

Agency concepts across cultures: How intuitive is folkpsychology?

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Abstract

The present research investigates cultural variation in conceptual frameworks for interpreting agency. A mind perception measure (Gray, Gray, & Wegner, 2007) was adapted for interviews with Indigenous Ngöbe adults in Panama and US college students. Participants ranked the agency capacities of various entities and provided explanations. Rankings varied systematically, with Ngöbe more likely to ascribe agency to nonhuman natural kinds than US participants. Analysis of explanations indicated that agency concepts are organized under different folktheories: US participants construed agency as a hierarchical, prototypically human capacity requiring consciousness, whereas Ngöbe construed agency as a multidimensional relational capacity expressed in directed interactions. An emphasis on psychological agency as distinct from other (biological, physical) forms of agency is widely assumed to be a conceptual prior, but these findings suggest it may instead be a feature of Western cultural epistemologies.

Keywords: agency; folkpsychology; mind perception; culture; domain specificity; animism; Indigenous; Western

Introduction

A major goal for cognitive science is to understand how people recognize and conceptualize agents. Here, we report cultural differences in agency attribution between Indigenous Ngöbe of Panama and US college students. We argue that these differences derive from striking variation in grounding principles for inferring agency.

Agency, or the capacity to act, is a signature property of moving, living, and sentient kinds (e.g., Lowder & Gordon, 2015). It can be imagined along a spectrum of causal force that evokes distinct interpretations depending on the kind of cause attributed to an action (e.g., physical versus mental). The skeletal representational system for agency appears to be early developing, with infants discriminating between entities based on cues such as goal-directed action and contingent interaction (Johnson, 2003). But how these basic representations relate to later developing concepts of agency is a matter of debate (Csibra & Gergely, 2007). Much of the conversation revolves around the link from agency to folkpsychology (Poulin-Dubois et al., 2009), asking how and when actions come to be understood via mental states.

One influential view holds that agency is conceptualized under distinct frameworks according to ontological kinds (Wellman & Gelman, 1992). On this domain-specificity account, children naturally come to understand causal events

and actions in terms of distinct intuitive theories for physical forces (folkphysics), living kinds (folkbiology), and minds (folkpsychology).

Domain-specificity is widely thought to be universal (Gelman & Legare, 2011; Sperber & Hirschfeld, 2004). At the same time, it is well known that cultures diverge in explicit beliefs about agency. For instance, many Indigenous philosophies hold that natural kinds like plants or thunder may think and talk (Harvey, 2005)—capacities that Western researchers view as psychological. As such, they have treated these beliefs as overextensions of a universal concept of psychological agency beyond its proper domain, characterizing them as counterintuitive, supernatural, or animistic concepts (Atran & Norenzayan, 2004; Boyer, 1996).

An alternative possibility is that “overextensions” reflect different concepts of agency, because cultural epistemologies (or worldviews) parse agency according to different focal dimensions of interest (Bird-David, 1999; Cajete, 2000; Kohn, 2013; Viveiros de Castro, 1998). Specifically, scholars have argued that Indigenous epistemologies are concerned with agency as expressed in relational interaction with others and environments. This cultural organization of knowledge does not share the overtly mentalistic emphasis of Western folkpsychology, and it affords recognition of many nonhuman entities as complex agents.

On this account, people may attend to similar action cues for agency across cultures (e.g., Barrett et al., 2005), but those cues evoke concepts that acquire very different meanings across cultural frameworks. We propose that two such cultural differences can be understood in terms of: (a) eco-centric or anthropocentric prototypes for agency, corresponding to a focus on natural kinds broadly or humans specifically; and (b) distinct causal theories of agency as a relational capacity (reasoning about interactions) or a psychological capacity (reasoning about mental states).

