



Blood symbolism at the root of symbolic culture? African hunter-gatherer perspectives

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ABSTRACT

At ~160 ka, near the end of our African speciation, archaeologists identify a change from sporadic to habitual use of red ochre, interpreted as 'blood-red colorant' for decorating performers' bodies during group rituals, with habitual ritual considered pre-requisite to symbolic culture's 'shared fictions' (Dapschauskas et al. 2022). This article considers the proposed motivations for such behaviour, and asks whether cross-cultural data on African hunter-gatherer ritual uses of red substances and associated beliefs can further constrain the interpretation of the archaeological finding. The comparative survey fills a basic knowledge gap. The survey's interpretation relies upon proposed relations of relevance bridging the past and present, foremost being predictions of symbolic culture derived from evolutionary models of group ritual. The main symbolic theme encountered is a metaphoric relationship between women's reproduction and men's hunting, expressed as a form of 'blood' symbolism. This is consistent with a long theoretical tradition within social anthropology, and the neo-Darwinian re-casting of that tradition by the Female Cosmetic Coalitions hypothesis, which arguably predicted the timing of habitual ochre use thirty years ago. Models aside, this article hopefully demonstrates that if evolutionary and social anthropology are to jointly address how we became a symbolic species, they will have to attend more closely to African hunter-gatherer voices.

1. Preface: A global local story?

Among recent southern African hunter-gatherers, redness and brilliance were visual qualities consistently used to conjure supernatural potency and to mark things or persons as 'sacred' (Watts 1999). There is nothing unusual about this, it probably approximates a visual universal of traditional cosmologies and ritual performances.

Wonderwerk Cave lies on the southern margins of the Kalahari Basin, in South Africa's Northern Cape Province. The back of the cave, 140 m from the entrance, is pitch dark. Here, archaeologists believe that sometime between 300,000 and 500,000 years ago, people – probably directly ancestral to *H. sapiens* – were applying red ochre, haematite, and dark, sparkly specularite to their bodies, in the performance of firelit, ritual displays (Watts et al. 2016). Along with similar finds from better dated contexts in the region, this is probably the earliest archaeological evidence for group ritual display.

Historically, in the same region, these pigments – especially specularite – were prominent in the initiation rituals of hunter-gatherers (Deacon & Foster 2005:75), pastoralists (Engelbrecht 1936:160–161, 167), and agro-pastoralists (Willoughby 1909:242). Specularite took on

emblematic political significance in Batlhaping (Tswana) resistance to British colonialism (Shillington 2011:12, 32), much as red ochre did in the Xhosa's resistance in the eastern Cape (Beaumont 1973:143 [citing Butler 1969:74]; Bokwe 1914). In both regions, abandonment of these ritual practises was the mutually understood symbolic acceptance of colonial rule.

Around 160,000 years ago (~160 kya), red ochre use became habitual across much of Africa (Dapschauskas et al. 2022). This is interpreted as a proxy of habitual collective ritual, a necessary – possibly sufficient – condition for inferring the stabilization of symbolic culture, a domain of 'shared fictions' (ibid). This shift from irregular to habitual use falls roughly at the end of our late Middle Pleistocene African speciation; it is probably the most distinctive behavioural change identified over this process.

The elements seem to be in place for telling a scientific story that bridges the divide between a natural history of our speciation and humanity's history as a symbolic species (cf. Graeber & Wengrow 2021). The disciplinary boundary may be legitimate in that shared fictions are unprecedented in nature, but we have little agreement as to how symbolic culture evolved and little in the way of a shared language of science

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between evolutionary and social anthropology. Dapschauskas and colleagues' interpretation of their ochre finding provides an opportunity to break down this siloing: Can evolutionary hypotheses about group ritual, of the kind they partially evaluated, go on to make interesting and refutable predictions of symbolic culture? Ethnographic findings in this domain certainly cannot be uncritically transposed onto the deep past, but it would be equally unscientific not to look for, or to ignore, symbolic cross-cultural similarities, particularly if they bear on predictions derived from theoretically informed models.

This article accepts Dapschauskas and colleagues' main temporal finding and their interpretation. Like their article, it starts with a knowledge gap – that there is no pan-African overview of hunter-gatherer ritual use of red substances, and that little is known about associated beliefs. If the African archaeology of modern human origins has forced evolutionary and social anthropology into dialogue, it is appropriate for African hunter-gatherers to lead off in that process. The *introduction* focusses on evolutionary models of group ritual and how the gap between the ethnographic present and our speciation might be bridged; the *body* of the article provides the first cross-cultural comparative review of African hunter-gatherer ritual use of red substances and associated beliefs; while noting differences, the *discussion* draws out the commonalities and their bearing on evolutionary models.

2. Introduction

Some evolutionary theorists consider the last major transition in the evolution of life on Earth to have been symbolic culture, epitomized by language, but essentially constituting contract-based society (Maynard Smith & Szathmáry 1995). They also recognize communal ritual as the most plausible mechanism for inculcating 'proper behaviour'; but, in the mid-1990s, they could not explain why religious fictions of the kind encountered in ritual and myth – rather than explicit precepts – were fundamental to this transition (ibid:272, cf. Knight 2008). From this perspective, the archaeological inference of pan-African shared fictions from ~160 kya, based on the lower level inference of habitual ritual performances involving red body-paints/cosmetics, not only forces evolutionary theory into dialogue with social anthropology, but provides the empirical terrain for that dialogue.

The Uniformitarian Principle in the natural sciences holds that forces operating in the distant past are mirrored by those still operating in the present. Can this be extended to a general interpretation of the early archaeological ochre record, one that takes us beyond the baseline inference of symbolic culture from a certain date? Before proposing how to address this problem, it is necessary first to consider how Dapschauskas and colleagues arrived at their ritual interpretation of the early African ochre record, which contextualises this article's warranting justifications and empirical focus.

Red ochre is a generic term for geological materials enriched in haematite, an iron oxide. Typically, when abraded, it provides a red streak and produces a red powder with staining power. While having a wide range of uses, following Dapschauskas and colleagues, it is assumed here that its principle use was as an earth pigment (see also Kuhn 2014; Mithen 2014; Watts et al. 2016; Davin et al. 2023; Watts 2024; Salagnon et al. 2024, see Supplementary Online Material [SOM] A1).

"Over the last two decades, red ochre has played a pivotal role in discussions about the cognitive and cultural evolution of early modern humans during the African Middle Stone Age." (Dapschauskas et al. 2022:233).

The authors point out that despite this pivotal role, archaeologists faced a major knowledge gap; there were no large scale, temporal analyses of the early ochre record. Their *meta*-analysis of over 100 sites, using time-averaging techniques, is an important step in filling this gap. The sample spanned the period from earliest occurrences, around half a million years ago, to an arbitrary cut-off of 40,000 years ago (40 ka).

They identified three phases of initial, emergent (from ~330 ka), and habitual use.¹ In the 'habitual' phase, a third of sites contained ochre (p.233). The date of ~160 ka for the beginning of this phase falls roughly in the middle of the African Middle Stone Age (MSA, conventionally placed between ~300 ka and ~40 ka, McBrearty & Brooks 2000²). They interpreted the ochre as having primarily served as body-paint in communal ritual, with habitual communal ritual considered a necessary condition for inferring 'the first jointly shared fictions (i.e. symbolism)' (ibid:244, parentheses in original). Archaeologists accepting a pigment interpretation typically also adopt a ritual perspective on the subject (Kuhn 2014; Mithen 2014:14; Watts 2014; Salagnon et al. 2024:1). That habitual, body-painted ritual performance from ~160 ka might be *sufficient* for the higher level inference is suggested by marine shell beads from Morocco – some with ochre residues – dated to ~142 ka (Sehasseh et al., 2021), currently the earliest consensual evidence for symbolic culture. Over the following seventy thousand years, from the Cape to the Levant, red ochre associates with nearly all the rare, early evidence for symbolic culture in our lineage. It is found as the substrate of geometric engravings, as residues on later beads, the medium of a fragmentary painted design, the paint in mixing palettes, and associated with some of the earliest burials (Dapschauskas et al. 2022:237-8 with refs.). Red ochre use also approximates a signature of our subsequent dispersal beyond Africa (e.g. Vandermeersch 1969; Clarkson et al. 2015; Clarkson et al. 2020; MacDonald et al. 2020). As a quantitative field of variation, it allows archaeologists to move from the qualitative diagnosis of symbolic culture (innovations such as beads) to the investigation of its evolution (cf. Shea 2011a). Contrary to Stibbard-Hawkes (2024:18), it is not the case that pigment use 'was absent for most of our lineage's prehistory, then rapidly appeared and proliferated.' As a trait shared with other Middle Pleistocene *Homo* lineages (e.g. Bednarik 1990; Roebroeks et al. 2012; de Lumley et al. 2016), it offers unique potential for comparative evolutionary study (Power et al. 2013).

Coming approximately at the end of our genetically and morphologically diagnosed process of speciation (Scerri et al. 2018; Bergstrom et al. 2021; Meneganzin et al. 2022; Zollikofer et al. 2022; Ragsdale et al. 2023), the interpretation placed on this shift from irregular to habitual use may have profound implications. First, it suggests that the

¹ Following Dapschauskas and colleagues, 'red ochre' is used here in a very generic sense, including relatively pure haematite and its platy crystalline expression known as specularite. Minor updates to Dapschauskas and colleagues' data include an additional ochre-lithic co-association in their 'emergent' phase (Mabulla 2015, accepting Manega's dating estimates for the Ngaloba fossil site as >200ka and possibly ~290 (see Sup. Mat.A3). In South Africa, the shift to habitual red ochre use by ~160ka is lent additional support by data published since Dapschauskas and colleagues' cut-off point of 2018. The very large specularite assemblage from Olieboomspoort (Limpopo Province) is associated with a dating estimate of ~150ka (Val et al. 2021), while the habitual use of red ochre in the basal MSA assemblage at Klipfonteinrand (Western Cape Province) is associated with mean dating estimate of 156 ka (Mackay et al. 2023). Both sites appear in the Dapschauskas sample of habitual use assemblages, but were undated and the samples were poorly resolved.

² The conventional date for the beginning of the MSA at ~300 ka is close to when Dapschauskas and colleagues identify the transition from 'initial' to 'emergent' phases of ochre use, ~330ka. This also loosely aligns with current diagnosis of the earliest *H. sapiens* fossils in the broad sense (~315ka). However, not too much interpretative weight should be placed on these correlations, as the key positive attribute of the MSA (producing points or blades from prepared cores) has been pushed back to ~550ka (Johnson & McBrearty 2012; Wilkins & Chazan 2012). The end of the MSA varies by region and, to some extent, by prevailing lithic raw material use.

widespread view that modern bodies significantly predate ‘modern minds’ (e.g. Tattersall 2010, 2024), sometimes referred to as ‘the sapient paradox’ (Renfrew 1996), can finally be discarded.³ Second, it challenges the main conclusion of a recent behavioural review of the African Middle Stone Age, that there is no evidence for a ‘pan-African trajectory for the cultural evolution of *Homo sapiens*’ (Scerri & Will 2023:10). This suggests that the ‘glaringly obvious lack of a ‘revolution’’ (ibid:13), may also be vulnerable. In this context, it is notable that while Scerri and Will cited Dapschaskas and colleagues’ work as a pan-African overview of the pigment record (ibid:8), they ignored the findings and interpretation. Third, and most profoundly, the inference of habitual group ritual from ~ 160 ka suggests that the evolution of symbolic culture in our lineage and our speciation are related research topics, inviting unification through a single explanatory framework.

Following a brief survey of experimental literature and pertinent archaeological observations, Dapschaskas and colleagues granted ‘the possibility that sometimes people also used this material for practical purposes’ (Dapschaskas et al. 2022:238),⁴ but overall, they inferred ‘the preparation of mostly blood-red colorants’ (ibid:237). Of hunter-gatherer and pastoralist ethnography, they remarked: ‘It is striking that the ritual context of ochre use – primarily in the form of body and face painting but also for rock art, ritual objects and burials – predominates’ (ibid:238). Their theoretical starting point was Émile Durkheim’s conceptual breakthrough (Durkheim 1915), that basic to symbolic culture are ‘collective representations’ – morally authoritative concepts installed in group members’ minds through their participation in ‘effervescent’ communal ritual (Dapschaskas et al. 2022:240, 244, 290). They then drew on work by ethologists on animal ritualised signals and by behavioural ecologists on human group rituals. Ethologists identified formal features of ritualized signals – including stereotypy, amplification, and redundancy; they also view ritualization as driven by observers seeking honest information about some underlying fitness quality. Conflicts of interest between signallers and receivers tends to drive up signalling costs (ibid:241 citing Zahavi and Zahavi 1997). Behavioural ecologists (e.g. Sosis & Alcorta 2003) transferred this principle to human collective ritual; according to Dapschaskas and colleagues, a consensus is emerging that costly ritual signalling “represents an effective psychological technique to signal and test *true* social, emotional and moralistic commitment to the group, and thus deters free-riders” (ibid:243, emphasis in original). Crucially, from an evolutionary perspective, emotional arousal and synchronisation of psychological states through costly song-and-dance ritual performance helps establish the necessary trust for cheap, conventionalized signalling to escape a cooperative dilemma – that ‘jointly shared fictions’ would initially be hard to stabilize because they make lying easy (ibid:244). Several things are implicit in this account: i/ a coevolutionary dynamic between costly ritual and ‘cheap’ speech (Knight 1998), ii/ that group ritual creates the ‘sacred’ (Durkheim 1915; Rappaport 1999), and iii/ that shared fictions constitute ‘institutional facts’ (Searle 1995), among them linguistic facts such as socially agreed ‘sound-meaning correspondences’ (Knight 2016:129). Addressing the trust problem from a biolinguistics perspective and assuming some version of the ‘self-domestication’ hypothesis (selection for reduced reactive aggression), Cedric Boeckx has proposed that something distinctive about the ecological context of *H. sapiens* rituals, possibly including initial abundance of resources, provided the ‘special, safe ecology’ prerequisite to upholding the levels of trust required for ‘reciprocal faking in communicatively helpful ways’

(Boeckx 2023: 4, 6–7, citing O’Rourke et al. 2021; Knight 2010; Brooks & Yamamoto 2021). With respect to language origins, a ‘great leap forward’ is ruled out (ibid:2), but a tipping-point in the transformation of quantity to quality is not considered.

