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Intuitions on Ownership
Among the
Achuar of Southeastern Ecuador

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by

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ABSTRACT OF THE THESIS

Intuitions on Ownership among the Achuar of Southeastern Ecuador

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Property and ownership claims and the array of ways in which they are operationalized comprise a large portion of our cognitive attention. On a day to day basis there is a need to know what to buy, sell, share, borrow, dispute over, and render away. There remains much that is not yet known about the psychology of ownership and how it plays out in particular cultural settings. This investigation aims to assess whether people in Achuar communities in Ecuador consider food(meat), land, and artifacts to be possible domains of ownership as well as whether intuitions about claims to ownership in these domains, including the principle of first possession, are the same as in an American sample. The vignettes were designed to be culturally appropriate for Achuar participants, in domains including hunting, establishing land claims, and the creating of artifacts. The same Achuar-specific vignettes were presented to a American English speakers in order to gauge if Achuar intuitions about the claims to ownership in these domains are the same as they are in the U.S. The factors on which this study focused its analysis were designed to

assess how judgments of ownership depend on the type of resource in question, and how it came to be acquired. Analysis of the findings across domains and populations reveals weak evidence for a first possessor heuristic among the Achuar and strong evidence for a first possessor heuristic with American Mturk Participants, suggesting that this might not be a cross-cultural universal.

This thesis of Ulises Espinoza is approved.

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Introduction

Human social interaction, across the various ecologies we inhabit, requires both comprehension and coordination. Our social interactions are regulated by norms upheld within the different cultural niches and exist in a cyclical relationship in which the norms are impacted by the cultural niches and vice versa, creating a mosaic of beliefs that vary across cultures (Friedman and Rowlands, 1978; Moya, 2016). The variations that emerge as a result of the interaction between cultural norms and ecologies are likely to differ across societies—including between "large-scale" industrialized societies and smaller-scale community-based societies. Globalization likely plays a role in the transmission of information present in a given population in ways that might reduce the variation seen across cultures as people become increasingly interconnected. It can be argued that the selection pressures experienced in our evolutionary history have played a role in our evolved psychology, possibly creating cognitive domains that can be seen as human universals that arise within all cultures (Brown, 1991). One of these possible universals is the concept of ownership and the ownership claims extended to property. All human cultures seem to have a distinction between possession and ownership, and ownership tends to be associated with specific modes of affective expression (Brown, 1991).

Property and ownership and the array of ways in which they are operationalized comprise a large portion of our cognitive attention; on a day to day basis there is a need to know what to buy, sell, share, borrow, dispute over, and render away (Friedman and Neary, 2008). Thus, the cognitive attention paid to concepts of property and ownership must play some type of role in the formation of cultural norms that help in the public recognition of ownership claims. One cannot deny the impact that culture has on perceived notions of property, but if ownership is a human universal then there must be an underlying variable that led to the emergence of ownership and

possession claims on a global level. This raises the question of whether ownership is a purely cultural phenomenon or if there are also evolutionary roots to how we conceptualize ownership and the claims to various ownership domains. A large part of human evolution occurred before the emergence of formal institutions protecting ownership claims. But contemporary work in developmental psychology suggests that the concept of ownership may have been part of our evolved psychology for far longer than modern day institutions have been in place. For example, young children show the endowment effect (Friedman &Neary, 2008; Da Silva, Moreira & Da Costa Jr, 2014), the ascription of higher value to items owned than items not owned, and the first possessor heuristic (Ramsey, 2001; Friedman,2008; Friedman and Neary, 2008; Rochat, 2011), assigning ownership to the first person to possess an object. Additional work has shown that the first possessor heuristic can be overridden in ownership claims depending on the circumstances in which ownership is acquired: for example, if one party exerts greater effort or investment to get the object than the other does (Friedman, 2010).

This thesis presents an investigation that aims to test if there are cross-cultural similarities in how we think about ownership. Similarities across cultures may suggest there are some evolutionary roots (e.g., an evolved psychology) underlying the presence of an ownership judgments ,but there could be other explanations linked to different cultural histories and traditions. The data presented in this thesis are comprised of surveys about ownership intuitions in Achuar and American participants. The assessment of ownership judgments took place across two different factors, the ownership domain (e.g., meat, land, artifact) and the means by which the domain came to be acquired (e.g., via effort vs. via luck). The ownership domains were selected because they are present in a wide array of cultures. The means of acquisition were selected to investigate whether judgments extended to ownership claims are impacted by effort

or by luck. The logic behind selecting effort as a factor by which ownership came to be acquired was done with the consideration that judgments given in favor of an owner who acquired a claim through effort may have possible adaptive reasons. Effort may be reflective of the sunk-cost fallacy, an owner may be willing to fight to protect a claim up to previously paid costs, the display of effort causing deference to the claim by others (Friedman et al., 2007). The logic of juxtaposing claims acquired through luck vs. those acquired through effort was devised with the understanding that luck as a means of acquisition of an ownership claim aligns with the Bourgeois strategy within the Hawk-Dove game in evolutionary game theory. The Hawk-Dove games highlight simplified behavioral strategies used to obtain resources, the Hawk always fights for a resource and a Dove never fights for a resource (Maynard Smith, 1982). The Bourgeois strategy can be seen as respect for ownership of a resource. A Bourgeois strategist will fight to hold on a resource they possess and use Dove displays over resources they do not own. Luck aligns with the Bourgeois strategy because the means of acquisition (via effort) do not matter, the first to possess a resource will defend at the same rate no matter how an item has come to be possessed.

Judgments on ownership acquired via effort or via luck across the different domains of ownership (food(meat), land, artifacts) may allow us assess whether ownership intuitions are the same or different in these populations, and what this might or might not tell us about the possibility of an evolved psychology of ownership extended to domains of ownership , and how and whether it might vary cross-culturally.

Possibility Space: Ownership

Contemporary perspectives on ownership, possession, and property exist within power structures that impose their expectations and norms on us. From such perspectives, property is often considered a modern innovation that emerged from feudal systems in Europe (Smith, 1937; Demsetz, 1974). However, it seems counterintuitive to think that prior to the emergence of feudal systems, humans did not engage in trading and possession of goods, or that they lacked social norms used to mediate these interactions (i.e., evidence of food sharing and exchange among hunter-gatherers). Our evolutionary history is a long one, existing long before modern day institutions were formally established to mediate social interactions between both groups and individuals. The emergence of ownership claims can thus be seen to have a long presence throughout the human developmental history timeline. The question of whether certain domains of ownership are evolutionarily older than others--for example, of resources, land, or artifacts--is an important one to consider. An understanding of what aspects of these different ownership domains are the most salient to the human mind, due to an evolved psychology, is an important question to investigate given the various and complex ways in which ownership rights/claims have come to be reflected in contemporary legal codes. In this thesis, I will use the term "ownership" to designate *socially recognized* ownership, which distinguishes "ownership" from mere "possession." For example, a thief might possess an object, but would not be socially recognized as the owner of that object. Similarly, it might be possible to "own" an object without physically "possessing" it, as when a landlord owns a property that is in fact inhabited by a renter. In the following, then, the formulation "ownership of" refers to the social attribution of ownership, a relationship between an "owner" and a thing "owned." Ownership as conceptualized here, then, involves a three-way relationship between an owner, a thing owned,

and a third party, an individual who *represents* that ownership relationship in their mind. This is not to say that an owner cannot also ascribe ownership judgments to a thing that is owned, there could be significant asymmetries between how individual owners and others (third party judgments) ascribe ownership. The emphasis of this study is on the third party judgments, those third parties are research participants, who will make judgments about characters in stories ("vignettes"), and will judge whether or not characters own things described in the stories, thus allowing us to assess first person assessments. The question I am aiming to address in this thesis is whether there are aspects of the concept of ownership, thus defined, that are similar or variable across two cultural settings, Achuar and American.

Ownership of Food -Meat

The norms around food sharing are an interesting phenomenon to begin with when considering the emergence of ownership. This is an interesting staring point due to the social interactions that play out when decisions about whether and how to share are made. Similar questions are relevant when considering how ownership claims are attributed, recognized, and maintained. While other species have been shown to exhibit food sharing, including eusocial insects (termites, ants, bees) (Shellman-Reeve,1997; Abe, 1971; Farina, 1996), social carnivores (lions, wolves, wild dogs) (Frame et al, 1979, Kleiman and Eisenberg 1973; Kuhme 1965), and birds (ravens) (Heinrich, 1988), human food sharing differs in that complex social relationships play a large role into how food is divided among kin and non-kin (Kaplan, Gurven, Hill,& Hurtado, 2005). Among non-human primates, sharing can sometimes be seen between adults in mating or coalitions, but rarely among non-kin (Jaeggi & Gurven, 2013). Tolerated theft on the other hand, the taking of food when the cost to defend outweighs the benefit incurred, is often seen in non-

human primates (Brown, 2004; Gurven & Hill, 2009; Hawkes, 1999). When assessing the ways in which ownership claims are extended to food in humans it is important to consider the evolutionary timeline in which the sharing of food came about. Hominin meat consumption can be dated to at least 2.5 million years ago and hunting of prey inferred at about 2 million years ago (Heinzelin et al., 1999; Steiner, 2002; Ferraro et al., 2013; Hartley,2019). The emergence of big game hunting came about through the emergence of many innovation, such as cognitive mechanisms that allowed for the navigation of larger social taxonomies (Barrett, 2017), morphological changes allowing for the ability to throw overhead (Roach, Venkadesan, Rainbow, Lieberman, 2013), and tool kits used for large game hunting (Isaac, 1987). Large game hunting is suggested to have emerged about 200,000-250,000 years ago, evidence suggesting that the large game was butchered and carried back to centralized spaces where they were shared divided among other early humans (Steiner, 2002; Steiner, Barkai, & Gopher, 2009). The social dynamics around food claims of early humans continued to expand as human populations became more complex and began to exploit various ecologies. Ethnographic work among contemporary human hunter gatherers has allowed us some insight into ways in which groups who do not practice agriculture may view the ownership of food.

