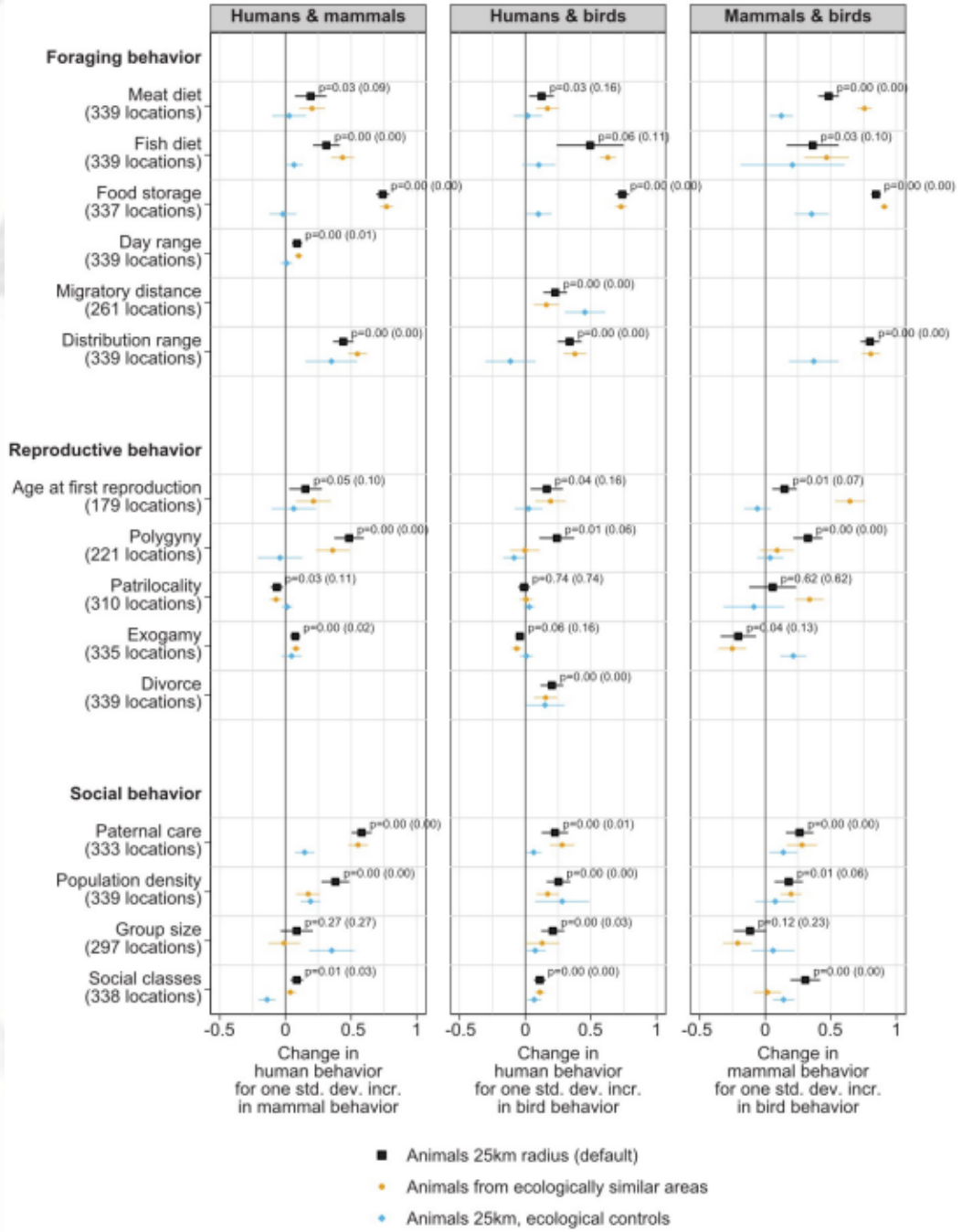



**Fig. 1. Matching the behavioral variation of foraging humans, mammals, and birds around the world.** For each of the 339 small-scale, subsistence-foraging populations from around the world (dots on map), we determined which mammal and bird species lived in the same location and computed their average behavior. For example, in the Mbuti population, which lives in the African rainforests, food storage is only minor and only 4% of the 171 mammal species living within a 25-km radius around the center of their population hoard food. Combining this information across populations shows that generally in locations where food storage among humans is more common, a higher proportion of local mammal species hoard food, as indicated by the upward slope in the scatter plot. Photo credit: Flickr Commons/PhyloPic public domain.



# Hlavní zájem a cíl

- Jak je chování jednotlivce ovlivněno prostředím ve kterém žije a jak různé behaviorální strategie, které si lidé osvojují, vytváří kulturní rozdíly?

- Jak ekologické a sociální faktory ovlivňují behaviorální variabilitu **uvnitř** populací **i napříč** populacemi?

- Ověřit zda modely optimality a maximalizace fitness poskytují dobrá vysvětlení variace v lidském chování?

  - proti klasickému kulturnímu determinismu
  - ke klasickým sociálně vědným zájmům o vývoj a historické danosti **doplňuje studium funkce**

Monique Borgerhoff Mulder
Kipsigis, Kenya

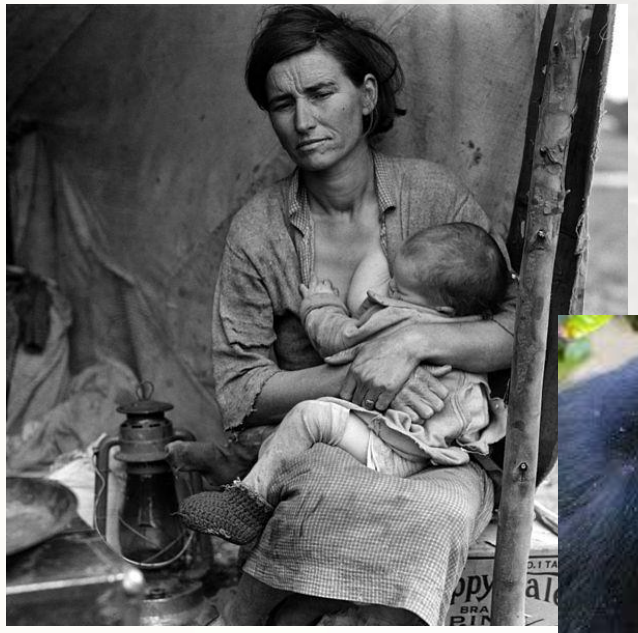
# Hlavní zájem a cíl

[T]o determine how ecological and social factors affect behavioural variability within and between populations. In one sense its hypotheses are viewed as an alternative to the more traditional anthropological belief in an unspecified force of 'cultural' determination. In another sense, behavioural ecological anthropology can be seen as adding the study of function to investigations of causation, development and historical constraints that were already well established in the social sciences.