As we will see, Ngöbe informants focus on discriminating different causal aspects of agency across a different scope of actors than would be predicted by current accounts of folkpsychology. From this we argue that the principled distinction between agency in general, and uniquely psychological agency in particular, may not be a conceptual prior but a property of Western epistemologies. If so, the implications would be far-reaching, for agency concepts play a fundamental role in cognitive processes ranging from causality and mind perception to morality (Banaji & Gelman, 2013).

Table 1. Mean rankings and percent inclusions for agency by culture (across five capacities)

Kind	Average Rankings ¹						Average Percent Inclusions					
	Ngöbe		US		Overall		Ngöbe		US		Overall	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Humans	3.86	(1.58)	4.21	(.58)	4.03 ^a	(1.18)	0.93	(0.10)	0.85	(0.14)	0.89 ^a	(0.12)
Animals	6.51	(1.94)	5.66	(1.16)	6.08 ^b	(1.62)	1.00*	(0.00)	0.83*	(0.21)	0.91 ^a	(0.17)
Plants	10.65	(1.23)	11.08	(1.19)	10.87 ^c	(1.20)	0.55*	(0.33)	0.21*	(0.26)	0.38 ^b	(0.34)
Ecol. Kinds	11.00	(1.71)	11.78	(0.85)	11.39 ^c	(1.38)	0.45*	(0.37)	0.08*	(0.17)	0.26 ^b	(0.34)
Artifacts	12.35*	(1.55)	10.58*	(1.40)	11.47 ^c	(1.70)	0.38	(0.36)	0.29	(0.26)	0.34 ^b	(0.31)
Overall	8.88 [†]	(0.22)	8.66 [†]	(0.16)	8.77	(0.22)	0.66 [†]	(0.20)	0.45 [†]	(0.15)	0.56	(0.20)

¹ Average Rankings: Lower numbers indicate higher rankings (range: 1 - 16); excluded items scored as tied for last.

* Interaction of culture x kind: $p < .05$ comparing cultural means within that kind.

^{a,b,c} Main effect for kind: $p < .05$ for pairwise comparisons between kinds. (*Ecol. Kind*: ecological kind, e.g., sun.)

[†] Main effect for culture: $p < .05$ for overall cultural comparisons.

Current Study

We adapted the mind perception survey (Gray, Gray, & Wegner, 2007) for use in interviews.¹ US participants ($N = 11$) were students in an introductory psychology course at a private Midwestern university. Ngöbe participants ($N = 11$) were residents of an indigenous village where subsistence practices are ecologically coordinated (e.g., agroforestry). Ngöbe participants' experience with formal schooling ranged from 6-12 years ($M = 7.60$; $SD = 2.17$).

First, we assessed cultural attributions of agency capacities. We predicted that Ngöbe would be more likely than US participants to attribute such capacities to plants and ecological kinds.² Second, we elicited explanations for capacity attributions. We predicted that Ngöbe and US respondents would draw on different framings of and criteria for the capacities under question.

Methods

In identical interview procedures, participants rank-ordered 16 entities by their capacities for agency, allowing for ties (equal capacity) and exclusions (no capacity). Five representative capacities were selected from the 18-item mind perception survey: communication, thought, morality, hunger and desire.³ Entities were 4 humans (old and young woman, infant, fetus), 3 mammals (chimp, dog, cow), 2 plants (banana, manioc [Panama]; lettuce, strawberry [US]),

5 ecological kinds (sun, clouds, rain, ocean, rocks), and 2 artifacts (robot, computer).⁴

Each participant ranked, on average, three of the five capacities to keep interviews of reasonable duration. Participants were probed to explain a subset of their rankings. Ngöbe and US respondents provided similar number and length of explanations per capacity and kind.

Participants were interviewed in Spanish (Panama) or English (US). Survey items were translated into Spanish by a bilingual research assistant in the US and checked for accuracy by a trilingual researcher (S.G.G.) in Panama. Ngöbe participants were bilingual in Spanish and their native Ngöbere; U.S. participants were fluent English speakers. Interviews were audio-recorded and transcribed, and Spanish responses were translated into English for coding analysis.