Among contemporary hunter-gathers, the sharing of food is fairly common, often extending far beyond kin. (Gurven & Jaeggi, 2015; Jaeggi & Gurven, 2013; Winterhalder, 2001; Hartley, 2019). Two case studies that are often used as examples of these sharing dynamics are the !Kung of the Kalahari and the Ache of Paraguay. !Kung groups often give the right of distribution to the hunter whose arrow was the first to strike the animal (Wiessner, P, 1989; Wiessner, P, 1996; Winterhalder, 2001). The distribution of hunted game meat among the Ache is often done by an older man in the hunting party, as strong moral sanctioning exists against the

hunter eating portions of their own kill (Gurven, Hill, & Jakugi, 2004). There appears to be strong social sanctioning to share game meat among these two groups of hunter-gatherers. This may be due to the high caloric value and unpredictability of acquisition of the meat (Kaplan,1984). On the other hand, these two groups as well as many other hunter-gatherer groups appear to show lower rates of sharing of resources that have higher rates of availability; !Kung have strong norms that require meat to be shared, but non-meat resources such as mongongo nuts do not need to be (Lee 1979, Marshall 1961). The Hill Pandarum of India (Morris, 1982) and the Ache of Paraguay (Kaplan, 1984) share meat and honey (a resource requiring collaborative extraction) widely but collected vegetables and tubers and typically not shared. If sharing norms among hunter-gatherers that are extended to various types of food are impacted by the predictability of a resource being available, it seems that groups sustaining primarily through agriculture may show stronger individual claims to food resources and display lower rates of sharing. Although the sharing of food among hunter-gatherers is common, there is likely to be a variation of norms surrounding ownership claims to food.

The subsistence practice of agriculture here is not meant to reference to the large-scale systemized version seen post-industrial revolution but to a form of agriculture more common in small-scale societies, horticulturalism. Horticulturalism is a small-scale form of garden cultivation that involves the production of agriculture through the input of human labor and use of simple tools (Bates, 2001). Horticulturalist often engage with fishing and hunting, but a large portion of their diet is comprised from domesticated plants (Gurven et al., 2010). This access to predictable caloric resources has been seen to reduce interfamily resource sharing while increasing territoriality in some hunter-gatherers; The Ache who have begun to live and grow crops on permanent settlements have begun to show a reduction in food-sharing networks when

compared to other Ache groups that still primarily forage nomadically (Gurven, Hill, and Kaplan 2002). The autonomy displayed among horticulturalist does not eliminate the dependent relationships between households within these groups seen during times of conflict(Patton, 2005), crop failure (Hadley, 2004), and illness (Sugiyama and Chacon, 2000). Anthropologists have posited that the main influences to ensuring that sharing norms are stable is the blend of effort, skill, and luck are taken into account when making decisions about sharing resources (Gurven, 2004). The success rates and quantities of foods that are grown and foraged are heavily dependent on the effort spent in their acquisition while the success rates and quantities of hunted meat is highly dependent on random factors and luck(Gurven, 2004; Barrett, 2018). If this is the case, the it could be the case that when the acquisition of a resource is done so primarily through effort, sharing norms may not be as stable due to success being determined by effort paid, thus more ownership claims may be extended to foods that are grown in a garden and or foraged. Agriculturalist (e.g., Horticulturist), specifically those in an Amazonian context provide an interesting case study to begin to study the domain of ownership and the norms constructed around claims to various food resources because they appear to share meat and foraged food more than gardened food, thus possibly displaying higher rates of ownership and territoriality than foragers (Wiessner, 1996; Hames, 1990). Additionally, Amazonian groups have traditionally held a unique understanding of causality in that they factor the agency of animals and the ecology into what is considered luck or fate. For Hunter-Horticulturalists things like the weather may be connected to outlooks on causality in where events like a drought are associated to having bad luck. The variations of local understandings of causality may impact how factors suck as effort and luck are weighed when attributing ownership rights.

Ownership of Land

As human populations began to expand and grow, a process known as *Neolithization,* involving the increase of population density and higher rates of settlement formation (e.g., cultivated land, permanent housing creation, cemetery formation), played a possible role in how claims to land came to be conceptualized. An important factor in the emergence of *Neolithization* was the emergence of agriculture 9,000 to 11,000 years ago. The domestication of plants and animals is often credited for rapid development of human cultures and civilizations over a short time period. As the environment began to change, the reduction in the densities of large game animals may have pushed early humans to rely more on cultivated foods, creating the need for higher rates of social interactions needed to learn how to begin to cultivate certain types of food. Early civilizations during this time period have been shown to have utilized one of more of the following species of plants; wheat, barley, millet, rice, maize, and potatoes(Flannery, 1973; Rindos, 1987). It seems likely that the emergence of individualized land ownership rights may have been a result of the co-opting of several cognitive domains related to cooperative behavior, pedagogy, and territoriality that were exploited by the needs of practicing agriculture. Early humans would need to have the capacity to navigate a multitude of complex social relationships (e.g., work with others to develop land, learn from others, manage resource boundaries) to be able to sustain through the means of agriculture. This is not to say that agriculture is the sole factor in the emergence of ownership extended to land. Hunter-gathers have been shown to display territoriality towards lands that they hunt on, but that agriculture may have helped to facilitate the investment that humans made into their landscape.

An additional factor that may have played a role in the emergence of explicit ownership claims to land may be linked with the emerging complexity of land modification in the Neolithic in non-agricultural domains, a primary example being burial practices. The archaeological record suggests that the clustering of burials (cemeteries) are associated with long-occupied villages. Burial monuments (long barrows, dolmens) are associated with less permanent villages (Saxe,1970; Artursson, Magnus, Earle, & Brown, 2015; Graziadei & Smith, 2017). Burial sites provide possible insight into the expansion of social relationships and biases in the acquisition of cultural traits that made the Neolithic period so important for stylistic modification of objects (Earle 2002; Graziadei & Smith, 2017). The manipulation of land associated with agriculture, burial monuments, and material goods (objects of status) thus may have created a niche for the control of these resources to arise where the group or individual that possesses the resources inherits a position of power and or prestige within the communal context (Saxe,1970; Artursson, Magnus, Earle, & Brown, 2015; Graziadei & Smith, 2017). The archaeological record suggests that the Bronze Age in Europe had displays of individualized property rights from the rebuilding of households on earlier foundations, hamlet size settlements that expanded to include the stratification of access to resources and land (Earle, 2002; Beck, 2007; Earle, 2018).

The Neolithic period through its expansion of agriculture may have brought forward an increase in permanent living patterns that may have played a role in how land ownership came to be viewed. The emergence of permanent living as a result of agriculture may have allowed for higher rates of accumulation of material artifacts such as pottery for food storage, cooking materials, and objects that helps identify personal and group identity status (Earle, 2000;2018). This increase in material remains associated with the Neolithic period suggests that it may have

provided the pressures needed to make way for the possible emergence of far more complex group dynamics around ownership than were previously seen.

Ownership of Human Made Artifacts

The evolved human psychology appears to be distinguishable in its ability to create, interpret, and communicate things related to visual symbolism, language, large group cooperation, and tool use; These phenomena may be the product of many-interacting mechanisms within the brain, some developed pre the genus *Homo* and others during (Barrett, 2017)**.** To have a full understanding of the evolved human psychology related to ownership, we must understand the conditions in which this psychology may have experienced selection pressures. Early Human history can be best understood as a time period in which human groups consisted of low-density foragers. These low-density foragers came to migrate to most parts of the world, their archaeological material remains suggest that the cognitive space attributed to ownership may have existed since early on in our human history. The daily experiences of early nomadic foragers may have required that early humans be flexible in their ability to move and reconvene, suggesting that formal land ownership may have not been imperative for the needs of successful foraging strategies (Bernard & Woodburn, 1988). This however does not negate the possible presence of ownership claims to artifacts that aided in game hunting (i.e., bows and arrows, axes). There has been debate on whether ownership claims could have been attributed to spaces that were modified for possible cultural practices and or rituals (i.e., cave paintings); The archaeological record suggesting that groups would use these spaces repetitively, possibly creating the need for norms attributed to space access and use (Curry, 2008). It seems more than

likely that the earliest forms of ownership domains salient to early humans were movable artifacts, with ownership domains such as land coming about later.