(Borgerhoff Mulder, 1991, p. 69)

Monique Borgerhoff Mulder
Kipsigis, Kenya

# Proč žena kojí své dítě?



- 1) jaké mechanismy spouští kojení?
  - hormonální nastavení ženy, plnost mléka v prsou ženy, pláč dítěte
- 2) jak se naučila kojit, mění se kojení v průběhu života matky s přibývající zkušeností?
  - odpozorováním od jiných kojících
- 3) jaká byla evoluční cesta ke kojení, jak vypadá kojení u ostatních primátů, liší se u lidí?
  - vejcorodí, živorodí, savci, velká otcovská investice
- 4) bylo kojení upřednostněno přírodním výběrem?
  - živiny, vazba dítě-matka, ochrana před nemocí

# Julian Huxley (1942) & Ernst Mayr (1961) & Niko Tinbergen (1963)

| | | *Druh pohledu* | |
|---|---|---|---|
| | | **Dynamický (vývojový)** Adresuje historické kroky vedoucí k současné podobě | **Statický (popisný)** Adresuje současnou podobu druhu |
| *Typ vysvětlení* | **Proximátní** **Jak** fungují rysy jednotlivého organismu? | **Ontogeneze (vývoj)** Historie vývojových změn v jednotlivcích, z DNA po jejich současnou podobu | **Mechanismus (kauzalita)** Mechanistická vysvětlení toho jak fungují rysy daného organismu |
| | **Ultimátní** **Proč** má daný druh takovéto rysy? | Evolutionary history **Fylogeneze (evoluce)** Historie postupných mnohogeneračních evolučních změn druhu | Survival value **Adaptace (funkce)** Rys druhu, který se v minulosti vyvinul k řešení problému souvisejícího s přežitím či reprodukcí |

development

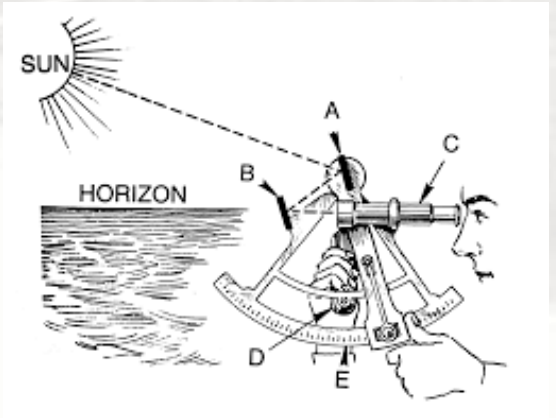
historical constraints

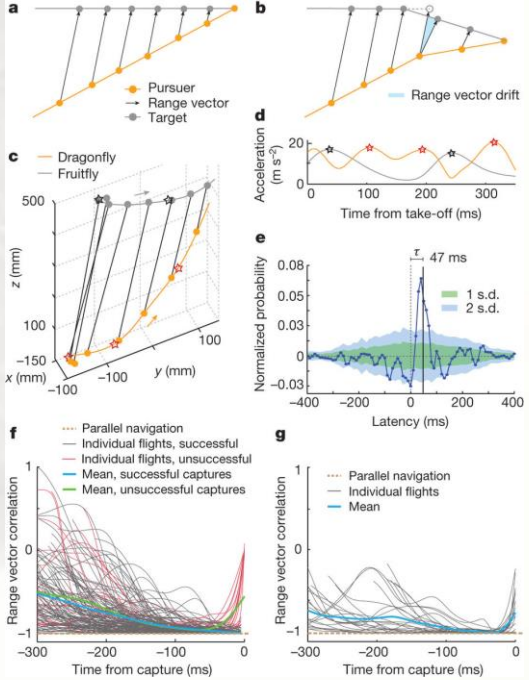
causation

function

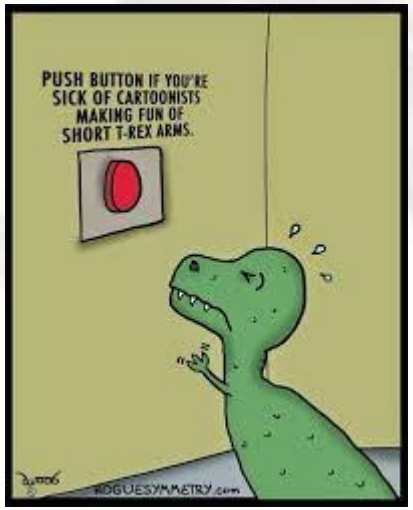
# Tinbergenova čtyřka

- Lidské vědomí
  - nás může vést na scestí chybného směšování proximální a ultimátní úrovně
  - Vědomí ultimátní funkce může sloužit jako proximální motivace (ALE KOLIK VARIACE TO VYSVĚTLUJE?)