The speciation of *Homo sapiens* and the evolutionary emergence of symbolic culture may be closely related research topics, but Palaeolithic archaeologists and palaeoanthropologists face serious obstacles to a productive engagement with symbolic culture. First, there is the paradox of equating culturally accepted fictions with nature’s ‘brute’ objective facts, the former being just as factual – for as long as the fiction remains relevant (Knight 2010:193). Second, despite Durkheim’s conceptual breakthrough, social anthropology has generally abstained from ‘origins’ or evolutionary debates (Gellner 1988; Power, Finnegan, & Callan 2017), inevitably handicapping the development of a multi-perspectival, transdisciplinary approach. Consequently, symbolic culture is often treated as a ‘mystery’ rather than a scientific problem (see Boeckx 2017 on language origins); this gains legitimacy if it is assumed that, for most of our species’ history, ‘we have next to no idea what was happening’ (Graeber and Wengrow 2021:1, 81). This assumption partially rested on physical diversity among early *H. sapiens*, likened ‘to a world inhabited by hobbits, giants, and elves’, thereby permitting the presumption that social organization must have been at least as diverse, beyond the reach of analogy or homology (ibid:81). At the other extreme, archaeologists have sometimes transposed ethnography onto the deep past with insufficient attention to warranting arguments (cf. Botha 2009, 2015), or have limited attention to environmental and ecological adaptation – without considering indigenous ‘ways of thinking about the world’ (David 2006:49).

Hypotheses. A starting point to develop a single explanatory framework would be to address two questions arising from Dapschaskas and colleagues’ interpretation of habitual red ochre use: What kind of body-painted group rituals were involved, and why was the colour red apparently so central to these performances and the subsequent unfolding of the symbolic domain? Both might productively be addressed with a different formulation: Can cross-cultural comparative study of African hunter-gatherer ritual uses of red substances, together with associated beliefs, constrain theoretically informed interpretations of the archaeological finding? This places a premium on evolutionary models that generate interesting, refutable predictions of the symbolic domain.

There are currently two main hypotheses as to the kinds of group ritual that could have raised collective-intentionality to the level of shared fictions – male ritual coalitions on the one hand, and female-led coalitions on the other (Power, Watts, & Knight 2024, see also Kramer 2022). Before considering these, some evolutionary context is necessary. The main story to the evolution of genus *Homo* is encephalization, with at least two periods of pronounced brain-size increase, among early *H. ergaster/erectus*, and over the last few hundred thousand years. Larger brains may be good to have, but they are nutritionally and energetically demanding. These costs largely fell on pregnant and nursing females, so general behavioural expectations would include the evolution of female strategies to harness more investment from others, together with age-related trade-offs between investment in resource acquisition and investment in direct fertility (Hawkes et al. 1989; Power & Aiello 1997; Power, Arthur, & Aiello 1997; Hrdy 2009; Opie & Power 2009). Through the Middle Pleistocene (780–130 ka), male hunting became a critical form of investment (whether as mating or parental investment), with greater emphasis on collective labour than in later epochs. This presumably provided females with a slightly different calculus to evaluate male qualities, and cautions against identifying ‘male-male behavioural

³ Interestingly, once the European Upper Palaeolithic was no longer seen as a cognitive Rubicon, Renfrew could still maintain his ‘sapient paradox’ whilst ‘siting the human revolution, ... – in Africa, between 150,000 and 70,000 years ago’ Renfrew (2007:88). This raises issues beyond the scope of this paper, but for a social anthropologist’s critique of closely related issues, see Goody (2005).

⁴ For further review comments on non-semiotic (mundane) uses of ochre, see SOM A1.

contests as the primary selection pressure on mating systems' (Gowaty 1997:379). For *Homo sapiens*, 'pooled energy sources effectively balance slow child development and rapid birth rates' (Shea 2011a:25, citing Kramer & Ellison 2010).

The male ritual coalitions hypothesis posits bonding of an in-group and othering an out-group in contexts of intergroup competition for scarce resources (e.g. Alcorta & Sosis 2013; Rossano 2015; Whitehouse 2021). It overlaps with the 'warfare' hypothesis of group mindedness (e.g. Bowles 2009; Wrangham & Glowacki 2012; Tomasello et al. 2012:681; Marean 2016⁵). Stress induced migration and increased encounters with other groups (Rossano 2015), or the capture/defence of dense and predictable resources (Marean 2016; Singh & Glowacki 2022), could well promote male ritual coalitions and generate unprecedented levels of in-group trust. The hypothesis would presumably predict male philopatry and female dispersal on maturity (Chapais 2008; Foley & Gamble 2009:tbl.3) and could draw upon psychological research to predict a red focus of indexical, agonistic ritual displays (e.g. Hill & Barton 2005; Robinson et al. 2015 with refs.; see also Jordania 2024). At least one team of archaeologists has proposed this kind of explanation for early habitual ochre use (Davin et al. 2023). But, it is unclear how this would generate sexual morality,⁶ cooperation with strangers, cooperation across wide networks, how a ratchet effect of sociocultural norms could stabilise, and why rival coalitions would accept each other's symbolic or conventional tokens⁷ (Power, Watts, & Knight 2024:296-7). Females are primarily a resource to be fought over (Marean 2016) or a medium of reciprocal exchange 'in the pacification of between-group relations' (Chapais 2008:250). In sum, there is no clear route from reality-bound iconic and indexical ritual signals, to signals with a fictive component.

Opposed to these scenarios is the Female Cosmetic Coalitions (FCC) hypothesis, with which this author is associated (Knight, Power, & Watts 1995; Power, Arthur, & Aiello 1997; Power & Aiello 1997; Power 2001, 2009, 2010, 2019; Power, Sommer, & Watts 2013; Power, Watts, & Knight 2024). Kuhn (2014) and Sterelny (2018) represent possible intermediate positions. FCC proposes that group ritual evolved as a coalitionary strategy driven by the material interests of mothers, essentially creating a 'reverse dominance hierarchy' (Boehm 1993, 1999), a strategy that evolved in two stages. The premise is that, as a cue of imminent fertility, menstruation could trigger conflict and competition, both among females – because a pregnant or nursing mother risked losing male support to a cycling female, and among males – competing to mate-guard or be-attentive-to such a female. It posits that the attractive property of menstrual blood (attracting male attention) was exploited on the coalition's terms, using blood or blood substitutes to scramble the honest information.⁸ Through indexical and iconic ritual display, this collective tactical deception laid the foundations for shared fictions. The primary goal in the first stage, initially dubbed 'the sham menstruation' strategy, was to make it harder for philandering males to pick and choose on the basis of fertility status. In the second stage, as brain-size increase continued or was renewed, ritual displays were organized irrespective of whether any coalition member was menstruating,

rewarding investor males. With males having to work harder to gain reproductive access, they would be choosier about which females to invest in, with the corollary of inter-female competition (Trivers 1972; Gowaty 1997). Power (2009) proposed that female cosmetic coalitions would, in the second stage, be indexically advertising the coalitionary support available to any offspring born into that coalition, while simultaneously stabilizing the transmission mechanism of a communal realm of pretend-play – extended from childhood to adulthood through ritual. In both stages, the logic of resistance to dominance cuts across biological sex and fosters the creation and sharing of fictions – but only in the second stage can it reasonably be inferred that an institutional fact – like the idea that some things are 'sacred' – existed at a continental scale.

For internal reasons, the posited form of this ritual action would be a dark-moon 'sex-strike', lasting until males returned from a collective big-game hunt at around full moon, surrendering the product as a collective form of bride-service. It 'institutes chains of connection across landscapes through sexual and economic exchange with men in fact being exchanged between matrikin groups.' (Power et al. 2024:302). If women's symbolically constructed 'blood' marked them as periodically sexually unavailable, as if removed to another world, this symbolic logic could be extended to the blood of game animals – marking their flesh as unavailable until brought to camp and the blood removed by women's cooking-fire. Symbolically, the legacy of this mechanism is cross-culturally expressed in rules that – in specified circumstances – disengage a hunter from 'his' kill, obliging him to surrender rights in distribution, typically to affines and originally to the mother-in-law (Knight 1987, 1991). At origin however, the collective nature of hunting would imply that this mechanism was analogous to collective 'bride-service', with sacrificial obligations subsequently transferable to whoever claimed ritual authority. Alongside a bias to matrilocality residence during a woman's peak reproductive career, bride-service is the default of African immediate-return hunter-gatherers (Power et al. 2024:301 with refs.; see also Verdu et al. 2013 re matrilocality bias).

The resulting cosmology is an alternation between uterine-kinship solidarity and 'marital' relations, unifying economic, sexual, ritual, and sociological periodicities (Knight 1991). The colour focus of early group ritual performance is readily accounted for, with preferential use of the reddest, most saturated, and eye-catching materials (e.g. Watts 1999, 2002, 2009, 2010; Barham 2002; Hodgskiss 2012; Salomon et al. 2012; Watts et al. 2016; Culey et al. 2023). It also predicts the world's ritually expressed first metaphor – establishing a relationship between women's blood and the blood of the hunt. If periodic signalling of sexual unavailability was an emphatic 'No!', then an inversion of standard fertility signalling may be predicted, with ritual displays creating 'gender' as the performance of 'Wrong species, wrong sex, wrong time'. The movement from uterine-kinship solidarity to 'marital' availability can readily be constructed as temporary death followed by resurrection, so familiar from Rites of Passage and fairy tales alike. Explorations of these and other symbolic predictions have been productive (e.g. Cardigos 1991, 1996; Knight 1983, 1988, 1997; Knight et al. 1995; Power & Watts 1997, 1999; Power 2004, 2009, 2010, 2015, 2019; Watts 2005, 2017;; Sims 2006;; Finnegan 2008, 2013; Knight & Lewis 2017a, b; contributions in Silva and Henty 2022). The model's implications for hunting strategies and periodicity during our speciation are explored elsewhere (Watts 2022). The critical point here is that when most Palaeolithic archaeologists were convinced that symbolic culture post-dated ~40 ka (and that most of the early evidence was European), the FCC model predicted a shift from irregular to regular use of red ochre in African campsites 'in the period 160–140 kya', as the first species-wide symbolic tradition (Knight et al. 1995:81). In the nineties, the earliest that such a shift could be identified – in southern Africa – was ~110 ka, in the early Late Pleistocene (Watts 1999).

Dapschaskas and colleagues could only find one other evolutionary model addressing group ritual that made temporal predictions about habitual ochre use, Rossano's (2015) intergroup competition model,

⁵ With the exception of Marean (2016), bellicose school models have generally been posited in Late Pleistocene contexts, partly a by-product of the discrepancy paradigm.

⁶ Following de Waal (2013), 'morality' is not viewed here as *sui generis*, but built from the bottom up, where assent is predicated on being able to say 'no', starting with the body.

⁷ Sterelny (2011:813) proposed a 'badging' role for red ochre in inter-group encounters, but is sceptical about resource-stress driven intergroup conflict as an explanatory mechanism of ritual intensification (2018:419–20).

⁸ 'Menstruation did not evolve as a signal, being a by-product of endometrial function (Strassmann 1996). But it is a trait that can be exapted as a signal in the definition of Zahavi and Zahavi (1997: 58): Its value to the signaler is that it conveys information to signal receivers, in this case information about fertility.' (Power et al., 2009:268).

which they dub ‘the ecological stress’ model. But, Rossano conceded that FCC: “may uniquely explain the earliest African red ochre sites” (*ibid*:92).⁹ The youngest of the earliest assemblages mentioned associates with stratigraphically inverted dating estimates of ~166 ka and ~144 ka (*ibid*:tbl.1, cf. Grün et al. 2003); this happens to be the earliest stratigraphic member at Border Cave to show habitual ochre use (Watts 2009:fig.4.1; 2014:tbl.16.2¹⁰). It is only after ~150 ka that Rossano posited ecological stress driving intergroup competition, resulting in costlier or more intensive ritual activity (but see Sterelny 2018:419–20). Why this date was chosen is unclear, as the earliest African evidence cited for such stress is the mega-drought inferred between 135–127 ka.

Turning to the FCC hypothesis, in its initial formulation, the prediction of habitual use by ~160–140 ka was a minimum prediction, partly based on a best guestimate as to final brain-size increase and partly on the assumption that dry-season nutritional stress would have been more pronounced during the peak of the penultimate glacial cycle – Marine Isotope Stage 6 (see SOM A2). In a later publication, taking account of back-dating of the earliest globular cranium (McDougall et al. 2005), the prediction was that habitual use should be established any time in the range of ~200–150 ka (Power et al. 2013:44), a range that now has to be extended to ≥233 ka (Vidal et al. 2022). The proposed evolutionary process or mechanism of runaway sexual selection, but with both sexes being choosy (Power 2009), would predict a relatively rapid shift from irregular to habitual use. The time-aggregating methods used in the Dapschauskas paper prohibited testing this. Research with the potential to test this aspect of the prediction is currently focussed on the regional cluster of shelter/cave campsites with long archaeological sequences, sampling the ‘Pietersburg’ regional variant of the MSA in northeastern South Africa (e.g. Watts 2014:218–22 & tbl.16.2; Porraz et al. 2015, 2018; d’Errico & Blackwell 2016; Backwell et al. 2018a, 2022; de la Peña et al. 2019; Val et al. 2021; Culey et al. 2023).

Dapschauskas and colleagues do not think their data supports either hypothesis. Acknowledging poor temporal resolution before ~160 kya, they could not identify any correlation between ochre’s relative frequency and climatic fluctuations (Dapschauskas et al. 2022:288; see SOM A2). With respect to FCC, they agree with key assumptions of the model (*ibid*:287), but consider that recent developments in understanding our speciation undermine the prediction that habitual use ‘should arise abruptly with the speciation of *H. sapiens* about 200,000 to 150,000 years ago’ (*ibid*:285). That speciation was a more protracted, mosaic, and reticulate process than envisaged a decade ago is not in doubt, but the critical issue for FCC is brain-size maximization. They highlight a large cranium from early in the morphologically diagnosed process, at ~315 ka, but this should not distract attention from the overall pattern, where brain-size increase seems to continue through the process (Will et al. 2021:fig.1c; see also Gingerich 2022:fig.3). I consider this pattern to be more pronounced than in Will’s data (SOM A3). Brain-size maximisation correlates with globularisation of cranial-shape. The finding of red ochre associated with the Ngaloba cranium (Mabulla 2015), dating somewhere between >200 ka and ~290 ka (Manega 1993, SOM A3) adds weight to the inference that Dapschauskas and colleagues’ ‘emergent’ phase of ochre use (from 330–160 ka) associates with early increments towards globularization (Stringer 2016:5). As both the earliest examples of globular crania are east African, it is

currently unknown how gradually or quickly this derived state spread (Meneganzin et al. 2022). In sum, the FCC model’s prediction regarding the onset of habitual ochre use remains relevant to Dapschauskas and colleagues’ main finding, with respect to timing and proposed mechanism.