Agency Rankings

We analyzed results by considering which entities were included in agency rankings (inclusion) and by their mean rank (ranks). Lower numbers indicate higher rank (range: 1-16); excluded items were scored as tied for last place.

Results Measures of inclusion and ranks were averaged by kind across the five agency capacities, then analyzed with a 2 (culture) X 5 (kind: artifact, ecological kind, plant, animal, human) repeated-measures ANOVA. Degrees of freedom used Huynh-Feldt estimates due to violation of assumption of sphericity (inclusion: $\chi^2(9) = 28.31$, $p < .01$, $\epsilon > .75$; ranks: $\chi^2(9) = 18.02$, $p < .05$, $\epsilon > .75$).

Results and descriptive statistics are summarized in Table 1. As expected, there were main effects for kind on inclusion, $F(3.24, 64.87) = 61.48$, $p < .01$, $\eta^2 = .76$, and ranks, $F(3.47, 69.35) = 114.41$, $p < .01$, $\eta^2 = .85$. Follow-up t-tests showed that animates were included more than inanimates, ($ps < .05$). Humans were ranked highest, followed by animals ($ps < .05$), then inanimate kinds, which did not differ.

There were main effects for culture on inclusion and ranks. Overall, Ngöbe included more entities than US par-

¹ Adapted from the original survey as follows: (a) stimuli included plants and ecological kinds in addition to selected original items; (b) response method was ranking rather than pairwise comparisons; (c) explanations were elicited.

² Such natural kinds are often referred to as "nonliving," but Ngöbe may consider them alive so we refer to "ecological kinds."

³ Gray et al (2007) propose that minds are perceived along two dimensions, experience and agency. They define agency in terms of moral agency and responsibility, as distinct from the usage here (namely, any entity that is [perceived] capable of acting). Specifically probing these two dimensions was not the goal of the current study, but we are exploring this distinction in ongoing work.

⁴ Notably, previous surveys have tended not to include plants or ecological kinds, preferring instead computerized artifacts; this is itself a commentary on Western views of agency.

Table 2: Coding scheme for US cultural framework: Anthropocentric psychological agency

Code	Description	Examples
Human-centric framing	Implicates humans as prototypical agents by referring to: (i) Human-nonhuman comparisons (ii) Human perception of agency (iii) Human intervention on agency	(i) Animals “don’t have the capacity to think like people” (NG, Th.) (ii) Animals “not so much, because they’re difficult to interpret” (US, Com.) (iii) Dogs have “been conditioned to act that way” (US, Mor.)
Scalar framing	Frames agency as scalar capacity by: (i) Assessing agency in terms of hierarchical scales or timelines (ii) Hedging the sense in which an entity has capacity, implying an ideal	(i) Mammals “tend to be smarter, have a more complex brain” (US, Th.); Baby will “given time, overcome the chimpanzee” (US, Mor.) (ii) Plants “feel emotion in <i>like a different sense</i> ” (US, Com.); “But the plant doesn’t <i>really</i> get hungry” (NG, Hun.)
Internalized indicators	Focus on internal parts or substrates underlying indicators of agency: (i) mind or brain (ii) interior or bodily substrates	(i) Animals “have receptors and stuff in their brain that signal when they’re hungry” (US, Hun.) (ii) Robot has “electric cables in their body” (NG, Com.); Human “body requires nutrients” (US, Hun.)
Consciousness	Consciousness is criterial to agency, as indicated by: (i) self-awareness (ii) autonomy over own actions (iii) (not) instincts or mere reactions	(i) Plants “perform actions” but “have no concept of being moral” (US, Mor.); Baby “can’t recognize” its hope (US, Des.) (ii) Animal’s “brain doesn’t control what he’s communicating” (US, Com.) (iii) Cows have “primal instinct rather than...more technical cognition levels” (US, Th.)