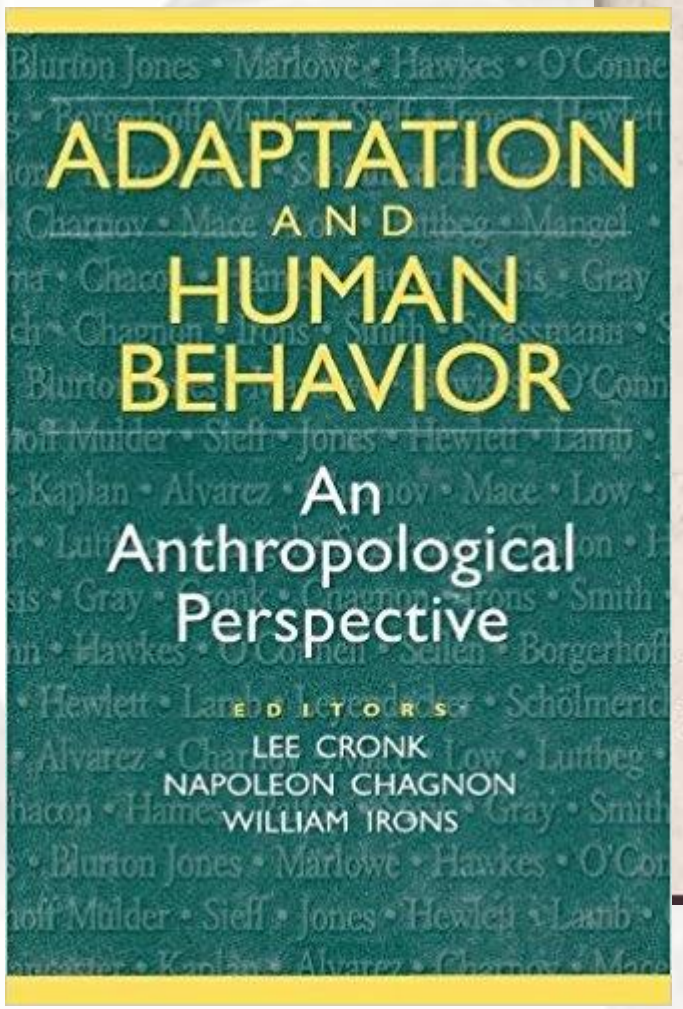




- Mezidruhová srovnání
  - Korigování správné otázky na správné úrovni
    - skrytá ovulace

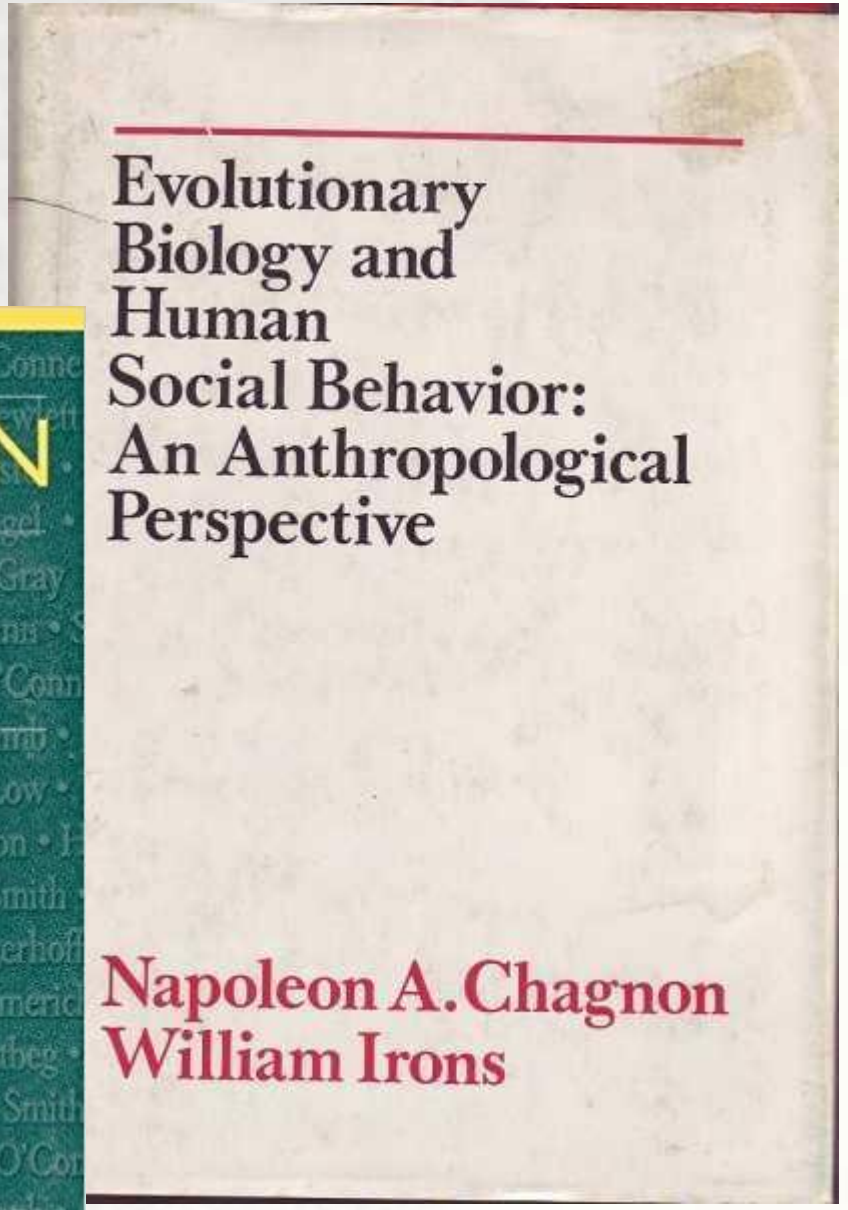



# Východiska

- Výchozí bod je **studium člověka jako** jakéhokoliv jiného **zvířecího druhu**, především vzorců chování ve vazbě k jeho fyzickému a sociálnímu prostředí
- **Pozorování reálného chování (+ historické datasety)** a porovnávání s predikcemi z evolučních hypotéz