The FCC model’s focus on menstrual bleeding is considered essentially untestable, as evolutionary psychology and primatology provide a wide range of potential contexts in which a pre-existing perceptual and cognitive bias for redness might have been ‘hijacked’ (Dapschauskas et al. 2022:239, 292–3¹¹). A ritual focus on red is theoretically overdetermined; even if blood-flow were the context, this could be ‘wounds caused by predators, fatal accidents or fights with conspecifics, as well as menstruation and fertility’ (*ibid*:292). While ethnography was used to support the inference of preponderant ritual use in the deep past (*ibid*:238), it was not deemed appropriate to evaluating whether rituals pick out particular kinds of blood-flow, apparently because of the truism that ‘the specific symbolic meaning of the color red varies across cultures and historical epochs’ (*ibid*:239). We may never be able to test hypotheses about what prehistoric symbols meant to the humans that made them (Shea 2011b:583), but this does not mean that ethnographic variability precludes constraining the interpretation of past use; social anthropologists routinely distinguish contextually contingent meanings from encompassing structures of symbolic relationships, within which meanings operate. The structuring of symbolic relationships in myth and ritual tends to be conservative, with ritual mediating between mythic ideals and peoples’ lives as lived on the ground (e.g. Leach 1954:16; Turner 1967:365; Murphy 1972:243; Knight 1991). If myths and magical fairy tales are amenable to scientific inquiry (Lévi-Strauss 1959; Propp 1968 [1928]; Knight 1991; d’Huy 2016), it may be legitimate to speculate that mythic ideals echo a sensitive dependence on initial conditions.

Dapschauskas and colleagues excluded symbolic data from the interpretation of their temporal finding (2022:236, 239), a finding which might be considered the smoking-gun of a pan-African ‘one myth only’ (Lévi-Strauss 1981). This is where the general absence of social anthropology in modern human origins debates is most keenly felt. One of the discipline’s longest running theoretical discussions has been the contention that an ideology of blood – established through group ritual – was foundational to symbolic culture (Frazer’s 1887 correspondence with his former supervisor [Fraser 1990:75–80]; Fraser 1900 vol III:204, 233; Durkheim, 1896–97, 1915; Briffault 1927; Makarius & Makarius 1956; Makarius 1974; Testart 1985, 1986; Knight 1991). This ideology has been taken to centre on menstrual blood and, since Durkheim’s intervention, on a posited relationship between this and the blood of hunted animals. The inference that ancient shared structures of ritual and cosmology might operate cross-culturally was implicit from the outset, with Frazer’s finding that the ritually constructed power of divine kings was identical to that of menarcheal girls. Durkheim’s identification of menstrual blood with animal blood is to be viewed in the light of his wider thesis that in ritual ‘we forcibly identify contraries’ (1915:238) in order to make abstract ideas seem sufficiently concrete to be communicable. Following Lévi-Strauss’s presumption of a hard-wired, binary oppositional structure to cognition, Testart took the effusion of menstrual blood and the effusion of animal blood in the hunt as presenting to the mind the catastrophic danger of conjunction of similarities, producing the near universal prohibition on women handling hunting weapons and the ideological justification for the sexual division of labour. For all concerned, the issues were indissolubly

⁹ In placing the emphasis on ‘reliable pair-bonding’ rather than alloparenting and generalised male provisioning (2015:78), Rossano arguably misrepresents the FCC hypothesis; it might be understood as concerning ‘the privatisation of female sexuality’ (Tužinská 2022:299). A definite misrepresentation is where he takes the second rather than first stage to be primarily *against* male philandering (2015:82).

¹⁰ Owing to the large volume of Beumont’s excavated deposit in 1987–88, Watts’ (1998) data from this excavation is more informative about temporal change in ochre frequency during the Pietersburg than recent data from excavations of very small volumes (Backwell et al. 2022:fig.9).

¹¹ Spanning survival, mating, and group living, the proposed potential evolutionary contexts for the exaptation (‘hijacking’) of the salience of red are: food acquisition, danger, pain, death, menstruation, sexual arousal, health, emotional arousal, aggression, and dominance (Dapschauskas et al. 2022:292–3).

linked to explaining the incest prohibition and exogamy. The FCC hypothesis built on this tradition while recasting it in evolutionary terms.

Linking the present to the past.

Assuming that symbolic culture evolved (Gontier et al. 2024), we have a range of constraints that theoretically informed models can draw upon, in order to generate interesting, refutable predictions that might justify invoking the Uniformitarian Principle:

- Theoretical and empirical grounds for regarding costly group ritual as the most plausible mechanism by which symbolic culture was established and stabilized,
- Theoretical and empirical grounds for expecting ritual display to exploit perceptual and cognitive biases for eye-catching qualities such as redness and brilliance,
- Two models hypothesising different kinds of ritual coalition, both generating temporal and palaeoenvironmental predictions of the ochre record and its associations, with FCC also predicting past selective criteria of preferential use,
- These two models generate opposite predictions of post-'marital' residence biases,
- Only FCC has generated predictions of symbolic culture, but this may be decisive where evaluations of predictions of conventional data (fossils, archaeology, palaeoclimate) are considered inconclusive, or where competing models are otherwise equifinal.

If archaeologists and the wider palaeoanthropological community are to further constrain interpretation of the ochre record during and following our speciation, then what counts as evidence in evaluating models needs broadening. It should be axiomatic that any theory of symbolic origins be testable against symbolic data (Knight et al. 1995:103).

I briefly consider five arguments why African hunter-gatherer evidence concerning the use of red substances in ritual contexts, together with associated beliefs, may be relevant to interpretation of the ochre record associating with our speciation process. The first two are general phylogenetic relevance criteria, concerning Africa and the category of Immediate-Return hunter-gatherers. Then there are several kinds of genetic and archaeological findings and inferences that afford some basis for temporal bridge-building.

1. With African speciation in the late Middle Pleistocene and with symbolic culture established long before Late Pleistocene major population dispersal beyond the continent, Africa provides an appropriate initial filter or baseline category for a comparative study, contrary to Graeber and Wengrow (2021:15, 539 endnote 7). None of this implies treating people as 'living fossils'.
2. Immediate-Return (IR) hunter-gatherers (Woodburn 1980, 1982a, 2005), primarily documented in Africa and southeast Asia, are considered the most relevant recently extant cultures for modelling modern human origins (Woodburn 1980:113, 2005:20; Whiten & Erdal 2012; Knight & Lewis 2014; Townsend 2018; see also Lee 2018), again contrary to Graeber and Wengrow (2021:15, 82, 129, 539). Woodburn identified a range of characteristic structural features, including assertive egalitarianism, but arguably their most distinctive trait is unparalleled gender egalitarianism (1980:111; 1982a:434), even where 'male cults' have developed (2005:26–9). Most extant African hunter-gatherer cultures are immediate-return,¹² with bride-service and initial matrilineal residence as default conditions (Power 2017:183¹³; see also Verdu et al. 2013; Verdu &

Austerlitz 2015; Padilla-Iglesias & Derckx 2024:6). The earliest evidence consistent with a delayed-return system – semi-sedentary hunter-fisher-gatherers – is inferred from 25–20 ka (Crevecoeur et al. 2016), an adaptation associating with warfare from ~ 14 ka (Crevecoeur et al. 2021).

3. African immediate-return hunter-gatherers fall into two geographic and genetic clusters and a geographic isolate. The clusters are centred on the Congo and Kalahari Basins; the isolated Hadzabe, in the Rift Valley's Eyasi Basin, are part of a genetically inferred cluster of otherwise former hunter-gatherer populations in east Africa (Scheinfeldt et al. 2019). All three are long isolated from each other. However, ancient DNA from eastern and southern-central Africa suggests that, through the later Middle Stone Age and early Later Stone Age (between ~ 80–20 ka), there was considerable interaction between ancestral populations, followed by regionalization in the terminal Pleistocene (Lipson et al. 2022; Fan et al. 2023). In genomic models which assume no admixture, 50 % of African hunter-gatherer lineages are estimated to coalesce between 85–58 ka (Fan et al. 2019:7).¹⁴ Interconnectivity between eastern and southern Africa seems to have ended by ~ 12 ka (Fan et al. 2023; see also McKenna et al. 2022:46). Non-trivial shared symbolic traits could, therefore, have arisen through Pleistocene interconnectivity. Within the Congo Basin, genetic divergence of ancestors to western and eastern populations is inferred from 20 to 30,000 ka (Boyette et al. 2022:2 with refs.¹⁵), but combined genetic and cultural analyses also suggest interconnectivity across the basin into the Holocene, most evident in singing style, musical instruments, and – occasionally – in the names of the instruments (Padilla-Iglesias et al. 2024; see also Demolin 1993; Bahuchet 1996:tbl.5.1; Fürniss 2014). Grauer (2009) and Poole (2018) have gone further, proposing significant affinities between 'Pygmy' and 'Bushman' music, suggestive of an older, larger scale of interconnectivity. Within southern Africa, the Ju/'hoan and the former /Xam are about 1,400 km apart and their languages belong to different language families (Kx'a and Tuu respectively). Genetics indicate that respective ancestral populations had separated at least 30,000 years ago (Fehn et al. 2022:249), possibly as a result of geographic isolation due to a Makgadikgadi mega-lake that existed through much of the Late Pleistocene (ibid:250). But, it was the comparison between Ju/'hoan and /Xam beliefs and rites surrounding a first land kill that helped legitimate speaking of a shared hunter-gatherer cosmology across southern-Africa (Lewis-Williams & Bieseke 1978). The most ambitious comparative endeavour is Power's (2017) proposed outline of a source cosmology among African hunter-gatherers, including an 'ideology of blood'.
4. Some archaeological evidence supports the genetic (genomic and ancient DNA) inference that Late Pleistocene populations across eastern and southern Africa were interconnected, becoming more isolated in the terminal Pleistocene and Holocene. Ostrich eggshell bead morphology shows uniformity across the two regions, from first occurrences at ~55 ka until ~33 ka, followed by divergence sometime between 19–33 ka (Miller & Wang 2021). A preliminary comparative study of Tanzanian and southern African Later Stone Age rock-art traditions showed that, despite stylistic differences, there were striking similarities in graphic conventions thought to represent healing dances (Lewis-Williams 1986). Within southern Africa, ostrich eggshell isotopic signatures have permitted the inference that bead exchange networks, spanning hundreds of kilometres and considered analogous to Ju/'hoan *hxaro*, extend back ~33 ka, to the late Middle Stone Age (Stewart et al. 2020). The therianthrop figures painted on stone plaques from the youngest MSA at Apollo 11 Cave (southern Namibia) and dated to ~30 ka, are

¹² African hunter-gatherers not considered immediate return include groups like the Okiek (Woodburn 1988).

¹³ As a long-term commitment, bride-service highlights a limitation to 'immediate-return' as a category label, something recognized by Woodburn (1980:111).

¹⁴ Incorporating admixture into models would reduce this estimate, but probably not by much (cf. Bergstrom et al. 2021:231).

¹⁵ This divergence may be as early as ~44ka (Fan et al. 2019:8).

interpreted as shamanistic, raising the possibility of some ‘ideological and cosmological continuity ... between the MSA and LSA’ (Rifkin et al. 2016:338). Several of these examples arguably provide demonstrations of principle, independent of the ochre record, that the Middle Stone Age is not beyond the range of symbolic cultural continuities with the ethnographic present. A more speculative case concerns the unique ritual site of Rhino Cave in Botswana’s Tsodilo Hills, thought to date back in the order of 70–80 thousand years, with, *inter-alia*, its snake-like, highly modified natural feature (Coulson et al. 2011). It has been proposed that this may have bearing on the temporal depth of some striking zoomorphic cosmological similarities between Australian and southern African hunter-gatherers (Watts 2017).

None of these considerations warrant assuming that archaeologists can bridge 160,000 years in the symbolic domain, but twisted together (Wylie 1989), they constitute a strong cable for tethering the plausibility of the Uniformitarian Principle in this domain, over at least the last few tens of millennia, into the final Middle Stone Age.

Because the shared fictions of symbolic culture appear paradoxical from a neo-Darwinian perspective, one might suspect that unusual socio-ecological conditions were implicated in their evolution. These may have influenced the form symbolic culture initially took in Africa, a kind of sensitive dependence on initial conditions. The critical condition is considered a safe ecology that favoured learning through innovation/exploration over learning through imitation/exploitation (Boeckx 2023). Whether addressing the evolution of collective ritual, of language as we know it, or of symbolic culture more broadly, following Hurford (1990) and Boeckx (2023), an ‘arena of use’ based account is called for, something also implicit in Shea’s suggestion that language and symbolism were epiphenomena of reproductive strategies (2011a:25).

In sum, without transposing the ethnographic present onto the deep past, there are good theoretical and evidential grounds for suspecting that shared structures of ritual and belief among currently isolated clusters of hunter-gatherer cultures are likely to be very old.

This study.

The focus on African hunter-gatherer ritual use of red substances (ochre, plant pigments, blood), together with associated beliefs, means that justice cannot be done to encompassing cosmologies, but wherever possible, Indigenous voices are foregrounded. Ritual use of other colours have little bearing on the archaeological record in question, so will not be considered here. The literature surveyed was of the most intensively researched groups in the Congo Basin, southern Africa, and the Hadzabe (Eyasi Basin, northern Tanzania). I aimed for as comprehensive coverage as possible, but this was not achieved for the literature on forest hunter-gatherers. While evolutionary models focus on group ritual, here individual, dyadic, and group rituals are included. An earlier survey considered red pigment use among southern African ‘Khoisan’ cultures (including pastoralists) (Watts 1998:App.5 h; 1999), so equatorial data is prioritized here. On a definitional note, with symbolic culture assumed – indexical and iconic signalling are *ipso-facto* subsumed into this domain.

3. The cross-cultural survey

3.1. Forest hunter-gatherers

The most well-known eastern groups are the Mbuti (Sua) and Efe; in the west, the main groups are the recently diverged Baka and Aka. The Mbendjele are an Aka sub-group. Most western groups are collectively known as BaYaka. There seems to be a general rule that men should not hunt or collect honey when women in close proximity (sisters, mothers, or wives) are menstruating (e.g. Lewis 2008:306–7; Carpeneto & Germi 1989:74; Schebesta 1941:114).