Abbreviations: (NG/US) Ngöbe/US; (Hun.) Hunger; (Th.) Thought; (Mor.) Morality; (Des.) Desire; (Com.) Communication

ticipants, $F(1, 20) = 7.82, p < .05, \eta^2 = .28$, and mean rank differed slightly, $F(1, 20) = 6.69, p < .05, \eta^2 = .25$.⁵

On an ecocentric prototype, Ngöbe should be more likely than US participants to include ecological kinds (but not artifacts) in agency ranks. This was confirmed by a culture by kind interaction for inclusion, $F(3.24, 64.87) = 2.86, p < .05, \eta^2 = .13$. As predicted, follow-up t-tests showed that Ngöbe were significantly more likely than US participants to include animals (Ngöbe: $M = 1.00, SD = 0$; US: $M = 0.83, SD = 0.21$), plants (Ngöbe: $M = 0.55, SD = 0.33$; US: $M = 0.21, SD = 0.26$), and ecological kinds (Ngöbe: $M = 0.45, SD = 0.37$; US: $M = 0.08, SD = 0.17$) p s $< .05$.

US participants were more likely than Ngöbe to rank complex artifacts above plants and ecological kinds, as indicated by a culture by kind interaction for ranks, $F(3.47, 69.35) = 2.70, p < .05, \eta^2 = .12$. Follow-up tests showed that the point of cultural divergence in rank order fell at artifacts, with US rankings significantly higher than Ngöbe rankings for artifacts (US: $M = 10.58, SD = 1.40$; Ngöbe: $M = 12.35, SD = 1.55$), $t(20) = 2.82, p < .05, d = 1.20$. The US pattern aligns with an anthropocentric view of agency, given that these are human-designed information processing artifacts.

Discussion. Ngöbe were more likely to attribute agency to nonhuman natural kinds than US participants, who tended to restrict agency attributions to humans and animals, with the occasional exception for artifacts. The fact that the two groups did not differ on artifact inclusion rules out a generalized tendency for Ngöbe to attribute agency to everything. We also observed a flip in rank order for artifacts versus natural inanimates. US attribution profiles are consistent

with a view of uniquely psychological agency tied to (human-like) minds, whereas Ngöbe profiles align with an ecologically oriented view of agency as a relational capacity. These possibilities were further investigated by analyzing explanations for agency rankings.

Agency Explanations

An entity can express agency in many ways. Whether those expressions are interpreted as relevant to the capacity in question hinges on one’s conceptual framework for agency. Building on current accounts of Western and Indigenous cultural epistemologies (see Medin et al., 2013), as well as the folkpsychology and mind-perception literatures, we developed several predictions. US folkpsychology is expected to treat humans as the prototype, linked to a *scalae naturae* model where organisms are hierarchically ordered on a scale from simple to complex agency. In contrast, Ngöbe are expected to treat agency as a capacity for relating to others and the environment, exercised by human and nonhuman entities alike in diverse ways (e.g., see Bird-David, 1999).

To operationalize these hypotheses, we designed a coding scheme to assess constructs associated with each proposed cultural framework (see Tables 2 and 3). Our coding system measured the extent to which participants’ explanations focused on the following variables: human-centric, scalar, or relational framings of agency; internalized or interactive indicators of agency; and consciousness or directedness as criteria for agency (each is described in more detail below).

Coding scheme The dependent variable was the percent of explanatory content associated with a given coding category, adjusted for explanation length. Two raters (b.o. and a research assistant blind to the hypotheses) each coded half the data independently. Inter-rater agreement was good: in-

⁵ Ranks are not exactly equal because aggregation by kinds leads to a weighted mean rank.