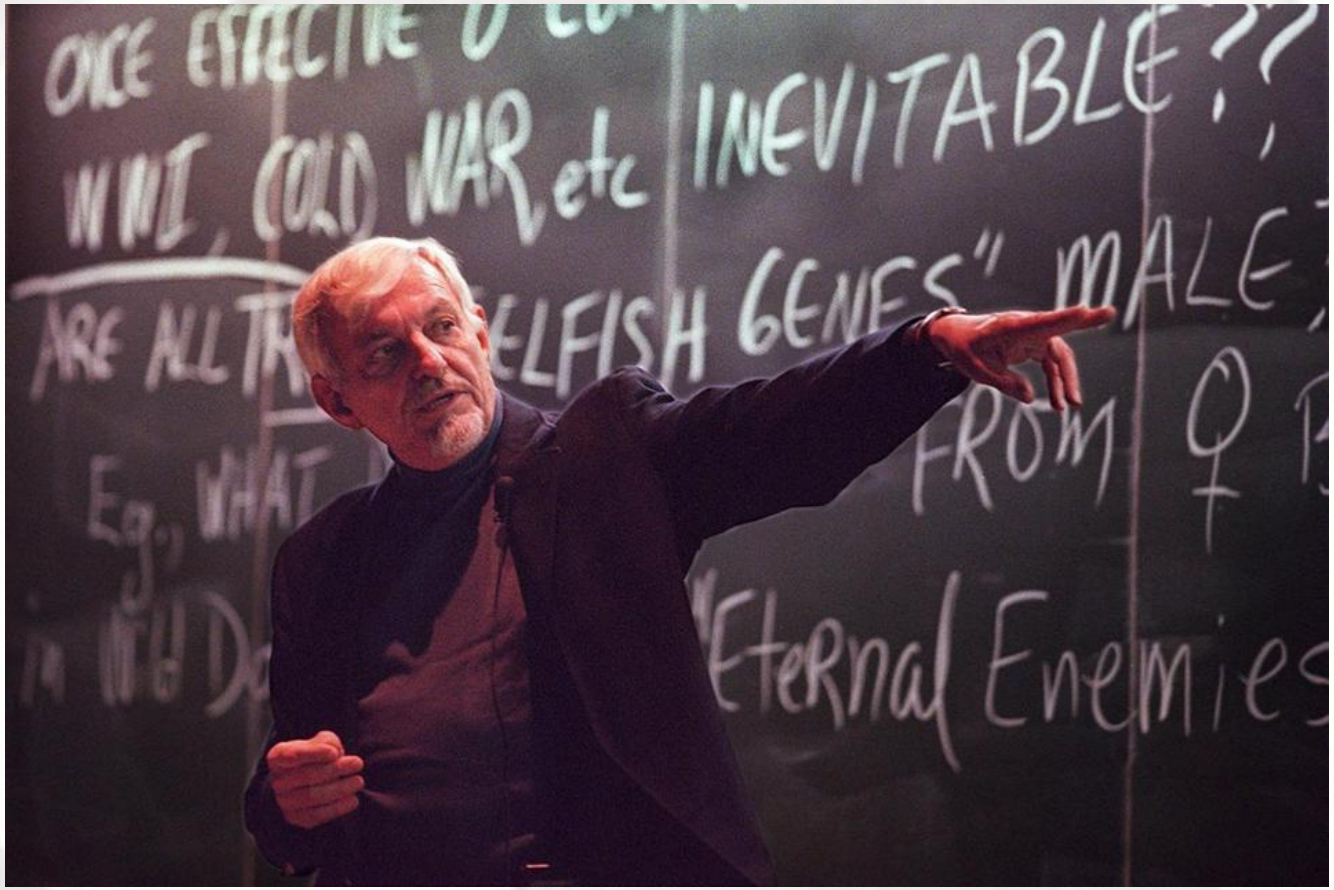

2000




1979
Chagnon – Janomamové, severní Amazonie

# Východiska

- Neobyčejná **flexibilita** chování lidského druhu mu umožňuje **chovat se adaptivně** v obrovském množství různých prostředí
- Přesné příčiny chování nestojí v popředí zájmu (včetně vlivu psychologických procesů, fyziologických procesů, sociálně přenášených informací a jejich genetických podloží) = **phenotypic gambit**




Irven DeVore (1934-2014)
!Kung, Kalahari

# Koncepty a teorie

- Life history theory
  - rozdělit investice energie a zdrojů (když investujete do jednoho nemůžete zároveň do druhého)
  - somatic efforts vs reproductive efforts
  - **Somatic efforts** – udržovat a vylepšovat vlastní tělo a mysl, kvalitnější potomek v budoucnu - **SLOW**
  - **Reproductive efforts** – soutěž o partnera, námluvy, co nejvíce potomků co nejrychleji – **FAST**
  - nepředvídatelné a nebezpečné prostředí => FAST

# Koncepty a teorie

- Adaptive trade-offs
  - do sebe vs do reprodukce
  - reprodukovat sám vs pomoci příbuzným
  - reprodukovat dál vs investovat do existujícího potomka
  - kvantita potomků vs kvalita potomků
- Flexibilita = adaptabilita
  - přežití a úspěšná reprodukce v mnoha prostředích
  - adaptabilita je adaptace

Optimal foraging theory
- max zisk energie, min čas
- nejefektivnější = největší reproduktivní úspěch
- konflikt zájmů, teorie nákladné signalizace

# Koncepty a teorie

- polyandrie a polygynie
  - Ladakh, Tibet – i pro mladší bratry stále výhodnější (Smith, 1998)
  - Polygyny threshold model (Orians, 1969)
    - monogamie vs polygamie – Kipsigis (Borgerhoff Mulder, 1990)
- Sexual conflict theory
(Muller & Wrangham, 2009)
- Interbirth interval

  !Kung San (Blurton Jones, 1997)
  - 4 roky – velmi dlouho bez antikoncepce
  - nižší interval = vyšší dětská úmrtnost
  - kojení

# Behaviorální ekologie náboženství

- Je konkrétní náboženské chování v konkrétním prostředí **adaptivní**? Tj. přináší nejvyšší možný fitness zisk ve srovnání s alternativními behaviorálními strategiemi?
  - Adaptace je jiná otázka – BE může jen naznačit při studiu prostředí blízkého prostředí evolučních adaptací lidských předků
- Jaké ekologické determinanty mohou za variaci v náboženském chování – uvnitř a napříč populacemi?