The archaeological record suggests that the earliest forms of artifacts attributed to the *Homo* lineage appear in the Lower Oma Valley and are known as the Oldowan tools, which are dated to be roughly 2.3 to 2.5 million years old (Susman,1991). Similar artifacts such as the Acheulean stone tools (1.7 million years old), Venus of Willendorf (32,000 years old), and Aurignacian beads (37,000 years old) have been found, suggesting that capacity to create and alter artifacts was present in early humans (Mithen, 1996; Hahn, 1984). The relationship between artifacts and the functional purpose they served seems to have changed over time, the earliest artifacts (e.g., stone axes) seem to have a direct fitness related functionally purpose (i.e., being able to treat meat) while in later artifacts there seemed to emerge more complex uses. These early ownership claims extended to tools (i.e., axe, knife, spear) make intuitive sense from a functional perspective given the possible resource benefits (e.g., calories from hunted game) that could be accrued from investing in the maintenance and protection of the tool kits. This is not to say that artifacts such as the Venus of Willendorf don't have a functional purpose, it may be that the creation and ownership of this artifact and others like it may have had a social value attributed to them (e.g., prestige) that could lead to directly fitness beneficial results. A contemporary example of ownership claims that have a high level of social significance that may have an impact on individual fitness can be seen amongst Australian Aboriginal sacred sites. Australian Aboriginal sacred sites are not large enough to provide for subsistence needs, thus clan membership is used as a proxy to have ownership over certain songs, legends, and painted motifs associated with particular sites making it so that only certain clan exploit resources from a given sacred site (Layton, 1986). This capacity for navigating the complex social interactions

around ownership of artifacts (i.e, territory borders, ownership claims, artifact symbolism) is an interesting niche that humans have been able to fill, and that no other non-human primate has displayed. As the creation of human artifacts continues to become more complex, it seems necessary to begin to parse apart if and how an ownership psychology originally extended to artifacts such as tools used for hunting has been extended to contemporary intellectual property claims; Ownership claims granted to individuals under the guise that they created innovations to a design.

The aforementioned sections on the trajectories of the emergence of ownership claims extended to Meat, Land, and Artifacts was meant to highlight the complexity behind the emergence of a possible ownership psychology. Across the three domains discussed, there appears to be no clear explanation as to how ownership in any of the given domains came to exist, rather if we step back and look at the evolutionary timeline in which humans evolved along with the various selection pressures encountered, we can begin to better understand the various cultural mosaics that emerged and how across those mosaics there may be an underlying psychology that can be extended to ownership claims

Psychology of Ownership

The diversity in social taxonomies around the globe that human groups opt into are quite obvious; The commonality within all of these differences is the institutions, whether formal or informal, that uphold a behavioral equilibrium through the use of coded norms, stories, and honor/law codes that are meant to sanction aspects of possession and ownership on both the individual and the collective level (Noles & Keil,2011; Rochat, 2011). The various spectrum of bodies of cultural histories and knowledge inform how ownership norms vary from place to

place, however they all seem to share the goal of dictating what can be owned, shared, and the rules by which agreements are reached in the distribution of resources. The psychology of ownership is interesting because it can begin to show us what and how the process of norm acquisition re ownership is like as well as providing insight on early intuitions of ownership, which could provide the framework for contemporary intuitions. The relationship between the creation of these norms and cognitive inference systems seems to be relevant in language acquisition (Chomsky, 1986; Pinker, 1994), mental state reasoning (Frith & Frith, 2003), and moral judgment (e.g., Darley & Shultz, 1990; De Freitas & Johnson, 2015; DeScioli & Kurzban, 2009, 2013; Haidt, 2012; Mikhail, 2007). The emergence of ownership norms around the domains of food (meat), land, and human made artifacts seen in various forms cross-culturally suggests that there may be an evolved psychology extended to ownership within the human mind (DeScioli & Karpoff, 2015).

The ownership domains that appear to be have the most salient judgments placed around them cross-culturally appear to revolve around food (meat), land, and human made artifacts; These domains may have stronger ownership norms placed on them due to having existed longer during the Human evolutionary timeline, the direct relationship of these domains to resources needed to survive appears to highlight a possible principle of the an evolved psychology of ownership. The principle being highlighted is that an ownership psychology may be calibrated to respond to ownership claims to resources that are directly linked to a fitness enhancing domains (e.g., food(meat), land, and artifacts that may aid in extracting resources from the two previous domains). This may be a primary principle due to the emergence of exchanges around food(meat), land, and artifacts among low density foragers during the Late Paleolithic. The exchanges around food(meat), land, and artifacts among these early foragers may have begun to

increase as populations began to grow and expand across territories, thus creating a niche for a more intricate social taxonomy to navigate around the ownership of food(meat), land , and artifacts (Earle, 2017; Graziadei & Smith, 2017). The social relationships between conspecifics around food, land, and artifacts required norms to develop around who has access or not, sharing, embedded rights, and the transferring of goods (James, 2009). Foragers might have used the costs and benefits of exclusion of access to items as a means of building or expanding social networks. Agriculturist and higher density foragers may have begun to establish group collectives to defend the larger plots of land and resources which may have set the precedence for the emergence stratified claims to ownership in where the group rights to land differ from the individual claim to land based on modification of the land (Earle,1998; Artursson, Magnus, Earle, & Brown, 2015; Graziadei & Smith, 2017). A strictly functional explanation may seem valid when considering ownership and possession claims to land that have been established as resource rich, however this gets a lot more complex when considering ownership extended to land that is low in resources but high in veneration (burial sites) or artifacts themselves that are considered to denote status (Saxe, 1970; Artursson, Magnus, Earle, & Brown, 2015). The point here is not to argue that an evolved psychology of ownership is separate from culture, as humans are more than likely adapted to be cultural, but rather to begin to understand how and why an ownership psychology functions the way it does and how the shape of the cultures has led to its possible various manifestations cross-culturally (Barrett, 2014).

Ownership and Culture

If an evolved ownership psychology exists, then it seems reasonable to assume that it can be calibrated differently to the various cultural schemes in which it may develop.

Anthropological work conducted on the domain of property within "traditional societies" often engaged with a wide array of concepts, the most salient being habitus, inheritance, identity, and territoriality (Graziadei & Smith, 2017). The notion of habitus can be thought of as the way in which people create mental schemas that shape how they think about their rights in regard to their daily interactions with others (Bourdieu, 1977). Habitus related to phenomena like property and ownership plays out in the ways in which peoples' daily lives are intertwined with material and non-material forms of ownership in which a structure of normative behaviors emerges in response to how ownership is negotiated between people.. From an evolutionary perspective one can see how humans have developed a social taxonomy that is closely associated with the materials that constitute their everyday lives (Hodder, 2012; Bourdieu, 1977). Two examples of different cultural schemas impacting the way that ownership claims are utilized can be seen among !Kung foragers whose mobility patterns have limited the material inventory due to the costly nature of that comes from moving objects (Graziadei & Smith, 2017) and among Yanomamo horticulturalist who showcase how less frequent mobility patterns, due to fallow cycle patterns, allowing for a larger amount of material culture to develop (Hames, 1990). Across both groups highlighted here, the existence of a material culture and property is present, the variation being present in the amount invested in living facilities. Thus, sustenance practices and the types of housing created by groups in response to their ecologies helps to facilitate the types of social relationships that will unfold in relation to their claims and property and how that forms their cultural schemas of ownership.

Given that ecologies are so different, and the pressures placed onto the groups living in these ecologies are different, it seems clear that different forms of habitus or cultural schemas of

ownership would come to exist and eventually encounter one another. Ownership at its roots is a triadic relationship played out in the social sphere where people relate to each other with respect to the objects in their environment; The nuance of these relationships become more complex when they are deeply entangled within social structures, where the protection of ownership is carried out through government led legal institutions (Hann, 1998). This is not to say that without written law there is no ownership claims, rather to highlight how varying cultural schemas held by groups of people impact the ways in which norms around ownership are carried out and how ownership claims can vary across domains. Claims to ownership within the cultural ethnographic record can show instances of both communal types of ownership where the various owned domains such as food(meat) and land across various ecologies have rules and norms that distinguish them as not-owned, collectively owned, and individually owned (Gluckman, 1965; Humphrey,1983). The western notion of ownership and property is backed up by institutions that provide "legal" documentation that allocates ownership to whoever is listed on the legal documents. The absence of formal legal systems that allocate ownership to individual and group identities may possibly shift both understandings and interactions around ownership (Stake, 2004; Hartley, 2005). The physical use of marked homes, burial sites, shrines, communal spaces, hunting territory, and manipulation of the physical space suggest ways in which ownership claims outside of written documentation; The Tsembaga of highland New Guinea marking their territory boundaries through the planting of shrubs (Graziadei & Smith, 2017). Physical property is not the only domain to which claim is laid to, it is simply one that is easier to understand and define as land claims tend to come with physically expressed boundaries. Ownership claims around domains such as land become far more complex in instances where two different cultural schemas of ownership psychologies meet. An example of this can be seen in the way that

ownership schemas held by colonial entities and placed on indigenous groups have often been rejected by said indigenous groups, often because those ownership claims were made to exploit land that was initially held by indigenous entities. An example of this can be seen in land claims that indigenous groups have on land which are overturned by the government, such as the Mabo Judgment in Australia in which Aborigines groups were denied their titles to their land (Hann, 1998). This is an interesting case study because it highlights changes (consented or non-consented) of ownership schemas; Aboriginal groups were forced to opt into the use of formal legal land titles when given no other option by colonial entities. Ownership has come to be intertwined with how political hierarchies and power structures are formed, the primary population of this thesis is an indigenous one (e.g., Achuar) whose ownership rights to their land existed prior to the formation of the Ecuadorian government yet are beholden to the land rights that the Ecuadorian government places on them. The ownership claims to land and resources of indigenous groups within the Americas and the clash of these different ownership schemas are a common occurrence within the history of the Americas, the United States and its use of Manifest Destiny being a primary example where claim to the land came through the use of the first possessor heuristic with respect to other colonial powers and not to the groups already living on the lands.