Table 3: Coding scheme for Ngöbe cultural framework: Ecocentric relational agency

Code	Description	Examples
Relational framing	Frames agency as relational capacity by referring to interactions and other-orientated states involving: (i) other agents (ii) environments	(i) Chimps “have a good sense of social structure” (US, Th.); Cows “know their owner” but are “fierce” to others (NG, Mor.) (ii) “Plants have hunger, for the rain that falls” (NG, Hun.); Sun “communicates with [water] in the moment of rising” (NG, Com.)
Interactive indicators	Focus on observable interactions as cues to agency, including: (i) Behavioral patterns (ii) Means of expressing agency	(i) Dogs have “certain things that they do or don’t do, when they live with people” (US, Mor.) (ii) Plants “communicate in the way they go growing” (NG, Com.); Animals “have their distinct forms to wait, express, know” (NG, Des.)
Directedness	Directedness is criterial to agency, as indicated by: (i) goal-directed needs or wants (ii) teleological processes (iii) variable states of the entity	(i) Plants are “hungry for something that will allow them to survive” (US, Hun.) (ii) Sun “has the thought to light the world” (NG, Th.); Rain “has thoughts, that it falls as the rain” (NG, Th.) (iii) Oceans “have a moment where they wait for the change” (NG, Des.)

Abbreviations: (NG/US) Ngöbe/US; (Hun.) Hunger; (Th.) Thought; (Mor.) Morality; (Des.) Desire; (Com.) Communication

tra-class correlations for each variable ranged from $r = .62$ to $.85$, $ps < .01$, ($df = 232$).

Results All tests reported below are 2 (culture) x 2 (kind: animate, inanimate) repeated-measures ANOVAs on the coding variable of interest. Data were collapsed over the five kinds into two categories (in/animate) to reduce empty cells (this split allowed us to include 10 of 11 participants from each group). We report only results that reached statistical significance. There were no main effects for kind, or interactions of culture by kind, for any test reported here. Results and descriptive statistics are summarized in Table 4.

Framings of agency On an anthropocentric model, we predicted that US explanations would treat humans as the ideal or most “developed” agents and thus contain more human-centric and scalar framings of agency. On an ecocentric model, we predicted Ngöbe explanations would frame agency in terms of relational action, both social and ecological.

Human-centric frame An anthropocentric framing was assessed by coding for (i) comparison of nonhumans to humans (e.g., chimps think because “they’re very similar to human minds”); (ii) taking a human vantage point on perceiving or appraising nonhuman agency (e.g., animals have minimal communication because “they’re difficult to interpret”); or (iii) human intervention on nonhuman agency (e.g., dogs only behave morally because they are trained to follow rules). As predicted, there was a main effect for culture, $F(1,18) = 8.65$, $p < .01$, $\eta^2 = .33$, such that US participants provided more human-centric content than Ngöbe.

Scalar frame A scalar framing was defined as explanations that (i) assess agents according to hierarchical taxonomies or developmental scales (e.g., mammals “tend to be smarter, have a more complex brain”); or (ii) hedge the sense in which an entity possesses a capacity (e.g., in an “abstract” or “different” sense), implying an anchoring concept based on an ideal standard. The predicted main effect for culture emerged, $F(1,18) = 7.82$, $p < .05$, $\eta^2 = .30$, such

that US explanations relied more on scalar framings than Ngöbe explanations.

Relational frame A relational framing was assessed by coding references to relationships, interactions, and other-oriented states involving (i) other agents (e.g., “babies know who their mother is”) (social relations); and (ii) environments (e.g., a plant “wants to wet itself with rain and eat sun”) (ecological relations). As expected, there was a main effect for culture, $F(1,18) = 7.76$, $p < .05$, $\eta^2 = .30$, such that Ngöbe participants provided more content associated with relational framings than US participants.

Indicators of agency We predicted that US explanations would focus more on internalized indicators of psychological agency by referring to (i) minds and brains, or (ii) other interior substrates (e.g., cables in robot) that underlie such capabilities. Contrary to our prediction, there was no main effect for culture on explanatory content associated with internalized indicators, $F(1,18) = .20$, ns.