- Fitness zisk:
  - kooperace
  - zdraví
  - reprodukce

- Teorie nákladné signalizace

# Costly signaling theory of ritual

(Sosis et al., 2007)

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(4) cost and benefit is correlated to signaler`s quality
participants who pay more costs are more committed
(Xygalatas et al., 2013)

ELSEVIER

Evolution and Human Behavior 28 (2007) 234–247

Evolution and Human Behavior

# Scars for war: evaluating alternative signaling explanations for cross-cultural variance in ritual costs

Richard Sosis[a,b,*], Howard C. Kress[b], James S. Boster[b]

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**Abstract**

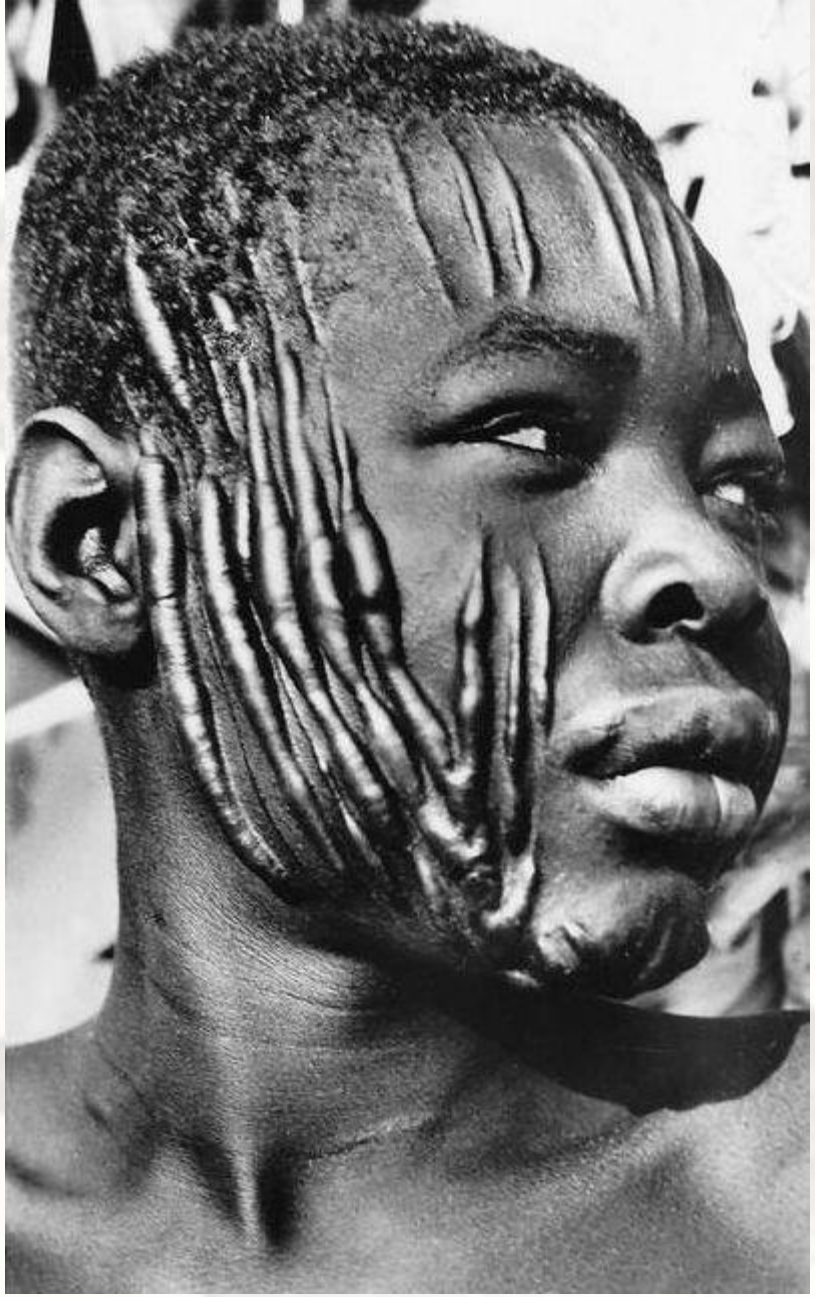
While males in many societies endure traumatic and painful rites, in other societies male rites are mild or completely absent. To explain these cross-cultural differences, we use data collected from the Human Relations Area Files electronic databases (eHRAF) to test two sets of hypotheses derived from signaling theory. If costly male rites serve to signal mate quality, they would be expected to correlate with the intensity of mating competition. If they serve to signal group commitments, they would be expected to be associated with the importance of overcoming problems of collective action. Our results support the latter set of hypotheses: males in societies that engage in warfare endure the costliest rites. Moreover, we show that whether wars are fought within cultural groups or against other cultural groups is an important determinant of whether or not male rites result in permanent visible marks, such as ritual scars. We argue that costly male rites signal commitment and promote solidarity among males who must organize for warfare.


*Keywords:* Cooperation; Costly signaling theory; Ritual; Religion; Warfare

## 1. Introduction

Evolutionary researchers have increasingly turned their attention toward understanding the adaptive significance of religious behaviors (for reviews, see Bulbulia, 2004a; Sosis

tion of various initiation and puberty rites, including scarification and tattooing (Low, 1979; Ludvico & Kurland, 1995; Singh & Bronstad, 1997).[1] Motivated by the logic of sexual selection and Zahavian signaling theory