Ownership, and the norms that comprise the various cultural schemas in which an ownership psychology may develop, has become even more nuanced in current times due to processes like industrialization that have led to the emergence of concepts like intellectual property. These types of ownership claims can be abstract, due to the possible lack of physical representations of the property , thus making it harder to prevent the resource from being

exploited. Despite the complexities that go into owning a token of intellectual property, at the root of the phenomenon there still exists the need for social negotiations and recognition of ownership between conspecifics who are navigating the cultural schema in which the ownership norms are playing out (Miller & Johnson-Laird, 1976). Given that ownership claims entail the involvement of individual engagement with objects and the recognition of claims, it seems plausible to argue that the social interactions around these claims can aid in establishing the structure of interactions of social identities around different ownership domains. The creation of these identities is not immune to the influence of cultural phenomena, often the expression of individual identities is a reflection of norms and behaviors engrossed in a cultural schema, thus impacting the way ownership claims are extended to concepts outside of a physical domain (i.e., intellectual property). The use, claim, and social lives of behaviors and artifacts (ritualized songs, stylistically distinctive dress, bodily adornments) that have been ritualized to express identity (e.g., ethnic markers, markers of prestige) within or between groups often have strong norms placed on them that determine who and how they can be accessed (Friedman and Rowlands, 1978; Moya, 2016**;**Graziadei & Smith, 2017). Work done on the transference of claims of objects in traditional societies has shown that transference may come along with sets of responsibilities associated with reciprocity in hopes of building social alliances (Mauss,1925). These ownership transferences become even more complex when items are marked with a token of status, the transference of an item often requires the loss of status of the individual to take place for it to be passed on to another individual (Weiner, 1992). This type of ownership psychology is not uncommon in contemporary notions of ownership; A contemporary analysis of ownership intuitions of distinguished art paintings created by renowned artists as well as items owned by individuals who have committed vile acts (e.g., Hitler) suggests that individuals in a

sample from the Global North are drawn to owning these items but in the case of the sweater not necessarily wearing it(Bloom, 1996; Newman & Bloom, 2012). This adds nuance to an understanding of ownership as there may be no direct fitness enhancing benefit from investing upwards of thousands of dollars into owing a sweater worn by Hitler or a painting by Rembrandt, yet individuals are investing into these domains of ownership.

Humans, as both a biological and cultural species, have been susceptible to selection pressures that may have impacted the domains of ownership that are most salient to the human mind (Olson, 2009). The capacity for an evolved psychology extended to ownership may very well be a possibility; The factors leading to the emergence of a universal ownership psychology are more than likely linked to some of the ecological pressures faced by Humans during the Late Pliocene. The shifting ecological conditions, cooperation dilemmas (i.e., hunting, land use, water use), and population growth created a new set of social negotiations that humans had adjust to. Thus, it may be the case that if there exists a universal ownership psychology within Humans, that it may calibrated to factors linked to subsistence practices. In addition, from the emergence of larger social groups that came about post-Late Pliocene, it seems probable that another underlying factor of an ownership psychology is one that is calibrated to be sensitive to ownership claims between different groups; Norms of access and rights to who can exploit resources being of present and of importance in small-scale societies suggest that this could have also been significant to Humans using similar subsistence practices in the Late Pliocene. The factors that may have led to the emergence of variations in an ownership psychology may be linked to the expansion of cultural mosaics and the shifting of subsistence practices and ecologies in which they develop. As cultural groups began to expand and vary, the means of

production (i.e., ways in which resources are accrued) have changed dramatically along with the ecologies in which the production is taking place. An example of this can be seen in the very creation of this thesis; I, a graduate student, live in an urban ecology where I do not hunt or grow my food and yet manage to produce resources (e.g., money to purchase food and pay rent) through the production of knowledge. The ownership norms that an individual from an urban ecology in the United States holds, will surely vary from those held by individuals in a small scale-society in Amazonian Ecuador. This is not from the lack of ability of either party to understand and appropriate the ownership schemas of one another , but rather from the fact that the cultural and ecological mosaics in which these schemas developed are different. Ownership claims and norms across cultures are likely to vary, but a large portion of cultures display norms directed towards mitigating various forms of ownership, suggesting that aspects of a universal ownership psychology may exist (Hann, 1998; Stake, 2004).

Developmental Psychology and Ownership

Early investigations on principles of ownership through the developmental lens suggest that within the given sample investigated, individuals generally assumed that ownership claims are best applied to resources where direct possession of the domain entails the most benefit (e.g. to fully be considered the owner of a domain one must be able to fully possess it) , suggesting a possible zero-sum psychology underlying the domain of ownership (Furby, 1978; Friedman et al.2011; Rochat,2011). Additionally, experimental work conducted among children suggests that intuitions on ownership are impacted by prior possession, the use of extractive foraging of a resource, modification of an object or resource, and the transference of an ownership claim (Friedman et al.2011); The first to possess and or modify a given ownership claim may function

as cues to highlight who is the rightful owner of a contended domain. These norms may function to minimize the number of conflicts within social groups while making our behavior predictable to other conspecifics. Maynard Smith's work on the bourgeois strategy within the Hawk-Dove game shows that ownership of a resource will determine the behavioral reaction in any particular contest (Smith, 1982). The concept of ownership and possession seen in development studies suggests that social rules manifest from the need to regulate the rights individuals have to possessing an item. The concept of social rules around possession seem to manifest at an early age in children, two years being a point where it has been shown that children begin to regulate conflicts amongst each other with the aid of social rules and conventions (Bakeman and Brownlee, 1982). The concept of an item being possessed through language, with words like "mine," has been shown in early childhood (Bakeman and Brownlee, 1982; Rossano, Rakoczy, & Tomasello, 2011). Additionally, it appears that the prior possession rule, that is when children who previously possessed an item and attempted to play with it again, would have possession deferred to them by other children during interactions around the disputed items (Bakeman and Brownlee, 1982).

One of the most studied means by which ownership is recognized in the developmental literature is on the first possessor heuristic: a heuristic or norm that holds that the first person to possess an object or resource is the rightful owner. Investigations conducted on the first possessor heuristic and in children suggests that this phenomenon may guide children's ownership inferences; Children defending claims to ownership often invoked first possessor heuristic(Ramsey, 200), preschoolers infer who is the owners when not explicitly told based on first possession (Friedman,2008), causality by which first possession came to be established plays a role in how ownership is attributed(Friedman and Neary, 2008), a first possessor child is

more likely to transfer ownership if effort has been invested by a second child than if (Kanngiesser et al.2010), past first possession of a contested item plays a role in how ownership is attributed (Friedman.et al., 2011), and ownership of objects is evaluated differently by children depending on the inferred qualities and context in which they came to be owned (Da Silva, Moreira & Da Costa Jr, 2014). This is an interesting finding because it suggests that toddlers have the ability to infer who owns an item when not explicitly told and when presented with items that they are not familiar with. Additional developmental work by Blake and Harris (2009) found evidence to suggests that children as young as 3 years old have the ability infer the first possession heuristic and as time passes can override the first possession heuristic in relation to gift giving. This was done through the presentation of two vignettes in where in one vignette a toy is given as a gift and in the other the toy is stolen (e.g., first possessor child leaves the toy on the park bench by accident) from a first possessor. Children as young as 3 years old judged the rightful owner of the toy to be the child to which the toy was given as a gift (Blake and Harris, 2009). Children between the ages of 2 and 3 were more likely to attribute ownership to the child who obtained the toy by finding it on a park bench, highlighting a possible "finders keepers" psychology linked to a windfall (Blake and Harris, 2009).