Across the Congo Basin, the most valued pigment is redwood powder from the leguminous tree *Pterocarpus soyauxii* (SOM B1a). In the

northeast, this is restricted to the southwestern corner of Ituri forest (Tanno 1981:37); Efe obtained it from Lese farmer neighbours, who procured it from further west (Wilkie & Morelli 1991). This may partially explain a sparser Efe and Mbuti record of red pigment use.¹⁶ In the west, each Baka family had its own block of redwood, powdered as required (Boursier 1994b:208 fn.1). Processing is almost invariably reported as done by women (Schebesta 1938:88; Wilkie & Morelli 1991:59; Thomas et al. 1993:37 [photo]; Boursier 1994b:208). Use was predominantly in ritual contexts (for the eastern Congo, see Maes 1911:134; Turnbull 1965:200; Tanno 1981:35; in the west – Higgs 1985:100; Boursier 1994a:20; Lewis 2008). Bahuchet reported that for particularly important Aka dances, it was common to colour the body with *mbema* – redwood paste (1985:507). He also drew attention to the wider salience of red in both ritual contexts and in Aka aesthetics (1985:513). As with most other languages with just three ‘basic colour terms’ (Berlin & Kay 1969; but see also Kay & McDaniel 1978; Kay & Maffi 2000), the Aka term for red includes yellow and orange (Bahuchet 1985:444). Contexts overlapping with ritual include bark-cloth decoration and medicine (SOM B1b): painted bark-cloths were typically made for ritual occasions (Wilkie & Morelli 1991:56; Wheeler 1996:64), while no terminological distinction is made between practical and spiritual efficacy of medicines (Boursier 1994a:94 fn.2). For the Aka, the primary symbolic significance of redness is said to concern movement between worlds (Bahuchet 1991:168; see Brisson 1999[I]:73–4 for a similar interpretation of Baka beliefs).

In Baka mythology, redwood was a pre-requisite of cultured life, stolen by the ‘foolish’ trickster Waito from his uterine uncle, Komba – god (Boursier 1994b:11, 208–12). When Waito saw Komba’s wife grinding redwood, he exclaimed ‘Oh! ... What a beautiful thing, like blood’ (ibid:208). He stole the red powder and covered himself with it; unable to wash it off, he begged Komba for help. Komba then split his redwood plank in two and gave one piece to the Baka for medicine. Another myth tells of Komba’s gift of redwood as a medicine to control rain; with this, he anointed the legs and feet of white stork twins, who were also people; he instructed them to go to the Baka, stop the rains and dam the waters with their wings, teaching the women to do the same so that they could catch fish. In this way, redwood (acajou) became the ‘remedy of water, to control the rain’ (Brisson 1999 II:363). The arrival and departure of white storks respectively signals the end and the start of the rains (when the rivers flood). A third tale figures the ‘clever’ trickster, Kunda – the Tortoise, Komba’s other uterine nephew; Kunda’s wife (also a tortoise-person) is pregnant. The infant in the womb asks his mother for the way out. She replies ‘This way’. ‘So he split his mother’s womb right down the middle and descended to the ground. As soon as he was down on the ground, his mother took the mahogany powder and smeared it on his forehead.’ (Wuya Philémon in Boursier 1994b:13). He is named Bisolo or Isolo – ‘He who speaks in the morning’ (Brisson 1999 I:33), or – ‘he who gives good advice in the morning’ (Kilian-Hatz 2008:182); alternatively, his name refers to the splitting of his mother’s womb (Boursier 1994b:13, fn.1).

Redwood applications take two main forms, marking the forehead (discussed below) or covering the body. Full-body anointments are generally done with oil – ideally raw palm oil (Maes 1911:134), the redwood enhancing the oil’s redness (Turnbull 1965:201, SOM B1c). In the west, adult full-body anointments included initiation into the men’s ritual association of *Jengi* (Higgs 1985) and at the end of mourning (Pöli in Boursier 1994a:87); in contrast to farmers, it was not done at marriage (Boursier 1994b:162, fn.18). Redwood is applied ‘to mark people in potent, dangerous, or vulnerable situations’ (Lewis 2008:302), generally relationally defined – women to men, parents to infants, the

¹⁶ Ituri lies on the rim of the Congo Basin, where underlying geology emerges; non-professional archaeological trenches demonstrated past ochre use (Schebesta 1938:86–7; 1941:222) and Schebesta’s employees reported seeing an Mbuti woman colouring barkcloth with ochre (1938:88).

living to the dead. These situations include serious illness, mystical activities, hunting dangerous animals and honey-gathering – also dangerous (*ibid*), travelling afar (Leonard 1997:40), women's reproduction and infancy. In this last arena, we have a wide range of reports. If a woman suspected infertility, she rubbed redwood onto the belly (*ibid*:75; Brisson 1999 I:73). It was applied to the expectant mother's stomach (Higgins 1985:100; Brisson 2011:114–15), the cut umbilical cord (Higgins 1985:100; Brisson 2011:229), following the baby's baths (Lewis 2002:108), when it learnt to crawl (Leonard 1997:39), and during weaning (Brisson 2011:73). The birth of Baka twins draws out the wider social ramifications. Everyone receives redwood blessings (Leonard 1997:50; Brisson 1999 I:73) and the placenta is dried for hunting and honey-gathering medicine (Boursier 1994a:94), applied to cuts on the spear-throwing hand before hunting large, dangerous animals (Brisson 1999 I:82). The twins are given raw meat to suck the blood or animal blood is put on their lips, so "their hearts go to the animals" (Pöli in Boursier 1994a:95) and the animals will come to them as adults (Leonard 1997:39). When Mbendjele twins fell sick, everyone was anointed with redwood paste (Finnegan 2008:207–9 & figs.21–2).

Transfers of potency in blessings or bestowing luck are particularly informative. Luck is largely down to personal responsibility, looking after one's *ekila* or equivalent concepts – broadly concerned with men's and women's joint responsibility for successful reproduction and production (Lewis 2008). Luck resides in the forehead (Joiris 1993:60; Brisson 1999 I:73), where blessings are typically placed:

'Luck, ... is given by Komba, or by women, with saliva, *nguso*, which is a blessing. This saliva, mixed with red mahogany powder, *ngele*, represents blood, *n je*. ... *ngele*, is the blood of God-Komba.' (Brisson 1999 I:73)

While iconic of blood, Brisson considered the construct 'blood' as symbolising 'solidarity, sharing and the prohibition of incest' (*ibid* I:74), with the *ngele-nguso* blessing providing 'the link between people to maintain peace, between people and Komba, between people and their ancestors' (*ibid* I:73). This account was embedded in a discussion of hunting rituals, the main context for this ritual act. Similar redwood and saliva blessings, sometimes collectively performed, are widely reported for hunting nets in the western Congo Basin (Motte 1980:227, 246; Sarno 1993:65; Takeuchi 2009:13). In Ituri, a black paste was used (Kenrick 1996:125), possibly because redwood was scarce. Redwood is also part of Baka medicines for pig and elephant hunting, applied to the forehead and spear (Brisson 2011:9–10, 113). Forehead *ngele-nguso* blessings are frequently conveyed by a father, but their potency comes from Komba or women and the blessing may equally be given by an old woman or an aunt (Brisson 1999 I:73). Leonard goes further, that the blessing is particularly potent coming from women, especially a mother-in-law (1997:50–51, 76), and that it is optional whether she gives a prayer to Komba or the spirits, as: "Her words alone have the power to bless" (*ibid*:78).

More explicit about this nexus of women, luck, and blood, is Jerome Lewis's claim that a shared feature of forest hunter-gatherer cosmologies is "the symbolism of blood" underpinning the sexual division of labour (Lewis 2014:220, citing Lewis 2008, Ichikawa 1987). This was largely based on his finding that menstruation was the ultimate mnemonic for the Mbendjele concept of *ekila* (2008:305). For the broader claim, studies of Aka and Mbuti conceptual equivalents were cited (*ibid*, note 2).

Inquiring why some men rubbed a red line onto their foreheads before hunting or honey gathering, Lewis was told it was because the man's mother or wife had become pregnant (2008:307–8). Once the pregnancy was known, the husband made small cuts on the woman's

belly and mixed the blood into balls of redwood paste, for himself and any of her sons old enough to hunt. This was because he had 'cut her moon', ending menstruation, so she no longer left blood-soaked bark-wads in the forest. This upset certain forest spirits called *edio*:

'They are much attached to blood, ... That's why a menstruating woman leaves her *ekila* blood in the forest. These spirits eat that blood and like it more than other blood. ... When her man cuts her moon, those spirits miss many meals. They get furious and very jealous of men when they realize.' (Lewis 2008:308)

They are appeased by the smell of her blood on the forehead and by sacrifices of raw meat following a kill. But ideally, 'A man whose wife is pregnant should not go hunting. He is vulnerable to attack and other animals will flee' (*ibid*:303). While *edio* are from farmer's cosmology (Lewis 2002), they are incorporated into the set of minimally discussed BaYaka blood-eating spirits (Lewis p.c. 29.4.22).

Other researchers provide corroborating Baka accounts, where the blessing sometimes included weapons and the hunter's right arm (SOM B1d). A Baka woman, Pöli, said the newly pregnant woman made the belly incisions; she speculated that this addressed the contradiction between blood-flow in the forest through men's cutting/piercing of animals and a woman's blood being tied in the camp in embryo formation, "Didn't God create people and animals in the same way? And that the blood of people and animals is the same?" (Boursier 1994a:112–13). She illustrated how early pregnancy could cause bad luck in the food quest: "an elephant is pierced or an animal struggles in a trap, but the future father is there in the group of hunters and he steps on the blood of the animal: it will run away and cannot be caught again, even if it is dying. Pregnancy is a strong thing." *ibid*:113). Similarly, the Mbuti believe that elephant hunters would be attacked by the elephant if one of them had a pregnant wife (Carpeneto & Germi 1989:33).

Menstruation as the mnemonic for *ekila* was conveyed by an Mbendjele man:

'*Ekila* is the same as *mobeku* [ritual danger]. That is the name of the medicine Komba sent women when women put in the Moon (menstruate). The business of *ekila* was first with them. It is all about children. ... Women's biggest husband is the moon.' (Emeka, in Lewis 2008:298, square parentheses added).

In sum: 'A menstruating woman is *ekila* and must share her menstrual blood (also *ekila*) with spirits so that her male relatives continue to find food.' (Lewis 2014:226).

A death's disruption of hunting luck is ritually managed the same way. After the burial, a close kinswoman applies redwood blessings to a hunter's forehead, his spear arm, and the spear; with his successful return and following the commemorative feast, these blessings are extended to the wider community (Leonard 1997:29–30, 101).

With persistent hunting failure or hunting dangerous prey, women's ritual involvement increases. If a Baka hunter who has been unlucky, hears his wife, mother, or father's sister speak about him, he may ask for an *ngele* blessing from them (Leonard 1997:58). When Aka hunting has been unsuccessful, a *bobanda* net-hunt is organized, requiring women's enthusiastic participation; their ritual preparations include extensive application of red and black powders (McCreedy 1994:30). But, the most widespread and significant expression of women's ritual labour in hunting is the *Yeli* association, responsible for hunting large, dangerous species – locating the game and tying them through yodelled song which "weakens the hearts of the animals" (Higgins 1985:101). Membership is through collective initiation, where existing members and novitiates have medicine applied to bleeding incisions on their throats, and black, white, and red pigments are applied to bodies and the sacred pot

(Boursier 1994a:134–5). The *Yeli* leader may borrow a hunter's amulet necklace (*simbo*), previously dipped in the heart's blood of an appropriate animal; sleeping with it helps locate the animals (Boursier 1994a:139; Brisson 1999 I:167). In mythology, this charm, along with a zither (*ngombi*) originally belonged to the first great hunter, Tibola; when Komba transformed Tibola into the guardian spirit of the elephants, he gave Tibola's charms and zither to 'all the women', thereby inaugurating *Yeli* (Boursier 1994b:215). Today, when the *Yeli* hunters depart, the *ngele-nguso* blessing is given (Brisson 1999 I:85). Over a thousand miles away, an Efe bow-hunter gave his wife an arrow to cut his skin – including between the eyes and between thumb and forefinger of the right hand (where an arrow set to the bow-string rests); into these bleeding incisions she rubbed her saliva mixed with plant ash to attract forest pigs (Schebesta 1941:113). A senior Efe woman would give a spitting blessing for an elephant hunt (Schebesta 1950:76¹⁷), and an Mbuti couple cut their tongues and spat blood onto their hunting net, to bring luck (Kenrick 1996:125). Use of red pigments may not be common among eastern Congo hunter-gatherers, but there is one context where the sound of blood-flow is arguably connoted. Unlike most forest hunter-gatherer cultures, the Efe and Mbuti (Sua) have documented menarcheal rituals (Turnbull 1957, 1960, 1961; Wilkie & Morelli 1991; Demolin 1993), involving relatively large shelters where older and younger women gather to sing during the girl's menarcheal seclusion. Demolin contextualised his account of the polyphonic music of the Efe *ima* house as follows:

'Throughout this period, boys who gather to observe what is going on or who get too close to the *ima* house are chased with whips by the women. To avoid this treatment, they must provide what the women demand of them, usually food.' (Demolin 1993:6–7).

Characterising the musical accompaniment of the *ima* songs, he reported:

'the most astonishing of the instruments is undoubtedly the one in which a house is used as a sounding board. The structure and volume of the house amplify a friction sound produced by a string attached to the central beam of the house roof, which is rubbed by the wet hands of one or two women. This frictional sound, quite muffled, gives the pulsation and the measure of the songs.

This low sound symbolizes the breath of the forest and in a way materializes the voice of the ancestors and of all the spirits associated with them. The sound of this string is similar to that of the bull-roarer – *aimò*, associated with the voice of the *Tore*, which is heard during the preparations for the elephant hunt.' (Demolin 1993:7)

Cross-culturally, typically in the context of male initiations, bull-roarers are widely associated with the sound of blood-flow (Dundes 1976:225 with refs.; Knight 1991). In Australia, it was repeatedly reported that the male initiates' blood was menstrual blood; for the Efe, a similar sound is associated with menarcheal blood.