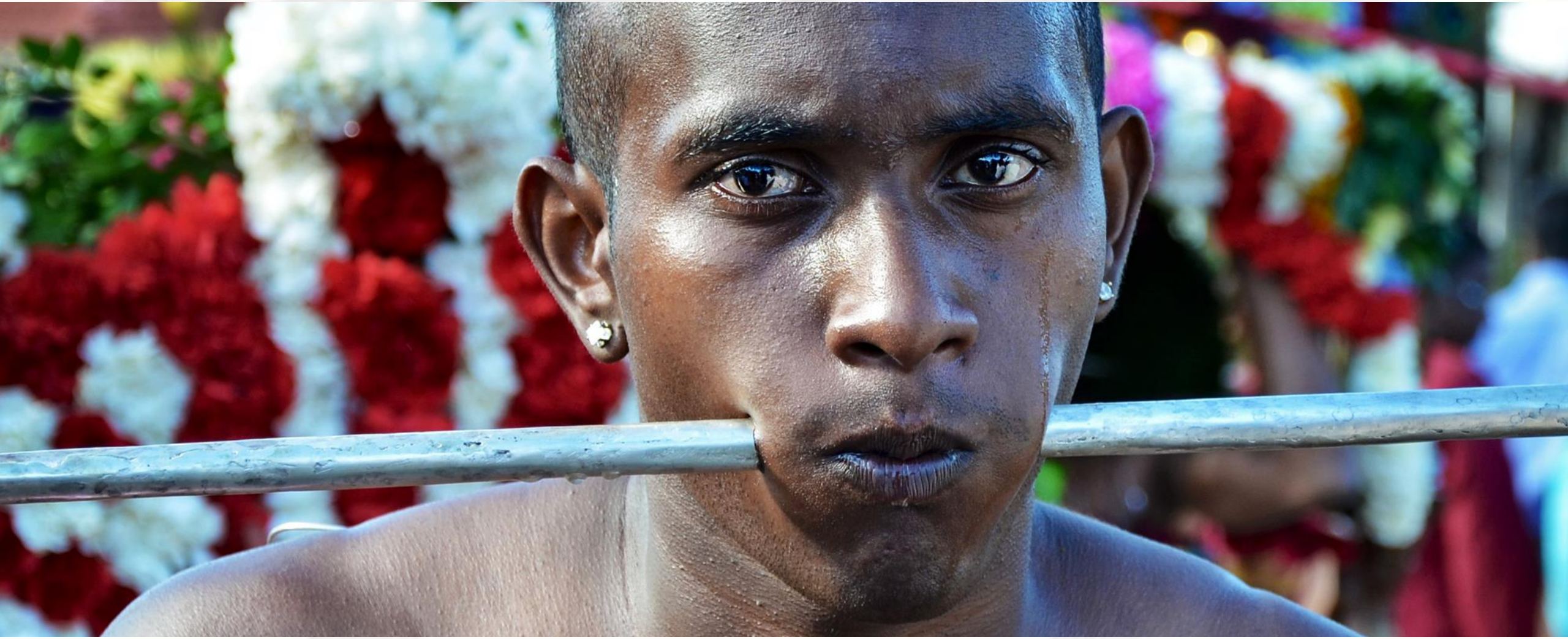


Kmen Sara, Francouzská Západní Africa (1953)

Kmen Toposa, Jižní Súdán

Dinka Agaar, Súdán

# Cooperative benefits of Kavadi ritual



*Short Report*

aps ASSOCIATION FOR PSYCHOLOGICAL SCIENCE

Psychological Science
XX(X) 1–4

DOI: 10.1177/0956797612472910
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# Extreme Rituals Promote Prosociality

**Dimitris Xygalatas[1,2,3], Panagiotis Mitkidis[1,2,3], Ronald Fischer[4], Paul Reddish[2,4], Joshua Skewes[1,3], Armin W. Geertz[1,3], Andreas Roepstorff[1,3], and Joseph Bulbulia[2,5]**

[1]Department of Culture and Society, Aarhus University; [2]LEVYNA Laboratory for the Experimental Research of Religion, Masaryk University; [3]Interactive Minds Centre, Aarhus University; [4]School of Psychology, Victoria University of Wellington; and [5]School of Art History, Classics and Religious Studies, Victoria University of Wellington

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Extreme rituals entail excessive costs without apparent benefits, which raises an evolutionary cost problem (Irons, 2001). It is argued that such intense rituals enhance social cohesion and promote cooperative behaviors (Atran & Henrich, 2010; Durkheim, 1912). However, direct evidence for the relation between ritual intensity and prosociality is lacking. Using economic measures of generosity and contextually relevant indicators of group identity in a real-world setting, we evaluated prosocial effects from naturally occurring rituals that varied in severity.

Our study took place in Mauritius, a multicultural country where citizens frequently negotiate between parochial ethnic-religious and inclusive national identities (Gaertner & Dovidio, 2000; Hornsey & Hogg, 2000) suggest that in Hindu-dominated Mauritius, where Thaipusam is celebrated on a national scale, the ritual of the majority religious group affirms the inclusive nature of the superordinate Mauritian national identity.