Friedman's (2010) work added a nuanced understanding of the first possessor heuristic shown in his previous work by suggesting that there is more to ownership judgments made about property than first possession; Participants were presented with a series of vignettes in a factorial design in where the difficulty of obtaining a resource was varied as well as the effort used to obtain. This was done see if the individual's actions (e.g., effort in pursing the resource) in reaction to the level of difficulty of obtaining the resource impact the way ownership claims are judged. Across the various scenarios participants came to judge the rightful owner of the

contended resource to be the one who utilized more effort to obtain ownership, the difficulty of getting the resource did not seem to impact judgments, suggesting that the effort utilized in the obtaining of ownership may override the first possessor heuristic. The empirical work conducted on ownership rights have allowed there to a better comprehension about judgments related to ownership rights, suggesting that the emergence of ownership claims play a significant role in norms and the social rules within varying social groups; Norm adhering behavior being a fitness-enhancing phenomenon that allows altruists to fare better in a heavily social species (Gintis, 2007; Gintis, 2008). Contemporary work in developmental psychology on ownership has shown these judgments to be present in children as young as 2 years old, the caveat being that a majority of these studies were conducted among populations that are highly industrialized.

Given the long history and variation that the phenomena of ownership may have across cultures, there has been little to no cross-cultural experimental work done that has aimed to gauge where the intuitions about use, possession, and rights begin and where they end and how they vary across cultures. (Boyer, 2008; Boyer,2015; DeScioli & Karpoff, 2015; Friedman, 2010). The research discussed in this section highlights a prominent gap in the literature left to be explored; Are ownership norms and judgments linked to the presence of a universal domain that underlies an ownership psychology or are they best explained by the existence of varying psychologies across cultures. Cross-cultural research is important for this research because it can begin to parse apart factors (e.g., varying ecologies, subsistence practices, industrialization) that may impact an ownership psychology, allowing a better understanding of similarities and dissimilarities of judgments(i.e., what can be owned, who can own it, how should it be maintained if owned) extended to ownership domains.

Research Rationale and Goals

This thesis presents an investigation that aimed to investigate if there are cross-cultural similarities to how we think about ownership, similarities across cultures may suggest there to be some evolutionary roots (e.g., an evolved psychology) underlying the presence of ownership judgments , but there could be other explanations linked to cultural differences. The data presented in this thesis is comprised of surveys about ownership intuitions among Achuar participants. The assessment of ownership judgments took place across two different factors, the ownership domain(e.g., Meat, Land, Artifact) and the means (e.g., via effort vs. via luck) by which the domain came to be acquired. Parallel versions of the same vignettes were administered in an American sample to assess cross-cultural differences and similarities in, intuitions about ownership in these two societies. These two groups provide an interesting case study for comparing ownership psychologies across cultures because of their different cultural histories, ecologies, and interactions with processes of globalization.

The Achuar Cultural Setting

The Achuar provide an interesting and useful case study to test hypotheses about a universal ownership psychology due to their complex cultural history and shifting individual psychologies related to changing economic ecologies within the Pastaza region of Ecuador. The Achuar are an indigenous Amazonian society living in Southeastern Ecuador and are a part of the larger cultural-linguistic group that includes the Shuar, Shiwiar, Awajun, and Wampis. The predominant language at the field site is Achuar but due to market integration there has been an increase in bilingualism (Barrett,2018). The education system within the communities varies with those that are closer to the larger cities having greater access to education after the high

school level. Traditionally the Achuar have sustained a hunter-horticulturalist lifestyle with a mixture of fishing and foraging.

Achuar communities practice slash and burn horticulture as well as displaying propensity to shift their garden plots every couple of decades. Traditionally, Achuar would move their homes, villages, and gardens when resources begin to become depleted (Descola, 1986) ; These movement patterns have begun to be disrupted by the privatization and allocation of land to communities, thus making it illegal to shift to new lands. The hunting and fishing practices of the Achuar are sustainable if there is allowed a time period for them to replenish, but due to population density increasing it seems that animal species distribution would be impacted (Descola,1986 ; Gomez-Pompa & Kaus, 1992**;** Peres 2002**;** Raffles, 2002; Barrett, 2018). A large proportion of Achuar communities have some level of interaction with the Ecuadorian market economy. The emerging connection to the Euro- Ecuadorian market has allowed the Achuar and Shuar to take part in in selling their own market goods, examples of this can be seen in the selling of timber to Ecuadorian companies by individuals Achuar and Shuar community members. In the late 1960's more Colonos, Ecuadorians who are not indigenous or native to the region, began to arrive to the Pastaza region which led to a shift economic possibilities due to the construction of roads between cities such as Puyo and smaller communities in the Pastaza region. The emergence of these roads has accelerated resource depletion within these communities, as the Achuar have a strong autonomous ethos that allows people free use of the resources (i.e., forest) near their homes. Considering the changing social, economic, and ecological conditions that have been occurring since the 1960's near the Achuar, it is important to understand how the cultural norms practiced by the Achuar have shifted if they have due to interaction dynamics. Most recently community members have begun to engage with commercial practices such as

raising livestock and pursuing careers in education, medicine, and politics (Rudel, Bates, & Machinguiashi 2002; Barrett, 2018).

Achuar communities have both strong norms protecting the autonomy of individuals and putting a communal ethos at the forefront; Food sharing is obligatory when it comes to resources like meat among Achuar communities but not so much with items that are grown in chakras (household garden plot) or foraged (Descola, 1986.1996; Hames, 1990; Barrett, 2018). When it comes to land claims, Achuar communities tend to have a homesteading principle that allows individuals to claim land that is unoccupied, making into a type of private property in where an individual owner can be named (Bremner & Lu, 2006; Descola, 1986. 1996; Barrett, 2018). This differs from food norms among the Achuar in that there is no direct responsibility to have to share or divide up land that is not explicitly labeled as communal. Land considered to be communal among the Achuar is regarded as a public good; Regulation around communal land can be tricky considering the autonomous ethos that Achuar communities display. Achuar norms extended to domains of food may differ than those held around land because domains of food like meat may be susceptible to risk-reduction sharing; Given that a resource like game meat can be difficult to attain, there may be stronger social sanctioning to share the food with others. This is not to say that there cannot be an individual owner of game meat, but that the owner is expected to split the resource with others in their community. In addition to strong norms related to food and land, Achuar communities hold strong norms about magic, fate, luck, and witchcraft. These beliefs in luck and magic often result in a set of beliefs that things are nonrandom, meaning they occur because they were meant to occur, suggesting a psychology that may play into economic decisions being made.

Selection of Domains

Both the food domain (Meat) and the land domain were selected for investigation because they provide an interesting case to test hypotheses about universals (e.g., first possessor heuristic). If Achuar ownership norms related to food(meat) and land differ from American ones, it would suggest that cultural variation influences ownership psychology, thus suggesting that there may not be a universal ownership psychology, rather it may vary from domain to domain across populations. This variance of ownership domains across populations may be linked to ecological, cultural, and historical differences experienced by these two groups; One would expect an American sample on average to have less experience hunting game animals and clearing land for agriculturalism. If ownership norms related to food (meat) and land show similar results in both the Achuar and American samples, it suggests that there may be an underlying psychology related to ownership that gives way for similar judgments on ownership rights to emerge across these two populations. The Artifact domain was also investigated, in an exploratory way, as the first step in creating a taxonomy of ownership around domains that may be less ecological rooted; The creation of artifacts with stylistic modifications attributed to the individual is an interesting domain to begin to investigate when considering the ways in which intellectual property is protected by law in places like the United States.

An additional factor that was investigated was the means by which ownership is acquired, via effort vs. acquired via luck. Ownership via effort vs. via luck was compared to gauge possible cultural differences behind an ownership psychology among Achuar and American participants to test if there was a difference in the application of a first possession heuristic to ownership claims. The logic behind selecting effort as a factor by which ownership came to be

acquired was done so with the consideration that judgments given in favor of an owner who acquired a claim through effort may have possible adaptive reasons; Effort may be reflective of the sunk-cost fallacy, an owner may be willing to fight to protect a claim up to previously paid costs, the display of effort causing deference to the claim by others. The logic of juxtaposing claims acquired through luck vs. those acquired through effort was done so with the understanding that luck as a means of acquisition of an ownership claim aligns with the Bourgeois strategy within the Hawk-Dove game in evolutionary game theory. The Hawk-Dove games highlight simplified behavioral strategies used to obtain resources, the Hawk always fights for a resource and a Dove never fights for a resource (Smith, 1982); The Bourgeois strategy can be seen as respect for ownership of a resource, a Bourgeois strategist will fight to hold on a resource they possess and use Dove displays over resources they do not own. Additionally, luck is a concept that has been looked at within the Anthropological literature, in relation to themes related to ownership it has been looked at in the sharing of domains such as food, food that requires both skill and luck to acquire (Meat) often involves sharing as a form of risk-reduction, thus less individual ownership may attributed to an overall kill (Gurven, 2004**)**. In resources where luck does not directly impact the success of a return but rather the work put into attaining a resource is what directly impacts the returns (e.g., land development) one would expect higher levels of individual ownership to be attributed to domains these domains. Judgments on ownership acquired via effort vs. via luck across the different domains of ownership (Meat, Land, Artifacts) may allow us assess whether ownership intuitions are the same or different in these populations, and what this might or might not tell us about the possibility of an evolved psychology of ownership extended to domains of ownership.