Spirits: Scarcely discussed blood-eating spirits are distinguished from masked spirits – enticed into camp with song; but there is overlap. The Baka's *mokondi* category of *me* spirits are spirits of the dead not yet returned to *Komba*, who may be appealed to for help in the hunt. If successful, the hunters throw pieces of the heart and liver all around, for the spirits to catch and eat (Leonard 1997:54–6). Similar offerings have been reported throughout the forest (Trilles 1932:80–81; Schebesta 1950:73–9; Joiris 1993:65; Lewis 2008:307). The Baka's masked *mokondi* may be called 'sons of Jengi' (Leonard 1997:56). *Jengi* (*Ejengi*) is the paramount BaYaka masked forest spirit (Boursier 1994a:21), dangerous to women and children. Mythologically, however, women originally possessed and danced *Ejengi*, parthenogenically causing babies to fall out of their raffia skirts (Lewis 2002:175–6). Women say they

gave *Ejengi* to the men, men say they took it by force. In the initiation ritual:

'The candidates are liberally covered in oil and *ngele*, ... said to be *Komba*'s blood, which will keep the candidates' bodies "soft." The candidates, each carrying a walking stick, then disappear behind the screen ... (each) accompanied by a ... guardian,' (Higgins 1985:102; see also Lewis 2002:180–182)

Jengi then removes the liver and eats it, before restoring the initiate to life. Meanwhile, the guardians emerge bearing their novitiate's stick, the tip covered in blood or a piece of liver (Leonard 1997:48; Yamaguchi 2014:132). To protect the novitiate, a female relative must prevent flies from landing on the blood (Higgins 1985:103; Lewis 2002:180; cf. Brisson 1999 I:89); it is later replaced by a curated stick coated in red-wood (Boursier 1994a:153 fn.1).

Why is *Jengi* dangerous?

'those whose livers *Jengi* has not eaten – the women and children – are especially vulnerable because he likes the sweet smell of their liver, which they say reminds him of *ngele*' (Higgins 1985:103; see also Brisson 1999 I:90).

So, in the forest, to allow continued hunting, an olfactory trick is played on *edio* spirits – using *ngele* and substituting menstrual blood with blood from the belly; in camp, with *Ejengi*'s desired presence, men must physically prevent his contact with women, threatened because of an analogous olfactory and alimentary predilection.

Higgins considered the gender dynamics of *Jengi* initiation comparable to an account of hunting's blood symbolism:

'If you do not give a portion of the meat you hunt back to the spirit, you will hunt in vain; because it is the spirit who ... has given you the game. He called the game for you. He took his medicine, he ate it, he gave it to the women, they gave it to the hunters, then you went and killed an animal.' (Yeye, in Higgins 1985:103)

This resembles what Lewis was told concerning the medicine *Komba* gave to women for managing the *ekila* of menstruation, when they 'put in the moon'; here, the complementarity of men's and women's *ekila* is emphasised. If, in such contexts, *Komba*, *Ejengi*, and *mokondi* spirits are interchangeable, so too, apparently, are livers, *ngele* paste, menstrual blood, *Komba*'s blood, sacrificial blood of the hunt, placentas, and blood drawn from women's bellies. Symbolically constructed 'Blood' as medicine or potency is most efficacious when cycled through women, men as hunters, game animals, and spirits; but the circuit begins with women's blood, menstrual blood – now 'tied' in the womb – being women's contribution to foetal development (Lewis 2016:155). Schebesta reached a similar conclusion through Efe and Mbuti origin myths, identifying Moon's responsibility for menstrual flows – women's contribution to reproduction – at the heart of their cosmology (Schebesta 1948:399–400; 1950:18, 50, 55, 57, 189, 191–2). The same structure of belief informs ritual practise in hunting, pregnancy, male initiation, infant sickness, and mortuary ritual.

Menstrual taboos provide a final, striking example of this shared structure of belief. If a Baka woman broke a menstrual dietary taboo, she scraped her tongue:

'... the blood begins to flow and she spits her saliva into the mahogany powder, saying to her husband: 'Give this saliva to so-and-so who has become unlucky.' (Pöli in Boursier 1994a:114)

If an Mbuti woman or her husband ventured from camp during her menstruation, menorrhagia might follow; the ritual remedy for the breach was identical, the woman spitting blood from her tongue onto all the camp's hunting nets, re-establishing hunting luck (Carpeneto & Germi 1989:74, cf. Kenrick 1996:125). The blessing of nets with red or black paste may be viewed in the light of this costlier ritual.

Discussion: Menstruation, pregnancy, and birth are only experienced by women; together with death, these linear, brute facts are

¹⁷ The original account specifies that it was an older woman (Schebesta 1941: 109).

cosmologically transformed into a cyclic, relational dynamic, embodied in fairly invariant, blood-coded ritual practices, typically relational to hunting outcome. Particularly striking are: the *habitus* of the redwood forehead blessing, the consistency with which women restore hunting luck through blood and/or redwood blessings, and identical ways of addressing breached menstrual taboos from opposite ends of the Congo. These features, together with conceptual equivalents of *ekila* and a shared musicking style, add to the impression of a forest hunter-gatherer civilisation (Lewis 2019:109, 2023; Bahuchet 1992; see also Graeber & Wengrow 2021:232-3). In BaYaka terms, continued successful hunting, birthing, and infant well-being, demand respect for the core metaphorical equivalences of *ekila* – between men killing animals and woman birthing children, between menstrual blood and blood of the hunt (Knight & Lewis 2017b:92). Ritual use of redwood and/or blood keep these equivalences alive, protecting them from becoming dead metaphors. That blessings are given ‘by Komba, or by women’ suggests an ongoing ritual discourse regarding sources of authority – ‘metapersons’ (Sahlins 2017) and/or flesh-and-blood women? This would align with Finnegan’s ‘politics of Eros’, contending that forest hunter-gatherer gender egalitarianism rests on a creative ritual complex stressing ‘the world of blood and breath – over the possibility of hierarchy and closure’ (Finnegan 2013:703).

3.2. Hadzabe

The Hadzabe live around Lake Eyasi, in the Rift Valley of northern Tanzania. Genetically, they cluster with other East African hunter-gatherers and former hunter-gatherers, distinct from central forest and southern African counterparts (Scheinfeldt et al. 2019). Notwithstanding that genetic lineages now restricted to southern Africa were present in east Africa just a few millennia ago (Lipson et al. 2022), the divergence of ancestral east African hunter gatherers may have arisen 100,000 years ago (Shriner et al. 2018). According to Stibbard-Hawkes (2024:18), ‘a comprehensive search’ yielded no record of Hadza pigment use (but see below and SOM B2a). They may, therefore, present a limiting case to speculation about an ‘ideology of blood’.

Hadza cosmology was succinctly summarized by James Woodburn:

‘the whole process of hunting big game ... is symbolically linked to the whole process of female reproduction ... Activities in one process are mystically dangerous for activities in the other. A man whose wife is menstruating cannot hunt big game because the poison of his arrows is believed to lose its efficacy. If his wife is pregnant he cannot walk on the tracks of a wounded game animal because this will cause it to recover from its wounds. Reciprocally, if a man whose wife is pregnant laughs at or mocks a dead but not yet dismembered carcass ..., the unborn baby will be born with defects which resemble the characteristics of the dead animal ...’ (Woodburn 1982b:188, see also Kohl-Larsen 1958:106–7; Power 2015:341).

If a menstruating woman touched a poisoned arrow (used exclusively for medium to large animals), ‘the hunting equipment’s thirst for extracting blood would be satisfied’ and the hunter would get nothing (Skaanes 2017a:169, fn.140). If a man ate Leopard Tortoise meat or allowed his arrows to come into proximity of one being roasted, it would have the same effect as a menstruating woman on the efficacy of his arrow poison (Peterson et al. 2012:65). Intriguingly, among northern Cape /Xam, the Leopard Tortoise was associated with the Rain, menorrhagia, and the moon (Jeursen 1995; Watts 2005). Similar restrictions to those mentioned by Woodburn applied after a birth – until lochia had finished (Kohl-Larsen 1958:107–8; Woodburn 1964:263-4, 275-8). If a man attempted to gather honey, he would either find none or it would be dry and crusty. If, in breach of such prohibitions, he shot an animal, he had to return to camp without looking at the blood, asking others to follow the trail (Mouriki, Fld. Ntbk. 1:26). If a woman was menstruating or had recently had a miscarriage, she was not allowed to touch a knife (ibid 1:59). These beliefs and observances primarily

concerned pair-bonded relationships, but a menarcheal girl influenced the fortunes of everyone in camp – particularly men’s hunting (Susan Zengu p.c. to Mouriki 3.4.23); she is spoken of as having ‘shot a zebra’ with an arrow (cf Power 2015:351¹⁸) and her ritual treatment is structurally identical to counterparts in southern African accounts (SOM B2b).

Two of the most important ceremonies involve ritualised bloodshed: the young man’s initiation into the *epeme* society of hunters – when he has killed a fat *epeme* animal, and young women’s collective initiation as *maitoko* (Power 2015). The backdrop to both is a myth of women’s rule, where a collective of mothers had obliged men to surrender the sacred *epeme* meat to them – essentially to perform collective bride-service. The mythic past came to a violent end when men appropriated this ritual power. While the meat was cooking, Mambeda – the women’s leader – would have sex with her young, beautiful ‘wives’, wearing the penis of a zebra which she had killed with bow-and-arrow. Now, God’s meat is secretly eaten by *epeme* men (Woodburn 1964). Women originally controlled the culture-defining *epeme* dance (Kohl-Larsen 1958:122), which requires moonless nights (ideally dark moon) and the participation of all women and initiated men. It emphasises kinship, joint parentage, and connection to ancestors; ‘above all’, it promotes ‘good health and successful hunting’ (Woodburn 1982b:190; see also Berger 1943:102 fn.4; Kohl-Larsen 1956:11, 1958:45, 105).

By far the Hadzabe’s most productive form of hunting is full-moon ambush hunting by waterholes, in the late dry season (Hawkes et al. 1991). This turns a season of relative scarcity (Marlow 2010:108) into one of abundance (Marlowe & Berbesque 2009:756; Watts 2022). The normative belief among men and women is that women menstruate at dark moon (Power 2015:341; Mouriki Fld. Ntbk. 3:61; see also Trns. Ntbk IX:6). The Mbendjele say that Moon is a woman’s biggest husband, but the Hadza – underscoring the intimacy of the relationship – say: ‘the moon is the brother of all women’ – ‘*Seta atits ‘i yayeta akwitibe wamaeta*’ (Mouriki Fld. Ntbk. 3:61; Trns. Ntbk IX:6; see also Woodburn 1964:319).

Bloodshed in the male initiation simply involves the initiate being given a nose-bleed in a charade of being assaulted by the *Epeme* spirit, before being returned to the women, comparable to BaYaka initiation into *Ejengi*. Essentially, women give to *Epeme* their boy children to ensure continued production of animal fat and women’s reproduction. The *maitoko* ritual is exceptional for typically (but not necessarily) involving costly genital cutting, in a rite of collective bloodshed. Of this blood, a man said: ‘Praise *Haine* (god)! Let bad luck be dispelled when the women *maitoko* bleed a lot from their cuts!’ (Magwasha in Bleek 1930:621, translation by Susan Zengu 3.4.23¹⁹). The initiates, traditionally dressed in male attire, then chased and beat men with their sacred *narichanda* sticks, a performance strikingly similar to accounts of the Mbuti and Efe menarcheal rituals (Turnbull 1957; Demolin 1993). Power (2015) argues that the costly ritual signal of the whole *maitoko* performance is women’s coalitional response to men’s *epeme* society. Like Mambeda, initiates in both contexts have attributes of the opposite sex (Power & Watts 1997; see also Peterson et al. 2012:photo on p.161).

Blood-letting also occurs in an eland first kill ritual, applying the heart’s blood to – among other places – the brow between the eyes (Skaanes 2017b:214), otherwise, he will be tormented by spirits. The whole ritual is closely comparable to Ju/’hoan and !Xam counterparts (ibid). If a man shot a pregnant animal, he had to wipe the foetus’s blood onto his right arm and the bow, otherwise he would be unable to kill in the future (Nyoha to Mouriki, Trans. Ntbk. VI:743). This is presumably also part of the cosmology linking men’s hunting to women’s

¹⁸ The two informants Mouriki heard this from used a Hadzane phrase – //akakwa dongo – translated by James Woodburn (p.c. February 2009) as ‘hit a zebra (with an arrow)’ – (Mouriki, July 2005, Transcription Notebook IV p.287–8, group of middle-aged women).

¹⁹ ‘*goronapi haku na’na haine tsikwa akwitibe maitobe piopu*’, modified by Susan Zengu to ‘*goronabi haku na’na Haine tsikwa akwitibe maitoko piopu*’.

reproduction. If a woman who already has a child starts menstruating again – as likely to happen during weaning, she applies a bit of her blood to the child's forehead, to 'give it strength and so as not to get sick', she will carry on doing so until she stops cycling (Zengu to Mouriki p.c. 22.3.2024; Hamisi to Mouriki p.c. 27.3.23). The same procedure is adopted if a menstruant needs to care for a sick person.

Contrary to Stibbard-Hawkes, not only are there reports of Hadza pigment use, but they concern ritual applications of red ochre, two accounts given to Kohl-Larsen in the 1930s, published in 1958. One described a hunter's ritual when his wife had washed after her period. He took some 'rote Erde' – red earth – 'with which the Maasai paint their hair', powdered it and added water. Prohibited from touching the paint, he applied it to all his arrows with a stick, otherwise he would hit nothing (Kohl-Larsen 1958:107). The second, as told by his Isanzu interpreter, concerned an Isanzu couple living in Hadza country. The pregnant wife saw men secretly eating *epeme* meat of an eland (epitome of god's meat), she stole and ate some; three serious breaches of *epeme* rules. Her teeth loosened and her cheeks swelled. Once informed, a Hadza man:

"took a small stick, and sharpened it like a nail ... painted it with red soil, ... and hung it, in the morning, around the woman's neck. In the evening the swelling had gone." (Kohl-Larsen 1958:100).

In addition to breaches of *epeme* rules, *tsiatobe* sticks are also used for certain physical ailments, but they remain connected with blood symbolism, gender politics and *epeme* beliefs:

'These small, arrow-like pieces of wood covered with blood either from a game animal or from the right *epeme*-stamping leg ... of a man are made in great secrecy by the men. The women are not supposed to know they are man-made.' (Woodburn 1970:57; see also Stephenson 2000:43).

The *epeme* stamping-leg refers to the belled-'stomp' of the barely visible, dancing spirit of the *epeme* dance, a sound said to connote the presence of a mature eland bull, with its characteristic knee-clicks (Skaanes 2017b; see also Woodburn 1998:59). The secrecy surrounding the *tsiatobe* sticks places this medicine close to the heart of Hadza cosmology. Elena Mouriki was told that this secret concerned the original nature of the blood, in the time of Mambeda (Fld. Ntbk. 3:75, 16.07.05). Widely distributed similar myths of patriarchy suggest that the 'blood' was originally women's (Knight 1991: 422–35, 471). What is unusual is to encounter such a myth in a society so assertively gender egalitarian in all other respects.