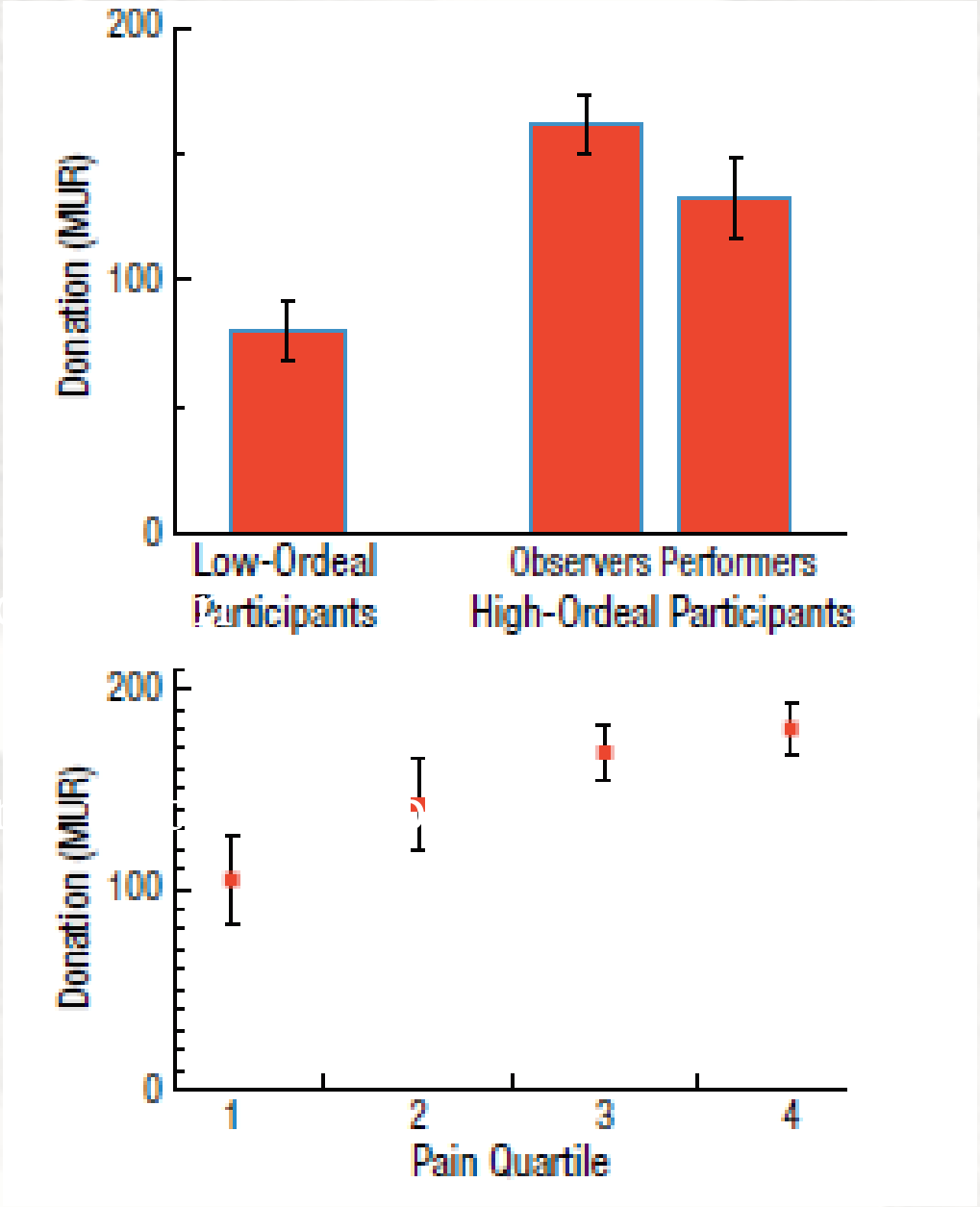
## Method

Participants were 86 males, all belonging to the same religious and social group: 19 were high-ordeal performers of the Kavadi, 32 were high-ordeal observers (nonperforming participants who walked alongside performers), and 35 were low-ordeal performers who participated in a collective prayer 3 days earlier. Observers were typically

- 36 males

- 200 MUR for partic

- Voluntary donation




Xygalatas et al., 2013

# So what is being signaled again?

- commitment to community and its values

# And what is the signaling for again?

- to distinguish member and non-member
- to assess the degree of commitment to cooperative norms

nature human behaviour



Published: 06 March 2017

# Social support networks and religiosity in rural South India

Eleanor A. Power

*Nature Human Behaviour* **1**, Article number: 0057 (2017) | Cite this article

**5946** Accesses | **47** Citations | **90** Altmetric | Metrics

## Abstract

In recent years, scientists based in a variety of disciplines have attempted to explain the evolutionary origins of religious belief and practice[1–3]. Although they have focused on different aspects of the religious system, they consistently highlight the strong association between religiosity and prosocial behaviour (acts that benefit others). This association has been central to the argument that religious prosociality played an important role in the sociocultural florescence of our species[4–7]. But empirical work evaluating the link between religion and prosociality has been somewhat mixed[8–11]. Here, I use detailed, ethnographically informed data chronicling the religious practice and social support networks of the residents of two villages in South India to evaluate whether those who evince greater religiosity are more likely to undertake acts that benefit others. Exponential random graph models reveal that individuals who worship regularly and carry out greater and costlier public religious acts are more likely to provide others with support of all types. Those individuals are themselves better able to call on support, having a greater likelihood of reciprocal relationships. These results suggest that religious practice is taken as a signal of trustworthiness, generosity and prosociality, leading village residents to establish supportive, often reciprocal relationships with such individuals.

nature human behaviour



Perspective | Published: 12 February 2018

# The social significance of subtle signals

Rebecca Bliege Bird, Elspeth Ready & Eleanor A. Power

*Nature Human Behaviour* **2**, 452–457 (2018) | Cite this article

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## Abstract

Acts of prosociality, such as donating to charity, are often analysed in a similar way to acts of conspicuous advertising; both involve costly signals revealing hidden qualities that increase the signaller's prestige. However, experimental work suggests that grand gestures, even if prosocial, may damage one's reputation for trustworthiness and cooperativeness if they are perceived as prestige enhancing: individuals may gain some types of cooperative benefits only when they perform prosocial acts in particular ways. Here, we contrast subtle, less obviously costly, interpersonal forms of prosocial behaviour with high-cost displays to a large audience, drawing on the example of food sharing in subsistence economies. This contrast highlights how highly visible prosocial displays may be effective for attracting new partners, while subtle signals may be crucial for ensuring trust and commitment with long-term partners. Subtle dyadic signals may be key to understanding the long-term maintenance of interpersonal networks that function to reduce unanticipated risks.

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# Social inequality and signaling in a costly ritual

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ABSTRACT

Evolutionary perspectives suggest that participation in collective rituals may serve important communicative functions by signaling practitioners' commitment to the community and its values. While previous research has examined the effects of ritual signals at the individual and collective level, there has been limited attention directed to the impact of socio-environmental factors on the quality of ritual signaling. We examined this impact in the context of the *Thaipusam Kavadi*, a collective ritual performed by Tamil Hindus worldwide that involves body piercings and other costly activities. We show that participants' relative position in the social hierarchy systematically affects the form of ritual signaling. Specifically, we found that low-status participants are more likely to engage in signaling modalities that require somatic and opportunity costs in the form of body piercings and cumulative effort, while high-status individuals are more likely to use financial capital, in the form of more elaborate material offerings to the deity. Moreover, signaling in each particular modality is stronger among individuals who participate in more public (but not private) rituals, corresponding to their long-term commitment to the community. In sum, our results demonstrate that social hierarchies exact unequal requirements on ritual participants, who in turn modify their signaling strategies accordingly.

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# Rituals as signals of mate quality

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ABSTRACT

Public ritual acts convey strategic information about the qualities of ritual actors. Although a prolific literature has examined their role in coordinating collective action in a variety of contexts, one of the most common communicative functions of ritual behavior in nature, i.e. its role in signaling mate quality, has received limited empirical attention in humans. Moreover, some of the particularities of human mating, such as the difference between short- and long-term pair bonding and the role of family pressure in mate selection, have also been relatively neglected in the context of ritual. We conducted an experiment to study mate preferences among Tamil Hindus in Mauritius. We found that men who practice religious rituals are perceived as better potential short- and long-term mates by young women as well as by parents, and that the latter prioritize those who practice more costly rituals.