In contrast, we expected Ngöbe explanations to focus on interactive indicators of agency by referring to (i) observable behavioral patterns as evidence of a capacity (e.g., learning from experience), or (ii) tangible means and multiple ways of expressing a capacity (e.g., barking as evidence of communication). As predicted, there was a significant main effect for culture, $F(1,18) = 9.01$, $p < .01$, $\eta^2 = .33$, such that Ngöbe participants focused more on interactive indicators than US participants.

Criteria for agency Following from a focus on psychological agency, we expected US participants to treat consciousness as criterial to agency by focusing on (i) self-awareness or consciousness and (ii) autonomy over own actions, distinguishing these from (iii) mere instincts or mechanistic reactions. As predicted, there was a reliable main effect for culture, $F(1,18) = 10.83$, $p < .01$, $\eta^2 = .38$, with US participants providing more content associated with consciousness (versus instincts) than Ngöbe participants.

Table 4. Explanatory content associated with coding constructs by culture

Agency framework	Coding construct	Percent explanatory content (across all kinds)					
		US		Ngöbe		Overall	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
<i>Anthropocentric & psychological (US)</i>	Human-centric framing	2.66*	(1.93)	0.78*	(0.63)	1.72	(1.70)
	Scalar framing	6.22*	(2.54)	2.71*	(3.06)	4.46	3.28
	Internalized indicators	0.53	(0.50)	0.91	(2.62)	0.72	(1.84)
	Consciousness	1.31*	(0.92)	0.24*	(0.47)	0.78	(0.89)
<i>Ecocentric & relational (Ngöbe)</i>	Relational framing	3.82*	(2.37)	7.47*	(3.41)	5.65	(3.42)
	Interactive indicators	0.60*	(0.85)	1.78*	(0.91)	1.19	(1.05)
	Directedness	0.93*	(0.96)	4.32*	(1.92)	2.62	(2.28)
Overall content coded		16.07%	(3.43%)	18.20%	(5.10%)	17.14%	(4.36%)

* Cultural main effect: $p < .05$ for cultural difference on that code.

Following from a focus on relational agency, Ngöbe explanations were predicted to treat directedness as criterial to agency by focusing on (i) goal-directed needs or desires, (ii) teleological processes (e.g., “plants have the thought to grow”), and (iii) change or continuity in states (e.g., growth, transformation, modulation). As expected, there was a reliable main effect for culture on directedness, $F(1,18) = 24.97$, $p < .01$, $\eta^2 = .58$, with Ngöbe participants providing more such content than US participants.

Summary With the exception of internal indicators of agency, the coding analysis revealed distinct cultural frameworks for agency. US participants were more likely to frame agency in terms of a hierarchical scale where nonhumans are compared against human minds, and to treat consciousness as a criterion for agency attribution. Their justifications implied that humans serve as arbiters of nonhuman agency, reflecting a view of humans as privileged knowers (e.g., “the smaller an animal is, the less I get a read of intention”). These findings fit with a concept of agency as a psychological capacity tied to the mind (as humans know it).

Anthropocentric framings were significantly less pronounced in Ngöbe explanations, which instead framed agency in terms of relational capacities not unique to humans. When Ngöbe informants referred to humans’ role in perceiving agency, they unanimously did so to affirm non-human agency (“The stones can tell you how long a life or time they were there”), and sometimes to deny that humans are privileged knowers (nonhumans “have their own form of communication, even though you don’t know”). Significantly, Ngöbe also emphasized interactions and behavioral directedness as criteria for agency, rather than consciousness. This is congruent with a view of agency as a relational capacity that exhibits many unique endpoints in nature more akin to a scale-free network than a *scalae naturae*.