In Hadza ritual and belief, the symbolic linkage between women's reproduction and men's hunting of large animals informs a range of injunctions and prohibitions, but its primary ritual expression is in 'blood'-coded forms, an idiom also deployed in ongoing gender-based contestation of ritual power, most notably in the *maitoko* ritual.

3.3. Southern African hunter-gatherers

Populations ancestral to speakers of Kx'a and Taa languages, two of the three 'Khoisan' language families, are inferred have been accumulating genetic differences distinguishing them from all other human lineages for somewhere between 150,000 and 300,000 years (Fehn et al. 2022:249), while a population ancestral to all three families is thought to have emerged around 120 ka, through the merger of two Middle Pleistocene stem lineages (Ragsdale et al. 2023:761). Ancient DNA indicates that lineages currently restricted to southern Africa formerly extended to present-day Kenya (Lipson et al. 2022), while genetic divergences among extant southern populations appear to be ≥ 30 kya (Pakendorf & Stoneking 2021).

Unlike the previous cultures considered, there are extensive literature surveys of southern African hunter-gatherer use of red substances (Rudner 1982; Watts 1998:258–63, App.5 h, and Cat.5 h; summarised in Watts 1999:133–37). While the most pertinent of these observations

bear repetition, the emphasis here will be on subsequent accounts and whether distinctions can be made between shared and more regionally specific ritual contexts.

In the now familiar general pattern, a Ju/'hoan man whose wife is menstruating should not go hunting, for fear of carnivores and that the game will escape (Biesele 1993:93). If a G/wi woman touches her husband's weapons while menstruating, he will hit nothing, 'because the game runs away bleeding' (Imamura 2001:137). The sight of a menarcheal girl would destroy a man's hunting luck (Fourie 1928:102; Vedder 1938:85; Silberbauer 1965:85; Shostak 2000:89; Guenther 1999:166).

As with the archaeological ochre record (Dapschauskas et al. 2022: fig.9), most accounts of ochre use are from southern Africa. These are predominantly ethno-historical rather than ethnographic, as cultures bordering the southern Kalahari were rapidly extinguished through the nineteenth century. Within the Kalahari Basin, ochre is rarely locally available and redwood pigments predominate, primarily *Pterocarpus angolensis*, followed by *Vacellia erioloba* (formerly *Acacia erioloba*, *Acacia giraffae*) (SOM B3a). The inner bark of *Pterocarpus* roots was particularly valued, providing a 'vivid' dye (Palmer & Pitman 1972:270; see also Ravenstein 1967 [1901]:43; Viegas Guerreiro 1968; Köhler 2018). Both ochre and *Pterocarpus* redwood figured in gift giving and exchange networks, with *Pterocarpus* also part of imposed tribute relations (SOM B3a). Pastoralist (Nama) accounts indicate that where neither ochre nor *Pterocarpus* were available, people would make do with a red colour obtained from acacia, but that this was considered inferior. Outside of ritual, Ju/'hoansi women regularly applied powdered *Pterocarpus* to their karosses, to keep them red and 'suedelike' (Lee 1979:124, 276), just as /Xam women decorated their karosses with red ochre (Hewitt 1986:281²⁰).

Köhler described *Pterocarpus* powder as 'intense red', and that – for the Khwe – it symbolised life and denoted blood (1973:235–6; see Viegas Guerreiro 1968:fig.38 for a colour photograph). He also reported that formerly, strings of ostrich eggshell beads were coloured red, with either *Pterocarpus* powder or blood (Köhler 1979:30). The Ju/'hoansi call it *n=hang*, which also refers to the blood of game animals (/Ai!ae Fridrick /Kunta, Ju/'hoan Transcription Group, Biesele p.c. 17.6.22²¹). In their folklore, *g!oq'in* (ochre) and *n=hang* were ritually interchangeable (Biesele et al. 2009:74–5; Biesele 1993:163). As with forest hunter-gatherers, it was typically women who pounded redwood or ground ochre (Watts 1999:134–5, with refs.). They seem to have also been the principal users. Along with fat and fragrant *sa* powder (made from the roots of waterside plants), red pigments were regularly used by Ju/'hoan women to look, smell, and feel their best: 'Dressing up specially for a dance meant women's faces were shining with creme or oil, or were dramatically scarlet or yellowed with ochred oil, or that the scent of newly pounded *sa* enveloped them – or all three, whenever possible' (Biesele 2023:64).

General well-being and greetings. Redness signified well-being (Lewis-Williams & Biesele 1978:121), hence widespread practises of social incorporation through anointment with red pigment. Establishing relationships with strangers this way is one of the earliest well-documented practises, with accounts from the 1770s, 1850s, and

²⁰ Roger Hewitt reported of the Bleek and Lloyd notebooks that the /Xam New Maiden had 'to give the women of the band red haematite with which they were to paint their cheeks and decorate their karosses' (Hewitt 1986:281). The relevant notebook page of Lucy Lloyd (Digital Bleek and Lloyd, A2 1 050, 3969 rev.) comprises a marginal note to the narrative on p.3970, within which we read: 'R. tells me the women paint their cheeks/faces with it, and also their karosses'. This might equally be read as concerning the general use of /ka (red ochre), distinct from menarcheal rites, a possibility unnoticed in secondary literature (e.g. Hewitt 1986:281; Knight et al. 1995:93; Jeursen 1995:43; Power and Watts 1996:320).

²¹ Dickens (1994:245) elicited *n=hang* as a respect word for animals' blood, but this could not be confirmed by /Ai!ae Fridrick /Kunta.

1970s (Mossop 1935:63; Chapman 1971 I:66; Bieseles 2023:171²²). !Xū and Khwe attendees at a healing ritual were all anointed with red powder on the forehead (Riccio 1997:49; see also Viegas Guerreiro 1968:308). In Ju/'hoan mythic story-telling, the sound of redwood or ochre being pounded signals the arrival of someone to be welcomed – a newborn, a returned relative, an initiate, or someone magically resurrected (Bieseles 1993:139, 140, 144, 163, 196²³). One story has a key episode identical to the Baka story of Bisolo's birth. The mother-in-law of the Beautiful Elephant Girl is about to give birth and is rubbing her belly with redwood when a supernatural boy-child violently jumps straight out of her womb and demands to also be anointed, so that he can depart with his older brother and sister-in-law. He has come to correct his brother's mistaking a fatty, meat animal for a wife, a familiar trait of First Creation stories (cf. Parkington 2002). But, in killing, butchering, and roasting the Beautiful Elephant Girl, getting his brother to eat of the cooked flesh, the 'sky-thing' child had not reckoned on her own magical powers. A drop of her blood flies back to her granny's groin, which she grows in a sealed bag (cf. Liebenberg 2023), until the Elephant Girl is resurrected, anointed with redwood and reintroduced to her kin (Bieseles et al. 2009:69–72, paraphrasing the full story on pp.72–97). Henceforth, the human/animal distinction is fixed, and men will have to work hard at hunting (Parkington 2002).

Marriage and burial. Elizabeth Marshall Thomas described a Ju/'hoan marriage: 'the bride's mother adorned the bride, ... rubbing her clothing with red, sweet-smelling powder, as symbol to Bushmen of beauty' (Thomas 1960:146). Marriage sometimes involved red pigments (Watts 1998 [vol.3]:236 with refs.; Bleek 1928:10), but it is a minor ceremony among immediate-return hunter-gatherers, with 'little difference between taking lovers and marriage' (Barnard 2019:111, see also Thomas 2006:186). Several accounts indicate that blood symbolism only came to the fore if a girl reached menarche during a trial marriage, as then her partner was considered particularly vulnerable (Silberbauer 1965:86; Marshall 1999:200; Imamura 2001:132; Köhler 2018:260). Red pigments also figure in accounts of burials (Watts 1998 [vol.3]:232 with refs.; Le Roux & White 2004:126; Köhler 2018:338 fn.3, 340–42, 350–51; Roos 1931 for a probable case). Köhler's Khwe informants reported that this was special treatment, afforded to respected healers or great hunters. The co-association regionally extends back ten millennia, occasionally providing possible cosmological insights – such as ochre being concentrated around the pelvis in some burials (Inskeep 1986:230–1), which in-turn may relate to details of ethnographic menarcheal rituals among some Khoe-speaking groups (Watts 1998 [vol.3]:232–3 with refs.). It is worth restating that red ochre's association with burials is first recorded among the earliest *H. sapiens* burials (Dapschawskas et al. 2022:238 with refs.), suggesting that redness facilitating movement between worlds is probably an ancient trope.

Rain. An association between redwood and the control of rain, seemingly connected with women, was noted in Baka mythology, but in southern Africa, with its highly seasonal and patchy rainfall across semi-arid regions, the theme is greatly elaborated. /Han=kass'o told Lucy Lloyd that when the rains arrived in the northern Cape, the /Xam "come out, they run about. They are all red." (Lloyd 1878: 7463 rev.), suggesting that they were covered in ochre. This association has been attributed to a cosmology linking rain with the bloodflow of women and great antelopes (Power & Watts 1999:113–18). The antelope's blood flowing into the ground could attract fertilizing female rain, as did correct observance of menarcheal ritual. The Ju/'hoan equate the meteoric potency released by the animal's blood with that acquired by humans at birth, when after-birth blood flows into the ground; these

beliefs are covered by the concept of *n!áo* (*n!ow*, Marshall 1957), which is also the term for a redwood 'plank' used to influence rain (/Ai!ae Fridrick /Kunta to Bieseles, p.c. 17.6.22, 27.8.22²⁴). With similar symbolic logic, a Ju/'hoan 'rain horn' contained powdered acacia redwood, crushed lightning teeth (fulgurite glass), and a little moisture (Marshall 1999:166–68; cf. Schulz 1907:652–3; Lebzelter 1934:53; see Kaufmann 1910:158, Le Roux & White 2004:134 for related ≠Au//eisi and Nharo accounts). As a variant on its normal use to attract rain, if someone died during a drought, strewing the horn's contents over the grave had a similar effect, while a facial design with the paste offered protection from lightning; a man might also have the mixture applied to a forehead cut and his upper arm, to aid hunting (Marshall 1999:167–8).

Healing and painting. Healing dances were 'a nexus of strength' at the centre of 'Bushman' cosmologies (Bieseles 2023:116), but 'healing' outcomes were secondary to the interpersonal synchrony that lifted peoples' hearts (ibid:154). They provided a frequent opportunity to wear red cosmetics (e.g. Arbousset & Daumas 1846:247; Bleek 1927:115; Shostak 2000:42; Le Roux & White 2004:98; Bieseles 2023:64), but the same substances also played an active role. A Bugakhwe woman recalled:

"they used some powders for healing people. This powder was made from the *n!gao* dead wood stamped in a mortar. ... known as God's tree, ... This *n!gao* powder allowed the doctor to watch the illness as a film or video ..." (Ôana Djami, in Le Roux & White 2004:120, see also Brenzinger & Naude 2010:7–8 and Pl.2).

A bloody injury among the Khwe was ritually treated with *n!gáo* powder mixed with oil or eland fat, partly therapeutic but also to prevent bad luck attaching to the person (Chedau in Köhler 2018:650). In the Ju/'hoan's Elephant Dance, dancers apply *n!hang* to help manage the healing power of *n!um* and enter into trance (/Ai!ae Fridrick /Kunta to Bieseles, p.c. 17.6.22), similarly with women's initiation into the control of *n!um* through the Drum Dance (Katz 1982:171), although there the anointment was with ochre and fat, and the whole ritual was compared to that of menarche. Ju/'hoansi women's preferred phrase for menstruation is *tsau n!um* – woman's *n!um* or potency (Marshall 1999:188). At the end of the initiation of a /Xam healer or medicine expert, they were cleansed with ochre and fat (Hoff 2007:19). In a !Xó healing dance, young women applied red //ai powder from their tortoiseshell containers to aid a recovering trancer (Heinz 1975:30). If he passed out, they would chew acacia roots (*Vacellia erioloba*) and spray him with the 'vile smelling' red, tannic juice (ibid; cf. Hahn 1881:140). Six months after the death of a Khwe healer, his female kin would treat all his ritual paraphernalia with *Pterocarpus* redwood powder, before passing it on to a successor (Köhler 2018:352).

Last descendants of southeastern Bushmen recalled that a girl entranced an eland by pointing a medicated arrow at it, so that it could be driven back to camp; its blood was used for medicines and artists' paint (Jolly 1986; Prins 1990). A Sotho man who had painted with Bushman artists reported that the paint was made under a full moon, by a post-menopausal woman who roasted glittery haematite, mixing the ground powder with fresh eland blood (How 1962).

Hunting preparation. /Han=kass'o described /Xam ritual treatment of 'feather brush sticks' used in drive lines for springbok hunting – painted with red ochre and smoked (Bleek & Lloyd 1911:359). They also made identifying marks on arrow shafts with red ochre and gum (ibid:363). For luck and accuracy, the !Xū anointed arrow link-shafts with redwood and fat (Viegas Guerreiro 1968:104). If a Khwe man dreamt of a big game animal, he rubbed *n!gáo* powder from the bridge of his nose, across the brow (Köhler 1973:225–6, 238). In preparation for a ritual hunt, organized when there had been no meat in the camp for some time, typically in the dry season, *n!gáo* was applied to the forehead and the

²² Bieseles's account concerns yellow *sa*. As with Aka 'basic colour terms', the Ju/'hoan term for red extended to orange and brown, but unlike the Aka, it did not extend to yellow (Wilhelm 1954:181; Berlin & Kay 1969:33, 75).

²³ In some of the cited pages of 'Women like meat', redwood should replace the published identification as ochre (Bieseles p.c. 17.11.21).

²⁴ According to /Ai!ae Fridrick /Kunta, *n!áo* does not refer to generic 'planks', contra Dickens (1994).

weapons, accompanied by a spitting blessing from a senior hunter (ibid:240). !Xū hunters – before setting out – placed redwood amulets in embers and rubbed them between the eyes (Viegas Guerreiro 1968:104), or chewed redwood bark and spat it out before them ‘so that their paces would take them to the game’ (ibid:105). A /Xam springbok hunter would – like the Efe archer – nick the skin between thumb and forefinger (Bleek 1936:145). Red symbolism was probably also implicated in a second-hand report of an arrow poison mixed with red ochre (Campbell 1822 1:30) and Ju/’hoan use of ‘brick-red’ powder from *Pterocarpus* seeds in the hafting of spears (Giess & Snyman 1986:322).