## Introduction

Signaling theories of ritual propose that participation in public cer-

we belong to for our survival and wellbeing (Birch and Heyes, 2021; Henrich, 2008). But while we are, on the whole, a highly cooperative species, individual interests do not always align with group interests

# Religion as a means to assure paternity

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**The sacred texts of five world religions (Buddhism, Christianity, Hinduism, Islam, and Judaism) use similar belief systems to set limits on sexual behavior. We propose that this similarity is a shared cultural solution to a biological problem: namely male uncertainty over the paternity of offspring. Furthermore, we propose the hypothesis that religious practices that more strongly regulate female sexuality should be more successful at promoting paternity certainty. Using genetic data on 1,706 father–son pairs, we tested this hypothesis in a traditional African population in which multiple religions (Islam, Christianity, and indigenous) coexist in the same families and villages. We show that the indigenous religion enables males to achieve a significantly ($P$ = 0.019) lower probability of cuckoldry (1.3% versus 2.9%) by enforcing the honest signaling of menstruation, but that all three religions share tenets aimed at the avoidance of extrapair copulation. Our findings provide evidence for high paternity certainty in a traditional African population, and they shed light on the reproductive agendas that underlie religious patriarchy.**

evolution | extrapair paternity | mating | nonpaternity | Y DNA

The major world religions sprang from patriarchal societies in which the resources critical to reproduction, whether in the form of land or livestock, were inherited from father to son down the male line (1–3). Consistent with patrilineal inheritance, the sacred texts set forth harsh penalties for adultery and other behaviors that lower the husband's probability of paternity (4–8) (*SI Discussion*). The scriptures also place greater emphasis on female than on male chastity, including the requirement of modest attire for women and the idealization of virginity for unmarried females (6–8). Previous studies have considered the a neglected terrain despite growing interest in the evolutionary biology of religion (17–22).

We show that paternity certainty was higher in the indigenous religion than in Christianity, which we attribute to the abandonment of menstrual taboos by the Christians. Women in the traditional religion are exiled for five nights to uncomfortable places called menstrual huts; during the day menstruating women work in the fields (23, 24). The indigenous religion uses the ideology of menstrual pollution as the supernatural enforcement mechanism to coerce women to disclose their menses by going to the menstrual hut. Hormonal data showed that fear of breaking these religious taboos enforced honest signaling to the men of the husband's family, who situate the menstrual huts in close proximity to the *toguna*, which is a shade shelter specific to the males of a given patrilineage (23). The Dogon do not practice contraception, and 83% of women have high fertility (7–13 live births) (25). The median duration of lactational amenorrhea is 20 mo, and menstruation is a rare event quickly followed by pregnancy (23, 26, 27). When a woman resumes going to the menstrual hut following her last birth, the husband's patrilineage is informed of the immanency of conception and cuckoldry risk. Precautions include postmenstrual copulation initiated by the husband and enhanced vigilance by his family (23, 24).

## Results and Discussion

Across all religions, we detected father–son Y DNA mismatches in only 1.8% of father–son pairs (Fig. 1), a finding that contradicts the prevailing view that traditional populations have high rates of cuckoldry (28, 29). Although a similar rate has been found in several modern populations (29, 30), a key difference is that the Dogon do not use contraception (16, 25). The preva-

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# Religious celibacy brings inclusive fitness benefits

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The influence of inclusive fitness interests on the evolution of human institutions remains unclear. Religious celibacy constitutes an especially puzzling institution, often deemed maladaptive. Here, we present socio-demographic data from an agropastoralist Buddhist population in western China, where parents sometimes sent a son to the monastery. We find that men with a monk brother father more children, and grandparents with a monk son have more grandchildren, suggesting that the practice is adaptive. We develop a model of celibacy to elucidate the inclusive fitness costs and benefits associated with this behaviour. We show that a minority of sons being celibate can be favoured if this increases their brothers' reproductive success, but only if the decision is under parental, rather than individual, control. These conditions apply to monks in our study site. Inclusive fitness considerations appear to play a key role in shaping parental preferences to adopt this cultural practice.

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# Alloparenting and religious fertility: A test of the religious alloparenting hypothesis

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ABSTRACT

Life history theory anticipates that organisms trade offspring quantity for offspring quality. In modern human societies this tradeoff is particularly acute because of increased returns on investments in embodied capital. Religious people, however, despite having more children than their secular counterparts, do not appear to suffer lower quality offspring. To explain this apparent *paradox of religious fertility*, we propose a *religious alloparenting hypothesis*, which hypothesizes that higher levels of alloparenting in religious communities enable religious individuals to support larger families without reducing offspring quality. Using data from a large national sample whose population is roughly half religious and half secular ($N$ = 12,980; New Zealand), we demonstrate that, after adjusting for denominational, environmental, ethnic and other demographic differences, religious identification is associated with an increased likelihood of having at least one child, and religious identification and ritual frequency are positively related to offspring number among people with at least one child. Consistent with the *religious alloparenting hypothesis*, religious identification and ritual frequency are also positively associated with alloparenting among community members who do not currently have young children of their own. These are the first findings to reveal that religious cooperation extends to alloparenting; however, whether or not the levels of alloparenting in religious communities are sufficient to mitigate the costs of higher relative fertility remains a critical consideration for future research.

## 1. Introduction

Despite prolonged investment in children, human females exhibit shorter interbirth intervals and have more offspring than our closest great ape relatives (Hill & Kaplan, 1999; Kramer, 2010; Walker, Gurven, Burger, & Hamilton, 2008). High fertility is accomplished, in part, by substantial energetic contributions to children by alloparents (Bell, Hinde, & Newson, 2013; Hawkes, O'Connell, & Blurton Jones, 1997; Hrdy, 2005, 2009; Kaplan, Hill, Lancaster, & Hurtado, 2000). Cross-cultural studies of natural fertility populations find that, under diverse ecological conditions, older siblings (Kramer, 2010), fathers (Hewlett, 2004), and adult kin (Sear & Coall, 2011; Sear & Mace, 2008)

Notably, human ecologies have undergone rapid change in recent centuries, with marked effects on human reproductive trends. Beginning about 300 years ago, industrialization in European societies led to the dispersal of individuals over greater geographical ranges (Chesnais, 1992; Mason, 1997). As a result, kin network size and alloparental resources available to mothers diminished (Draper, 1989; Sear & Mace, 2008; Turke, 1989). Indeed, cross-cultural studies find that, when compared to natural fertility populations, children in modern societies receive less investment from kin, particularly older siblings, cousins, aunts, and uncles (Sear & Coall, 2011). It has been argued that the lower levels of alloparental resources in modern environments contribute to reduced fertility because the costs, real and/or perceived,