Discussion

This study revealed systematic cultural variation in understandings of agency. Ngöbe were more likely to attribute agency capacities to animals, plants, and ecological kinds than US college students. Current theories would interpret this as evidence that Ngöbe overextend folkpsychological

concepts beyond their proper domain. This makes sense if we assume that people universally share the Western view of agency as a scalar, prototypically human capacity requiring consciousness (as exemplified by our US participants’ explanations). However, Ngöbe explanations challenge the idea that agency concepts are universally structured around a concern for minds and mentalistic interpretation of actions. Instead, Ngöbe focused on entities’ directed interactions with environment and others, indicating a concern for the relational dimensions of agency. Before discussing implications of these findings we address potential limitations.

First, these results could be argued as revealing metaphors rather than agency concepts. For instance, perhaps Ngöbe speak metaphorically when they attribute thought to plants. We did not find evidence for this in the frequency of hedges or metaphorical construals (e.g., “in a sense”). More to the point, identifying a metaphorical extension of such capacities rests on one’s definition of agency itself. From this perspective, appealing to metaphor is question begging (why are Ngöbe more metaphorical than US participants?).

Second, it could be claimed that Ngöbe and US respondents interpreted the questions differently. There may be a sense in which the two groups are not answering the same questions, but we believe the source of variability lies not in the questions but in the conceptual frameworks they evoke. A capacity such as communication acquires different meanings on an ecocentric model of relational agency than it does on an anthropocentric folkpsychological model. For instance, one Ngöbe informant cited communication between ocean and rain via water falling and “vapor rising like new.”

Last, if Ngöbe conceptualize these as relational capacities and ascribe agency on the basis of cues such as directed behavior, the question might arise: Do Ngöbe view these cues as sufficient to ascribe mental states to natural kinds like the ocean? This question implies that an ecocentric concept of relational agency can (or should) be aligned with commonsense Western views of agency. But we might equally turn our question to ask: Do Westerners view directed motion as evidence that plants have a capacity for relating? This poses an interesting challenge. For starters, domain specificity offers no obvious conceptual slot for intrinsically relational capacities (e.g., communication) between

folkpsychology, folkbiology, and folkphysics (see critiques in Hirschfeld, 2013; Luhrmann, 2011; ojalehto, Waxman, & Medin, 2013). This underscores the need for comparative research on agency concepts to start from an understanding of culture-specific systems of knowledge organization.

These findings raise a wealth of questions about the interaction of agency concepts and broader cultural systems (ojalehto & Medin, 2015). For instance, one might speculate that the US folkpsychological stance on agency is tied to a heightened focus on (human) minds under Cartesian dualism, whereas the Ngöbe ecological stance on agency partakes of a cultural worldview that sees humans as part of nature (Medin & Bang, 2014). One must also consider that our two samples differed in many ways, including formal schooling, language, and familiarity with computerized artifacts. Each factor might relate to beliefs about agency, yet each factor also reflects and reinforces cultural epistemologies. If one views cultures as complex systems, then it may not be feasible (or desirable) to isolate one factor and give it explanatory priority in a system where many variables interrelate with one another and epistemological orientations.

Conclusion

We have argued that Ngöbe individuals hold a conceptual framework for agency that is fundamentally geared toward understanding interactions and relationships, not internalized mental states. This leads to an ecocentric model of agency conceptualized in terms of relational capacities.

This provides a novel perspective on current domain-specific theories of folkpsychology. An anthropocentric folktheory of mentalistic agency may reflect particular cultural concerns, and the corresponding dissociation of psychological versus biological or physical modes of agency may be specific to Western epistemologies. This proposal resonates with other work that reevaluates the privileged role of mentalistic folkpsychology in theories of cognition (Heyes, 2014; Hirschfeld, 2013; ojalehto et al., 2013).

In the context of the massive pool of studies of agency, the present results are a small drop. Yet they bring to light a novel perspective for understanding agency concepts and their place in cultural domain-specific epistemologies. Indigenous knowledge systems such as those of the Ngöbe provide us with new ways of thinking about old questions.

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