The cross-cultural design of the research allows for the investigation of both universals and variation. If there are cross-cultural universals in ownership intuitions, this could provide evidence for a universal, and possible evolved psychology of ownership. For example, if the early-developing first possession heuristic shown in U.S. and Canadian children also is exhibited by Achuar and American adults, that provides evidence that first possessor heuristic might be a strong driver of ownership intuitions across cultures, suggesting that it may be a feature of a human evolved psychology, or that it is a widespread norm that is universal for other reasons. If, on the other hand, there is variation in ownership intuitions, this shows dimensions along whether ownership psychology can vary cross-culturally, either due to differences in culturally transmitted norms, differences in ecological factors, and cultural histories that impact ownership intuitions.

Study Hypotheses

Hypothesis 1. A first possessor heuristic is a cross-cultural universal.

Hypothesis 2. A first possessor heuristic will be stronger cross-culturally in the ownership domains of meat and land.

Hypothesis 3. Property acquired through effort will show a higher positive ownership judgment than if acquired though luck. Ownership rights will favor the party who acquires said resource through effort.

Materials and Methods: Study 1 and Study 2

The research presented in this thesis was collected using a series of vignettes across three domains (Meat, Land, and Artifact). The original set in Study 1, which was collected among the Achuar, consisted of three sets of vignettes (twelve in total) and Study 2 consisted of the same

vignettes used with the Achuar along with an additional set of modified vignettes. The modifications made to the vignettes in study 2 are in the Meat and Artifact domain. The edits made to the Meat domain were made to account for the ambiguity of phrasing used to highlight at what point the animal meat was spotted by both parties. The edits made to the Artifact domain were made to make sure that across all four conditions, the same individual was the one that turned the artifact design into the community festival. Additionally, the original vignettes were run with Mturk participants as well to compare if the edits altered the rights attributed to the possessor of the domain.

Domains of Ownership

Meat:

In the Meat domain, the experimental conditions created across these two modes of acquisition were varied across four different vignettes.

Table 1: Crossed Factorial Design: Meat

Effort	Both Search All Day	Last Minute Find with Intent
Luck	Goes Out Last Minute to Search	Last Minute Find with No Intent

The rights acquired in the Meat domain was done so via effort vs. via luck to test possible cultural differences behind an ownership psychology among Achuar and American participants to gauge possible difference in the application of a first possessor heuristic Land domains. Variations in claims extended to Food (Meat) domains between Achuar and American participants may mitigate the effects of a first possessor heuristic, suggesting that it may not be a cross-cultural universal. The scenarios across the four different modes of acquisition consisted of a small game animal that recently died being discovered. This was done to mitigate for the strong

sharing norms that Achuar communities hold about sharing large game animal meat. The rationale behind using Food(Meat) as a domain of ownership was to compare ownership across a domain that has had a longer timeline to develop, early humans more than likely had to deal with disputes related to the claim of resources derived from hunted game.

Land:

In the Land domain, the experimental conditions created across these two modes of acquisition were varied across four different vignettes.

Table 2: Crossed Factorial Design: Land

Effort	Searches All Day/ Communal Land	Searches All Day/Non-Communal Land
Luck	Finds Last Minute/Communal Land	Finds Last Minute/ Non-Communal Land

The rights acquired in the Land domain was done so via effort vs. via luck to test possible cultural differences behind an ownership psychology among Achuar and American participants to gauge possible difference in the application of a first possessor heuristic Land domains. Variations in claims extended to Land domains between Achuar and American participants may mitigate the effects of a first possessor heuristic, suggesting that it may not be a cross-cultural universal. In addition to the modes of acquisition being varied, the type of land was explicitly stated (communal vs non-communal) to gauge whether Achuar homesteading practices impact how ownership claims are seen in a first possessor. The rationale behind using land as a domain of ownership was to compare ownership across a domain that has had a longer timeline to develop, early humans more than likely had to deal with disputes related to the claim of land resources.

Artifact:

In the Artifact domain, the experimental conditions created across these two modes of acquisition were varied across four different vignettes.

Table 3: Crossed Factorial Design: Artifact

Effort	Both Make, Only One Submits	Altered Design Submitted
Luck	Design Taken Accidentally	Discarded Design Submitted

The Artifact domain was selected as an exploratory study to function as the first step in working towards creating a taxonomy of ownership around domains of ownership that may be less ecologically dependent (i.e., various ecologies will give varying types of land and meat that can be owned). In addition to the means in which the artifact in the vignette was obtained, modification of an artifact by another individual was varied to gauge whether this impacted Achuar participant intuitions. The rationale behind using the Artifact domain, the exploratory portion of this study, was to begin to gauge Achuar intuitions on the owning and creating of ideas and how that varies from American participant intuitions; Intuitions that have exposed to legal mandate put in place to navigate these types of ownership disputes.

Study 1: Materials and Methods

All study protocols reported in this paper were approved by the University of California, Los Angeles Office of the Human Research Protection Program. Informed consent was obtained from all participants before participation.

Design

The vignettes presented to participants in both Study 1 varied from each other in a factorial design, manipulating the means of acquisitions (Effort, Luck) across the three different domains

of ownership (Food (Meat), Land, Artifact). Each participant was assigned in pseudorandomized format to of the study, in where the presentation of the domains of ownership, the vignettes in each domain, and the questions being asked varied in the order in which they were presented. Following the presentation of the vignettes , participants were asked to answer five DV's: Owner, Credit, Fame, Entitled, Deserves. These DV's were selected to gauge whether participants attribute claim to ownership than from other rights; Credit, Fame, Entitled, Deserves, (i.e., one could be the owner seen as the owner of the meat but not be deserving of the meat). The interviews took place in areas where the subject and researcher could be alone, such as in their home or in communal areas where others were told not go near until the interview was over

Achuar participants

Study and Field sites

The study site is the Achuar village of Santiak, located on the north bank of the Pastaza River in Pastaza Province in southeastern Ecuador. Pastaza province is relatively warm and humid with a median temperature of 64-75 F with an annual rainfall of about 22 feet throughout the year. The rainy season takes place from March to June, with high levels of precipitation and occurrences of flooding.

The data was collected during the Summer between July-September of 2018. This research carried out -in part- thanks to a grant from the Graduate Division and Anthropology Department at the University of California in Los Angeles.

Participants:

Achuar

Participants were 35 adults, 19 men and 16 women. The interviews were conducted in Spanish by the author and ranged in time from an hour and a half to two hours. Most participants in the

study do not read or write. Paraphrasing was not often needed unless a participant asked for a clarification of the vignette and the questions being asked. The participants' participation was voluntary, and they were compensated for their time with a one-time payment of USD $2.50.

Table 4: Achuar Demographics

	Meat	Land	Artifact
N=	35	35	35
Age Mean	29.1	29.1	29.1
Males	19	19	19
Females	16	16	19

Materials and Methods: Study 2

All study protocols reported in this paper were approved by the University of California, Los Angeles Office of the Human Research Protection Program. Informed consent was obtained before participation.

Design

The factorial design used in Study 2 was the same as Study 1 with the addition of the Modified set of vignettes from the Meat and Artifact domains to account for the errors in the first set of vignettes. Study 1 was conducted with American populations through the Amazon Mechanical Turk survey service. Translated versions of the vignettes that were used in Study 1 among the Achuar, were used in Study 2. The vignettes were translated from Spanish to English by two different bilingual speakers. Similar to Study 1, each participant in Study 2 was assigned in pseudorandomized format to versions of the study, in where the presentation of the domains of ownership, the vignettes in each domain, and the questions being asked varied in the order in which they were presented.

U.S. Participants

Study and Field sites

The data presented here were collected on Amazon Mechanical Turk. The data was collected during the 18-19' academic year. This research carried out -in part- thanks to a grant from the University of California in Los Angeles.

Participants

American Mturk Participants

Surveys were conducted with 1935 U.S adults. The surveys were presented in electronic form on the Qualtrics platform, in English. Participants were granted an hour time window to complete the survey, with the mean time of completion being 28.5 minutes. Subjects were prescreened for repeat participation, English fluency, minimal completeness, and the correct answering of attention questions (i.e., On a clear sunny day, what color is the sky?). Subjects who failed to answer the attention check questions or responded too quickly were excluded from the survey.

Table 5: Mturk Demographics

Original	Meat	Land	Artifact
N=	484	498	404
Age Mean	39.38	38.46	39.61
Males	231	243	208
Females	253	255	196
Modified:			
N=	305		244
Age Mean	39.75		37.26
Males	152		126
Females	153		118

Analysis

Effects of the experimental manipulations and variation across these two societies on participant judgments seen in this thesis were analyzed using generalized mixed effect regression models . Here we provide plots and regression for an omnibus mixed effect model to view the difference

in the attribution a first possessor heuristic across societies(See Table 6.). In order to look at estimates of variation between the DVs and Vignette versions, they were treated as random factors due to varying across domains. Additional analyses, including breakdowns by domains, questions, and vignette versions are reported in Table 7-10; The DV's in these individual models were treated as fixed effects to investigate specific effects on the positive attribution in favor of a first possessor. A table with the parameter estimates for each model follows the corresponding figure.