Male initiations. When a youth killed his first large antelope, the most widespread act was to cut the mid-brow and rub carbonised animal or plant material into the bleeding incisions (e.g. Viegas Guerreiro 1968:102–3; Steyn 1971:294; Lee 1979:238–40). The Ju/’hoan liken the bleeding to that in menarcheal ritual, enabling the boy to enter First Creation (Keeney & Keeney 2013:9). An officiant also rubbed the antelope’s blood onto the initiate’s bow (Lee 1979:239). In !Xū preparatory rites to initiation:

‘A good hunter cuts some roots from the *lukae* bush (*Pterocarpus*)..., plunges them in to hot ashes and rubs them into cuts on the young hunter’s forehead, who he then gives them to,’ (Viegas Guerreiro 1968:104, parentheses added)

These amulets were suspended from the bow (ibid: fig.6.). Having killed, he rubbed the blood onto his forehead (Estermann 1946–1949:717). In the Nharo’s former collective male initiation, blood from incisions between the eyes belonged to *Hisheba*, overseeing the ritual (Steyn 1971:294). When Heinz was about to undergo the !Xoō initiation ritual, the women told him that ‘the big thing’, the spirit responsible for making the forehead cuts, would ‘lick my blood with its hard tongue’ (Heinz & Lee 1978:108). Collective male initiations among several groups were inferred or reported as having been adopted from neighbouring delayed-return cultures (England 1995:236; Imamura 2001:131).

Restoration of hunting luck. The general form was similar to first-kill rituals. The !Xū used the *lukae* stick amulets which – like their Baka counterpart – would, on some previous hunt, have been soaked in animal blood: ‘they scrape the ends ... and rub the shavings between the eyes’ (Viegas Guerreiro 1968:104). Cross-culturally, a hunter could ask another man, often his father, to do this (e.g. Köhler 1979, cited in Rudner 1982:231), but numerous accounts specify a woman (Schmidt 1986:343 with refs.; Seydel 1910:505; Imamura 2001:137; Tci!xo Tsaa, in Le Roux & White 2004:178). Following a death, /Xam hunters expected to lose their luck, so women sucked blood from cuts to the shoulder made with an arrowhead, mixed the blood with aromatic buchu and burnt it: “for they want the springbok to lie down for us” (/Han=kass’o in Bleek 1932:248). The G/wi had two rites for restoring bow-hunting success, the wife applying medicine between the eyebrows, either to bloody incisions or rubbing in mushroom spores (possibly red, see Currle 1913:114; Moffat 2008 [1857]:44), also rubbed onto the bow; the accompanying verbal blessing echoes Baka comments on *Yeli* and twins rituals: “You find animals every day, but you can’t shoot them. I will make the animals’ hearts sleep. I will make their eyes close” (Imamura 2001:137). A variant was that a hunter who had broken a run of bad luck, asked his wife to make the forehead incisions to ensure continued success (Wannenburgh, Johnson, & Bannister 1979:Pl.90 and following page). From a Nharo perspective, women’s relationship to the animals could be viewed in terms of their privileged relationship to First Creation – that they “were never reversed”, “they shall live forever” (Guenther 1981:19).

Menarche. Blood symbolism in menarcheal rituals, the only ritual context where red pigments were almost invariably reported, has been examined in literature addressing Khoisan ritual construction of gender (Knight, Power, & Watts 1995; Power & Watts 1997, 1999). Among hunter-gatherer groups, the climax of the ritual was typically the Eland dance, where the girl was identified with eland, but it could also be said

of her that she had ‘shot an eland’ (Lewis-Williams 1981:51).

The clearest statement about an ideology of blood concerns menarcheal ritual. This was almost exclusively a women’s affair, but in a paraphrased account of the Ju/’hoan healer – /Kunta Boo, an apparently new element is introduced:

‘To help make everyone more like the girl, small cuts on the ear are made on each person. An elder *n/om-kxao* (healer) administers these ... This results in blood dropping to the ground and deepening their entry and identity with the girl who has entered First Creation. Everyone bleeds during the ceremony ... in order to be assured of full entry When they bleed like the girl, they have no fear because they, too, are like her and the changing makes them as strong with *n/om*.’ (Keeney & Keeney 2013:9)

With or without a male healer and synchronized blood-flow, menarche is symbolically constructed as a catalyst capable of moving people and things between worlds, changing their ontological status (Guenther 1999:179). But a menstruating woman is also “poisonous death” to hunting (Marshall 1999:188); as among the Hadzabe, she cools the arrow poison (Bieseles 1993:92–3). Should a /Xam menarcheal girl look at game during her isolation, she would make them ‘wild’, unavailable to the hunter (Hewitt 1986:285). Should a G/wi counterpart cook meat or touch weapons – hunting will fail ‘because the game runs away bleeding’ (Imamura 2001:137). On the other hand, the sand receiving the first drops of her menarcheal blood will be thrown onto the roots of a raisin bush (*Grewia flava*) to induce a rich harvest (ibid:129; see also Valiente-Noailles 1993:94; Usandivaros 2011:17), presumably by attracting the desired female rain (Power & Watts 1999).

Both the Khwe and Ju/’hoansi considered that redwood helped the girl become ‘fat’, a Khwe informant adding that it ensured “the blood would keep flowing well” (Mbongi [1965], in Köhler 2018:282; /Ai!ae Fridrick /Kunta to Bieseles, p.c. 17.6.22). Marshall detailed the anointment: red ochre, ideally mixed with eland fat, was applied across the brow and on her cheeks (1959:355–6). Additionally, ‘haematite’ or an oily paste of roasted *tsin* beans was applied from her throat to the belly-button and down the backbone (1999:199–200²⁵). Dickens learnt that ‘ochre’ and fat were applied to her navel with a *g̃am* stick, “so she will not eat greedily” (Dickens 1994:206, redwood according to /Ai!ae /Kunta). Red substances help ensure that the hardship of restricted food and water during seclusion produces a fat ‘New Maiden’ and that the whole community will live well. Two Ju/’hoansi women recalled that ochre applied at the end of seclusion had to be roasted to produce the desired ‘deep-red’ colour (N#aisa Kqce and N#aisa N//ao, in Le Roux & White 2004:98).

Where gemsbok replaces eland in menarcheal symbolism, facial decorations were dark (e.g. Knight 1995 cover illustration [photo, Jane Taylor – Sonia Halliday Photographs]). Where the southern Kalahari merges into the Karoo of South Africa’s Northern Cape Province, specularite figures prominently among the world’s earliest pigments (Watts, Chazan, & Wilkins 2016). For the N!n#e (aka Khomani), this dark, glittery form of haematite was the ideal medium for the New Maiden’s gemsbok face-mask. When Craig Foster showed /Una Rooi, one of the last N!n#e speakers, some powdered specularite, she had not seen it since childhood, almost seventy years earlier. She was thrilled and went to paint her face with the gemsbok facial design, commenting: “the gemsbok bull seeks the women” (Deacon & Foster 2005:75²⁶).

The girl’s emergence from seclusion was lunar phase-locked, either at the appearance of the new moon or at full moon (Watts 2005:100–101 with refs.; see also Imamura 2001:130; Köhler 2018:258–9). Upon her

²⁵ It is possible that the South African Museum’s expedition to the Kalahari in 1975 has photographed a Ju/’hoan girl with this ritual body paint down her spine – at least between the shoulder blades (Rudner 1982:231, citing June Hosford pers. comm., mentioning John Kramer as photographer).

²⁶ ‘seeks’ replaces the original translation of ‘looks out for’.

emergence, the Ju/'hoan New Maiden hit young hunters' legs with a *Grewia flava* wand coated in ochre, to protect them whilst out hunting (Lewis-Williams 1981:51). The Xam New Maiden was taken to the spring to introduce herself to !Kwa – the Rain Bull – overseer of menstrual observances, sprinkling fragrant buchu (like Ju/'hoan *sa*) and haematite over the water (Bleek 1933:300; Hewitt 1986:281). On her return, she anointed the young hunters, painting haematite stripes on their backs to protect them from lightning whilst in the veld (Hewitt 1986:281).

Similar blessing of hunters by New Maidens involved either touching their scrota (Fourie 1926:58²⁷; Bjerre 1960:145) or handling weapons. The G/wi girl and her guardian gathered all the bows and arrows of the camp, medicated them, and then shot the arrows one after another, giving them special power (Imamura 2001:130; see also Silberbauer 1965:86). Among the neighbouring !Xō, the New Maiden – painted with the gemsbok mask – shot arrows at a real gemsbok mask, as in the male initiation (Heinz & Lee 1978:96, 116). Now living a sedentary life with negligible hunting, these elements have gone. Instead, she is covered with red ochre, said to make her beautiful and more attractive, the anthropologist adding that it 'symbolizes blood and fertility' (Nhlekisana 2017:37). The ochre – particularly its all-over application – may be emulating higher-status local groups, but the indigenous explanation remains consistent with older beliefs: 'this gave her the freedom to walk about without fear of being bitten by snakes or being attacked by wild animals.' (ibid:37; cf. Watts 2017:261 with refs. and endnote 10).

Discussion: Notwithstanding deep genetic and linguistic divergences (Fehn et al. 2022), it is the ontological flux of menarcheal ritual, creating systematic reversals, that grounds and revitalizes the ontological stability of southern hunter-gatherer cosmologies, primarily expressed in the relative uniformity of menarcheal ritual and the trance dance throughout the region (Guenther 1999). Menarcheal rituals were the context where ritual use of red substances was most consistently reported, primarily upon the girl's reincorporation into the band, when her blessings confer general fertility and successful hunting. The transformative potency of her symbolically constructed 'blood', either reversing culture or ensuring its continued recreation, informs other liminal states (Knight et al. 1995:95 with refs.; Guenther 1999; Keeney & Keeney 2013), and no other ritual context is as associated with the possibility of cultural reversal (Power & Watts 1997). Hunting and healing provided much more frequent occasions for ritual use of red substances. Hunting rites are restricted to specific contexts and primarily concern the hunter's relationship to game animals, but they are also informed by an encompassing cosmology where women's relationship to the animals is critical. This is the one context where ritualised blood-flow is more frequently encountered than red pigment use. The most striking similarities with forest hunter-gatherers are the blood-coded forehead hunting blessings, women's use of this form to restore hunting luck, and the reversal of the supposed universal prohibition on women handling cutting or piercing hunting weapons (cf. Testart 1986; Brightman 1996).

4. Discussion

Palaeolithic archaeologists are rightly sceptical about historical analogies, preferring relational rather than claimed direct 'heritable' links between source and subject. Relational links generate implications for fields of variation such as function, raw material, and ecological parameters, providing scope for exploring similarities and differences (Pargeter et al. 2016:1; d'Errico et al. 2016). This article has elements of both. The weak historical form is the presumed continuity of body-painted ritual performances, stretching back half a million years in

interior southern Africa. The stronger relational form concerns the various disciplines that have contributed either relevant parameters or theoretically derived predictions of symbolic data. The cultural taxonomy on the source side of possible analogies is the category of immediate-return hunter-gatherers, not the named cultures nor an intermediate level of civilizations (e.g. 'Bushman'/San, or 'Pygmy').

Dapschaskas and colleagues filled a basic knowledge gap about the earth pigment record, considered important to addressing the evolution of group ritual and symbolic culture. Their findings led to the inference of pan-African, ritually sustained shared fictions, from ~ 160 ka onwards. Two models were identified that made predictions of this record: female-led cosmetic coalitions – playful – but with the serious intent of mobilizing male collective hunting labour; or, bellicose male coalitions seriously competing over scarce resources, typically envisaged under conditions of ecological stress. It was overlooked that Rossano had proposed that stress (aridity) only kicked-in after female cosmetic coalitions had established symbolic culture. Their evaluations of the two models were inconclusive. For FCC, this largely concerned technical details and definitions. For the ecological stress model, where the data was sufficiently resolved (after ~ 160 ka), there was no correlation between ochre peaks and aridity indicators. Symbolic data and FCC's symbolic predictions were excluded from their evaluation, testimony to the legacy of siloing evolutionary from social anthropology. Left unchallenged, it ensures that neither evolutionary anthropologists nor archaeologists can hope to address the questions raised by the inference of a pan-African shared fiction from at least 160 ka, arguably taking the form of an ideology of blood, arguably the culmination of our speciation.

Like Dapschaskas and colleagues' article, this article addressed a knowledge gap. There was no pan-African synthesis on hunter-gatherer ritual uses of red substances and associated beliefs.

In Peircean semiotic terms, and in terms of signal evolution theory, male-focussed inter-group competition models have been unable to move the debate beyond iconic and indexical ritual performatives – costly, honest displays of coalition quality. They have provided no leverage on what Malinowski called 'beauty magic', where the deployment of the ornamented body invokes other-worldly powers (Power 2010:74). Camilla Power provides a compelling account of how cosmetic usage constructed a playful shared fiction of identity, where 'an individual experiences herself as others see her, becoming conscious of her own thinking through the thoughts of others' (ibid). Addressing this problem of stabilizing shared fictions from a biolinguistic perspective, Boeckx sees something like the FCC model as providing the kind of safe ecology required for the flourishing of utterances that are 'patent falsehoods serving as guides to communicative intentions' (Boeckx 2023:6, quoting Knight 2010).

Whatever their precise character, these habitual ritual performances had evolutionary antecedents that had been building up during our speciation, culminating in a major evolutionary transition – the stabilisation of shared fictions at a continental scale, possibly singular – 'one myth only' (Lévi-Strauss 1981; see also Propp 1968:89; Knight 1991). Either way, I propose that this effectively marks the end of our speciation process, the missing behavioural component that complements genetic and palaeontological diagnoses. This challenges recent claims that there is no evidence of a 'pan-African trajectory for the cultural evolution of *Homo sapiens*', nor for any 'revolution' during the Middle Stone Age (Scerri & Will 2023:10-11; see also Kelley et al. 2023:6). Not only has a trajectory to the evolution of group ritual been tentatively identified, but a case can be made for a tipping point from quantitative to qualitative change in information transmission.