Omnibus Model

Fig 1. Summaries of First Possessor Attribution Across Societies and Domains

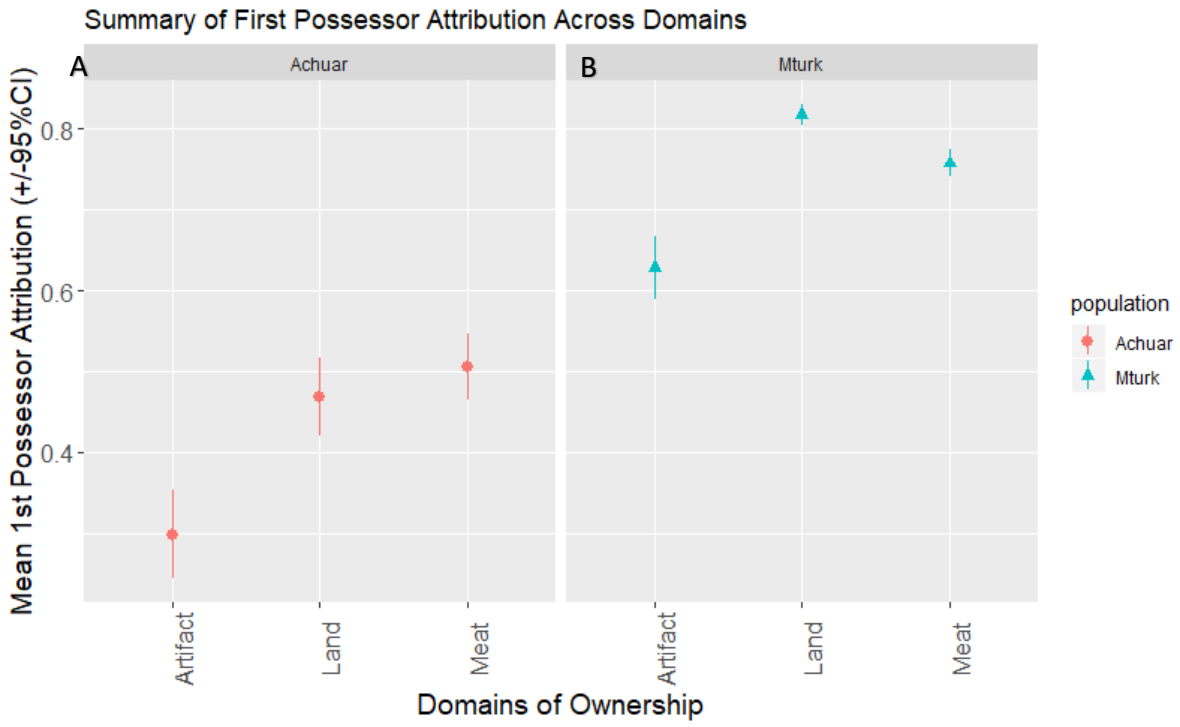

Table 6. Parameters of omnibus generalized mixed effects model for First Possessor Attribution across Societies

First Possessor Bank	Estimate	Exp(β)	Variance	SD	SE	P
Fixed Effects						
Population (1=Mturk)	1.1319	3.101544			0.339	<0.001

Domain: Meat	0.3996	1.491228			0.1826	0.44
Domain: Land	0.3689	1.446143			0.5142	0.42
Population X Domain Land	0.4978	1.645098			0.2119	0.02
Population X Domain Meat	0.2169	1.24222			0.2167	0.32
Random Effects						
Vignette Version			0.57	0.75		
Question			0.01	0.09		

Results

An omnibus general linearized mixed-effect model in where vignettes and questions were collapsed together was used to gauge differences in the attribution of a first possessor heuristic between Achuar and American Participants across the domains of ownership. The model shown in Table 6. include all three domains of ownership (Meat, Land, Artifact) treated as fixed factors with both Questions (DV's) and Vignette Versions as random factors. The plots and parameter estimates in the general linear regression between societies shows that there was substantial variation in the effect of a first possessor heuristic across domains of ownership, with the interaction between Population x Meat domain having the smallest effects of a first possessor heuristic and Population the largest. The odds rations (exp(β)) associated with the First possessor parameter estimate (β) in the omnibus model were Population, (β) =3.10; Domain: Meat, (β) = 1.49; Domain: Land, (β) =1.45; Population x Domain: Land, (β)=1.65; Population X Domain Meat, (β) = 1.24. Thus, across societies, a judgment from Americans on rights to Meat increased the odds of a one-unit boost in the attribution of a first possessor judgment by a factor of 1.65 whereas judgments made by Americans across all ownership domains increased the odds by a factor of 3.

Discussion

The results yielded from the omnibus model yielded several conclusions. On one hand it seems that American participants across all three domains of ownership, attributed a first possessor heuristic (e.g., See Figure 1 for aggregate of responses above 0.5) regardless of what the means of acquisition may have been. The attribution of a first possessor heuristic appears be the highest in the Land domain. On the other hand, it seems that Achuar participants are at a 50/50 chance when it comes to the attribution a first possessor heuristic within the Land and Meat domains. The Artifact domain highlights a difference of attribution of a first possessor heuristic between Achuar and American participants, American participants attribute rights to the first possessor (e.g., creator of the artifact) while the Achuar attribute rights to the individual who first makes the design public.

Meat and Land Domain Model

Fig 2. Summaries of First Possessor Attribution Across Societies in Land and Meat Domains

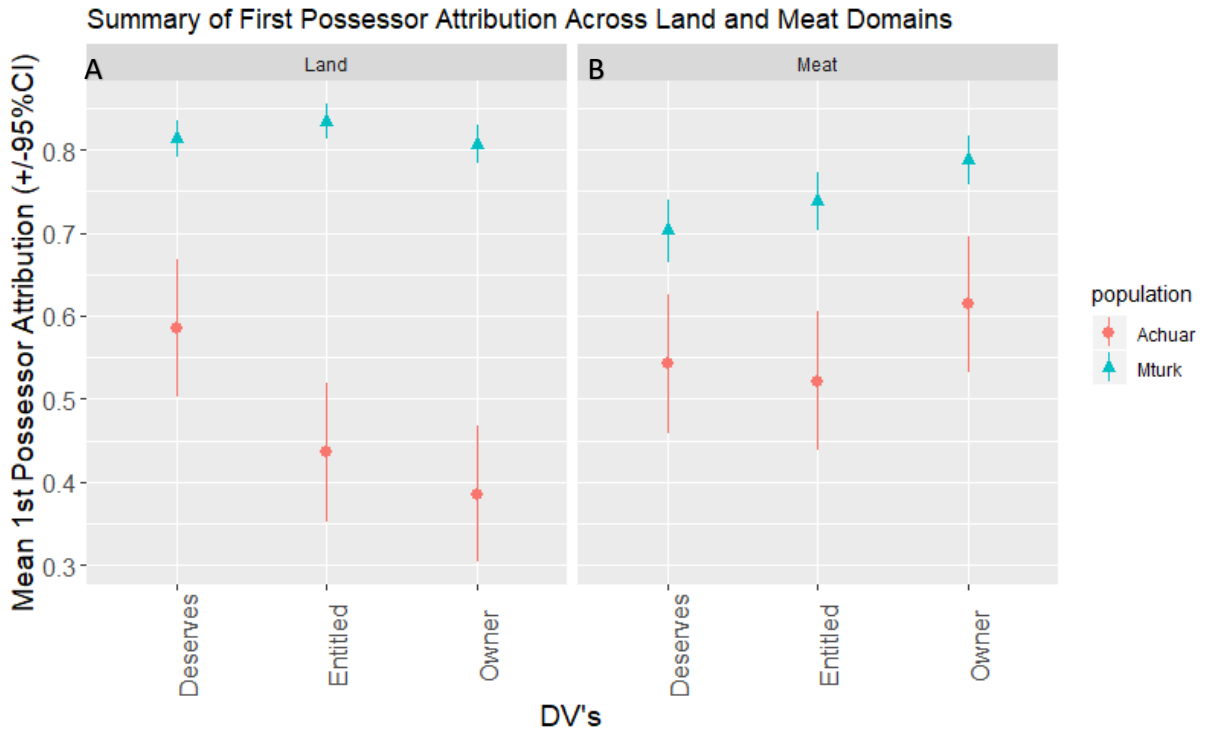

Table 7. Parameters of generalized linear mixed effects model for First Possessor Attribution across Societies in Meat and Land Domains

First Possessor Bank	Estimate	Exp(β)	Variance	SD	SE	P
Fixed Effects						
Population (1=Mturk)	3.74916	42.8538			0.57910	<0.001
Domain: Meat	0.43421	1.543743			0.52867	0.411
Question: Entitled	0.08948	1.093605			0.10274	0.384
Question: Owner	0.08925	1.093354			0.10205	0.382
Population X Domain Meat	-2.01330	0.133547			0.40100	<0.001
Random Effects						
Subject			8.66	2.94		
Vignette Version			0.59	0.772		