Ethnographically, ritual action – 'the basic social act' (Rappaport 1979:197) – is the most important and consistent domain of red pigment use. Marking people or things red in ritualized contexts typically imbues them with ritual potency, transferring them from the world of brute facts to a symbolic domain of institutional facts. As evidence about very early collection and processing of iron oxides accumulates (e.g. Barham 2002; Watts et al. 2016; Culey et al. 2023), anything other than visual display

²⁷ Widlok (1999:228-9) considers Fourie's report to show the influence of Nama (pastoralist) menarcheal ritual on Heil|om practise (citing Hoernle 1985: 65).

becomes harder to argue for. This does not deny non-semiotic uses in the deep past, indeed there is archaeological evidence for several of them within the last ~ 80,000 years; but, it does suggest that ritualized visual display was paramount and had temporal priority. This supports the extension of the Uniformitarian Principle to this aspect of signalling behaviour. Ritual use has effectively become a premise of much current research (e.g. Dapschauskas et al. 2022; Davin et al. 2023; Salagnon et al. 2024; this paper).

Among African hunter-gatherers, the processing into a powdered form was predominantly done by women; this may also suggest a time-resistant pattern. Both within the Kalahari, and when comparing southern African to forest hunter-gatherers, redwood use seems indistinguishable from red ochre use. This has an important implication. We do not know when *Homo sapiens* first occupied tropical forests, but the Uniformitarian Principle, combined with Dapschauskas and colleagues' finding of habitual ochre use to the north, east, and south of the central forest from ~ 160 ka (2022:fig.9), suggests that whenever it was, early Forest People would have sought out a vibrant red pigment, with *Pterocarpus* the most widely distributed form available. Unfortunately, the earliest archaeological red plant pigments yet identified are from just ~ 15 ka (Davin et al. 2023).

Both materials are contextually considered metaphoric of blood, although blood is famously polysemic. The metaphor is so entrenched that it can be reversed, as with the smell of an uninitiated person's 'liver' connoting to *Ejengi* the smell of *ngele* paste. There is little to differentiate the use of blood from either kind of blood-like substance, except that costly cutting (*maitoko*) and community-wide minor cutting (/Kunta Boo's account of menarcheal ritual) associate with the most fundamental rituals – initiations. Both contexts involve synchronous blood-flow. Among the Hadza, this seems to be bound up with women having to contend with a men's 'cult' potentially threatening their autonomy. Among the Ju/'hoansi, irrespective of whether the cutting by a male ritual specialist in menarcheal ritual is a recent development (with probable bearing on current gender politics), the legitimating idea is to facilitate the movement of all celebrants to the world of First Creation, by synchronously bleeding with the menarcheal girl.

As expected, both by FCC and by Dapschauskas and colleagues, the ritually deployed colour red conveyed a huge range of meanings, including 'fertility', 'blood' (human and animal), 'life', 'hunting luck', 'rain', 'beauty', 'birth', 'rebirth', 'solidarity, sharing and the prohibition of incest', the 'link between people and God' and 'between people and their ancestors'. Dangerous or vulnerable states figure prominently, but little in the survey suggested that 'wounds caused by predators, fatal accidents or fights with conspecifics' (Dapschauskas et al. 2022:292) might have provided an evolutionary context for the hijacking of a cognitive bias for red. The little there was, however, is informative. Mbendjele men's hunting of dangerous animals or climbing great heights for honey are intrinsically dangerous, but it is the fictive danger of a woman not having ritually made public that she is pregnant (no longer cycling) that demands blood-coded ritual action in these dangerous contexts, because certain forest spirits missed that blood. Contrary to Davin and colleagues' expectations (2023:1, citing Hill and Barton 2005), nothing in the survey suggested that cosmetic use of red pigments arose in contexts that enhanced 'dominance, aggressiveness, and testosterone'. Instead, the emphasis is overwhelmingly on the reproduction of life, society, and cosmology.

The ritual contexts most consistently encountered were initiations and hunting, followed by healing. Use of red substances in establishing relations with strangers, marking reunions, births, marriages, mortuary ritual, and influencing rainfall, all tended to be more localized – although there were hints of a shared cosmology between central and southern Africa, where red substances mediate a relationship between women and seasonal rain. As noted, a recurrent theme cutting across several of these nominally distinct contexts is an element of perceived danger, illustrated by the southern 'marriage' material. Here, blood or red pigments were more often reported as protecting a provisional

'husband' whose young, provisional 'wife' had reached menarche, rather than in ritual celebration of what are typically considered trial relationships (contra Deacon 1997:406–7). The predominant initiatory context concerned the maturation of girls and boys, celebrating female reproductive capacity and male productive capacity to hunt medium to large animals. Rather than separate spheres, these are systematically brought into relationship to each other, most consistently and obviously through menstrual 'taboos' – injunctions and prohibitions imposed on both sexes, together with 'bride-service' obligations. Symbolically, the counterweight to men's hunting is women's fertility and birthing, both readily represented through the idiom of blood (Knight & Lewis 2017b). To appreciate indigenous core values, it may help to think of these cultures as hunting and mothering societies rather than as hunter-gatherers (Bieseke 1997; Narvaez 2024); it certainly helps contextualise Bieseke's abiding impression of 'the surprisingly strong relationship of their postmenopausal women to power' (2023:208).

One ritual form was consistently encountered across all groups, a blessing with ochre/redwood/blood, typically applied to the forehead, or incisions to the same spot – mixing medicines into the blood. As an instrumental technique of the body, with aspects of *habitus* (Mauss 1935 in Schlanger [ed.] 2006:82–3), this blurs, or possibly transcends, Mauss's division of 'traditional actions' into techniques and rites. In the Congo and southern Africa, this is how women typically restored men's hunting luck, a sub-set to the wider pattern of women's ritual involvement in hunting, including the blessing of weapons. The ultimate charm for the hunter or his 'equipment' is to be blessed by a New Maiden, a pregnant woman or his mother-in-law; the former Hadza men's practise of anointing arrows with ochre shares this symbolic logic. Menstrual blood is consistently close to the core of the respective cosmologies, most obviously in the near-universal menstrual taboos, typically counterpoising women's blood to that of the hunt (cf. Testart 1986; Knight 1991). Specifically, menstruation provides the ultimate mnemonic for Mbendjele *ekila*, the model of reversal in southern African cosmology, and arguably the mythic prototype of Hadza healing. An intriguing topic for future research is the variation in how public or hidden this centrality is, whether it is direct or mediated (through pregnancy for example). While the connection between menstrual blood and the blood of the hunt is typically an opposition, at a deeper level the taboos depend on an 'identification of the two kinds of blood' (Knight 1991:485), a 'powerfully attractive equivalence' (Power 2017:196). This helps explain why a significant qualification was necessary to the supposed universality of the prohibition on women handling piercing hunting equipment; more than an instantiation of the 'wrong-sex' prediction, this reversal highlights the role of reversal more generally (Knight & Lewis 2017a). Seemingly basic to the moral rules encountered is the idea that women's reproductive capacities be respected in ways which connect them to men's productive capacities. This might be considered a metaphor that African hunter-gatherers live by (Lakoff & Johnson 1980), with ritual action setting up the conditions for any verbal metaphor (Knight & Lewis 2017b), the opposite of the ontology where language is 'the foundation of what anthropologists call symbolic culture' (Sinha 2024: 220).

This said, historically contingent processes have also clearly been at work. Ritual use of red substances sometimes show influences from delayed-return cultures, in hunting rituals (e.g. Lewis-Williams 2006:111, discussing Köhler 1973), in menarcheal ritual (e.g. Estermann 1976 [1956]:16–17; Nhekisana 2017; see also Widlok 1999:228–9), and no doubt in other contexts too. Collective male initiation rituals were primary arenas in which relationships with farmers were forged and maintained (England 1995:236–40; Turnbull 1965). Both BaYaka *Jengi* and Hadza *Epeme* are legitimated through mythic histories where men stole women's ritual power. These may well predate the rapid spread of delayed-return systems in the last few millennia, but it is intriguing that such myths are not encountered in southern Africa, the last region to feel the full impact of agro-pastoralist economies. We might also speculate about how the invention of the bow-and-arrow,

some seventy thousand years ago (Backwell et al. 2018b; Lombard & Phillipson 2010), would have impacted gender and economic relations, and their ritual expressions (cf. Woodburn 1980:113). Could this explain the prominence of pair-bonded relationships in much of the material encountered?

But, it is the consistency of the symbolic logic surrounding ritual use of red substances that transcends specific contexts and points to a deeper history and more singular origin. Indigenous voices help us to appreciate this time-resistant quality. One example is Pöli's (BaYaka) statement, 'While the animals are being hunted in the forest there and the embryo is being formed here at home, the woman brings bad luck'; the newly pregnant woman had tied her monthly flow – now diverted in foetal development, this prevented closely related men from shedding blood in the hunt, until the new brute fact had been ritually and publicly acknowledged. Another is /Una Rooi's remark, provoked by the glittery specularite gemsbok mask she had just applied to her face, 'the gemsbok bull seeks out the women'. Then we have /Asa N!a'an's comment that 'the first meat' – a steenbok – was the transformed heart-blood of G!kon//amdima – archetypal Ju/'hoan New Maiden (Biesele 1993:202), this same heart's blood also being the medium of her resurrection in the alternate persona of the Beautiful Elephant Girl, flying to her granny's groin (ibid:141; see also 162–3; Biesele et al. 2009:69–97). Several women said that they make the animals' hearts sleep – or make them run away bleeding. Most elaborate was Yeye's description of the circuit of blood-coded potency underpinning continued hunting success: spirit (*Jengi*) 'took his medicine, he ate it, he gave it to the women, they gave it to the hunters, then you went and killed an animal', which required a bloody offering in return. Where some ritual power has passed from women to men, the potency of women's blood remains – as with the Baka saying that *Ejengi* was attracted to women and children because 'the sweet smell of their liver ... reminds him of *ngele* (redwood paste)', or Magwasha's formulaic response to Hadza women's reverse-dominance ritual of *maitoko* – 'may their blood dispel all misfortune!'

Now juxtapose these voices with an evolutionary perspective of our speciation. With maximization of brain-size and its concomitant energetic costs, mothers experienced continued or renewed selection pressure to harness unprecedented levels of male investment in the form of reliable provisioning with animal fats, especially in the late dry season of grasslands and savannas (Watts 2022). We have a model specifying women's coalitionary reproductive strategies to achieve this goal in the particular evolutionary conditions of the late Middle Pleistocene. The outcome would be consistent with ethnographically documented 'bride-service', but the form is predicted to have been more collective than anthropologists are familiar with (but see Siskind 1973), something resembling the Hadzabe view of history before Mambeda's overthrow (Woodburn 1964). From this perspective, language and symbolism may well have been 'epiphenomena developed in the service of these strategies' (Shea 2011a:25), but epiphenomena that marked the last major transition in evolution.

Emiliano Bruner (2023) has proposed that the parietal lobe expansion that drove globularisation was implicated in attentional capacities (visual, somatic, and spatial) and working memory (crucial to self-perception), and that this area integrated 'on-line' and 'off-line' cognition, to produce a narrative self. Red ochre use in Africa became more widespread from ~ 330 ka and, where regionally available, had become habitual across the continent by around 160 ka (Dapschauskas et al. 2022), particularly in campsites (Watts 1999). From a social anthropological perspective, Dapschauskas and colleagues' ritual interpretation of this finding implies the habitual donning of a 'social skin' (Turner 1980), critical to the construction of a narrative self, with cosmetic body-painting a key transformative technique, certainly one of the first instrumental body techniques (Power 2010). Megan Biesele, avowedly distrustful of 'scientific' claims and methods, was nevertheless tasked with trying to understand Ju/'hoan oral narratives from an evolutionary, adaptationist perspective. She found that:

'the arts of the Ju/'hoan people, especially their narrative and healing arts, both constitute the intricate web of symbolic mechanisms of their egalitarian culture and drive it forward.' (Biesele 2023:212).

This study would add that it seems probable that an 'ideology of blood', danced and sung into existence, both informed and provided the safe ecology for this narrative creativity. Reflecting on fieldwork after fifty years, Biesele recalled what she had wanted to share with us:

"to hear voices of people today living lives that preserve some important links to those of our most ancient human ancestors. Key among those links are that the narrative imagination is in fact an evolutionary tool for survival, and that meaning must be made anew by each group of storytellers and listeners, and by each group of dancers and singers and community members being healed." (2023:190)

5. Conclusions

Across the diversity of African immediate-return hunter-gatherers, ritual use of red substances shows significant shared structures of belief, foremost being a metaphoric linkage between women's blood and the blood of the hunt. More broadly, these usages tend to mark the movement from brute to virtual reality. It is proposed that this shared structure of belief can be referred to as an ideology of blood. Hunter-gatherer populations in southern Africa, the Congo Basin, and northern Tanzania have long been isolated from each other, but genetics and archaeology indicate considerable interconnectivity in the late Middle Stone Age – generally > 30 ka. This suggests that shared fictions are unlikely to result from recent diffusion or convergent evolution, and that they probably extend much deeper into the MSA. With menstrual and menarcheal observances, particularly in relation to hunting, being so consistent around the world and menarcheal ritual providing a model for the treatment of divine kings (Frazer 1900 vol III:204, 233), it would seem that the relevant shared structures predate Late Pleistocene dispersal beyond Africa.

Accepting Dapschauskas and colleagues' interpretation of their main temporal finding, it seems we are dealing with shared structures of ritual and belief spanning at least 160,000 years of history. The antecedent evolutionary or 'natural' history of brilliant ritual display, spanning another 300,000 years plus, provides enough time for a safe ecology for shared fictions to have evolved, nested within the deeper evolutionary history of prosocial emotions in genus *Homo* (Hrdy 2009). We must also keep in mind the various sites where regular ochre use extends back well into the 'emergent' phase (e.g. Apollo 11, Kathu Pan, Twin Rivers). At least two factors might account for this proposed fidelity in symbolic cultural transmission: a sensitive dependence on the initial conditions of that 'safe ecology', and that keeping the metaphoric equivalence between two kinds of blood alive was somehow critical to the constant work of maintaining gender egalitarian relations in 'immediate-return' societies (Finnegan 2013). This kind of continuity becomes slightly more plausible because redness and brilliance approximate cross-cultural universals in the mobilization of ritual power, and considerably more plausible because the metaphoric equivalence of the two kinds of blood has within it the periodicity of blood flow as pacemaker to temporary death and resurrection, so familiar to social anthropologists (e.g. Testart 1978, C. Hugh-Jones 1979, S. Hugh-Jones 1979, de Heusch 1982, Knight 1991).

Irrespective of how particular evolutionary explanatory hypotheses of group ritual fare, this article will hopefully help bring to a close the protracted exclusion of Indigenous voices from science-based discourse on how we became a symbolic species and what it means to be human.

CRediT authorship contribution statement

Ian Watts: Data curation, Conceptualization.

Declaration of competing interest

I have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jaa.2024.101627>.

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