Results

A general linearized mixed-effect model in with only the Meat and Land domain was used to gauge differences in the attribution of a first possessor heuristic between Achuar and American Participants across the domains of ownership. Meat and Land were the only domains included in this model because they are similar in aspects of how they can be owned , the direct resource benefit they can provide, and are the most comparable across the DV's. The model shown in Table 7. include only two domains of ownership (Meat and Land) treated as fixed factors with Subject (e.g., individual ID) and Vignette Version held as random factors. The plots and parameter estimates in the general linear regression between societies shows that there was substantial variation in the effect of a first possessor heuristic across the Meat and Land domains, with the interaction between Population and Population x Domain Meat having the smallest effects of a first possessor heuristic and Population the largest. The odds rations (exp(β)) associated with the First possessor parameter estimate (β) in the Meat and Land general liner model were Population, (β)=42.85; Domain: Meat, (β)= 1.54; Question: Entitled, (β)=1.09; Question: Owner, (β)=1.09; Population X Domain Meat, (β)= 0.13. Thus, across societies, a

judgment from Americans on rights to Meat increased the odds by less than a half unit boost in the attribution of a first possessor judgment by a factor of 0.13 whereas judgments made by Americans across all ownership domains increased the odds by a factor of 43.

Discussion

The results yielded from the generalize liner model with only the Meat and Land domains yielded several conclusions. American participants across both the Meat and Land domains of ownership, attributed a first possessor heuristic (e.g., See Figure 2. for aggregate means of responses above 0.5) regardless of what the means of acquisition or the DV's may have been. The attribution of first possessor judgment differences between societies appears be the most visible in the Land domain, high attribution of rights across all DV's (refer to Figure 2.). This pattern of the attribution of first possessor judgments by American participants can similarly be seen in the Meat domain. It seems that Achuar participants are attributing a weak first possessor judgment in the Land x Deserves condition. In the Land x Entitled condition, the Achuar are at a 50/50 chance when it comes to attributing rights to the first possessor. In the Land x Owner condition, Achuar participants are not attributing rights to the first possessor, highlighting that Achuar participants are attributing ownership to the first to modify the land and not the first to possess it. In both Meat x Entitled and Meat x Deserves, the Achuar are at a 50/50 chance when it comes to attributing rights to the first possessor. A weak first possessor judgment is being given in the Meat x Owner condition.

Meat Domain Model

Fig 3. Summaries of First Possessor Attribution Across Societies in Meat Domain

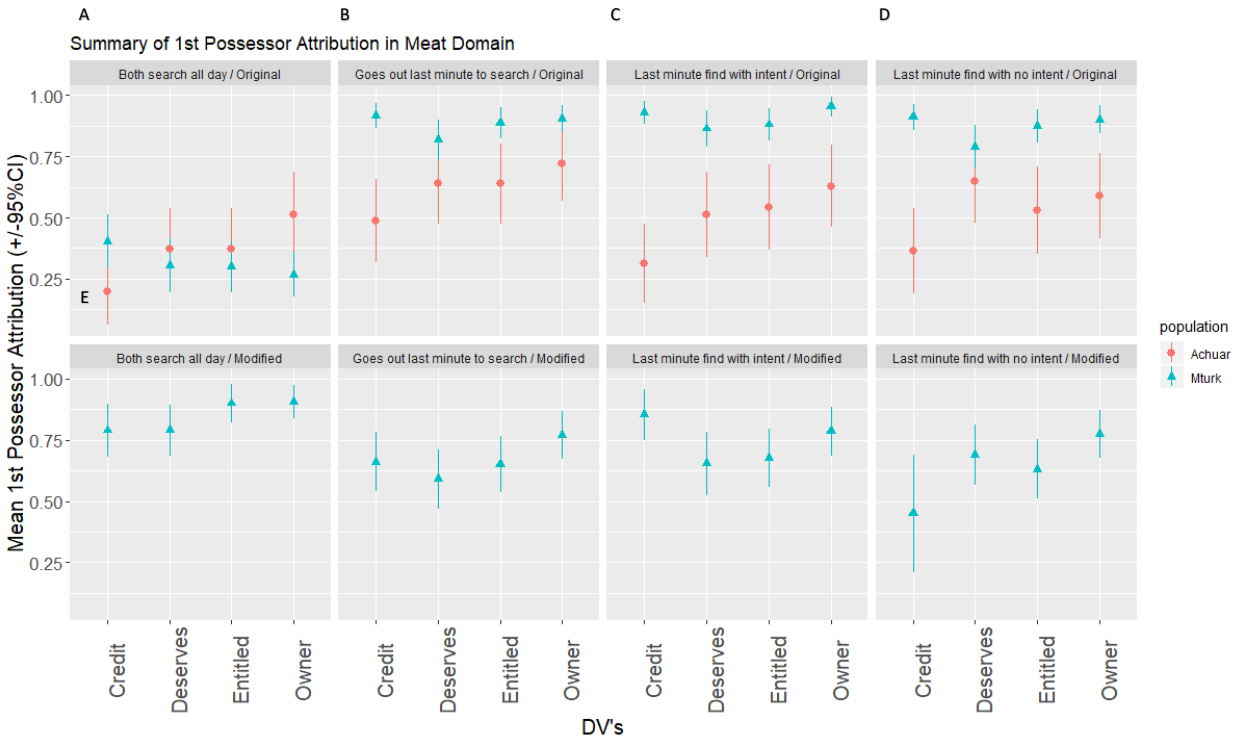

Table 8. Parameters of generalized linear mixed effects model for First Possessor Attribution across Societies in Meat Domain

First Possessor Bank	Estimate	Exp(β)	Variance	SD	SE	P
Fixed Effects						
Population (1=Mturk)	2.30961	10.0705			10.365	<0.001
Question: Deserves	0.96547	2.626022			3.622	<0.001
Question: Entitled	0.86035	2.363988			3.240	0.001
Question: Owner	1.33053	3.783048			4.892	<0.001
Sex (1=Male)	-0.13088	0.877323			-1.425	0.15
Population x Question Deserves	-1.44247	0.236343			-4.747	<0.001
Population x Question Entitled	-1.11985	0.326329			-3.696	<0.001
Population x Question Owner	-1.26632	0.281867			-4.111	<0.001
Random Effects						
Vignette Version			0.7128	0.8443		

Results

A general linearized mixed-effect model in with only the Meat domain was used to gauge differences in the attribution of a first possessor heuristic between Achuar and American Participants within the Meat domain. The model shown in Table 8. includes only the Meat domain of ownership with Vignette Version held as random factor. Population and DVs are treated as fixed factors along with sex; Hunting tends to be done by males in Achuar communities, so we felt it was important to see the effects of sex on the attribution of a first possessor judgment. The plots and parameter estimates in the general linear regression between societies shows that there was substantial variation in the effect of a first possessor heuristic within the Meat domain, with the interaction between Population x Question Deserves having the smallest effects of a first possessor heuristic and Population the largest. The odds rations (exp(β)) associated with the First possessor parameter estimate (β) in the Meat general liner model were Population, (β)= 10.08 ; Question: Deserves, (β)= 2.63 ; Question: Entitled, (β)= 2.36 ; Question: Owner, (β)= 3.78 ; Sex, (β)=0.87 ; Population x Question Deserves, (β)= 0.24 ; Population x Question Entitled, (β)= 0.33; Population x Question Owner, (β)=0.28. Thus, across societies, a judgment from Americans on the Deserving of Meat increased the odds by less than a half unit boost in the attribution of a first possessor judgment by a factor of 0.23 whereas judgments made by Americans across all ownership domains increased the odds by a factor of 10.

Discussion

The results yielded from Meat domain generalized liner model yielded several conclusions. American participants attributed a first possessor heuristic (e.g., See Figure 3. for aggregate means of responses above 0.5) regardless of what the means of acquisition or the DV's may have

been in all cases except the Both Search All Day (BS) condition (refer to Figure 3.A). The results of the BS condition show that American participants attribute far less rights within the BS condition to first possessor than the Achuar in all DV's except Credit. This changes in the Modified BS condition (refer to Figure 3.E) , where now American participants are attributing rights to the first possessor. The series of binomial tests carried out on both the original and modified set of vignettes showed that the revisions did not have significant effects on judgments casted by American participants in any of the other conditions (*SI Appendix L*). The Achuar are at 50/50 chance of attributing rights to the first possessor across all DV's and conditions in the Meat domain except in the Goes Out to Search Last Minute x Owner condition, where a weak set of rights are being attributed to the first possessor (refer to figure 3.B).

Land Domain Model

Fig 4. Summaries of First Possessor Attribution Across Societies in Land Domain

Table 9. Parameters of generalized linear mixed effects model for First Possessor Attribution across Societies in Land Domain

Domain Bank	Estimate	Exp(β)	Variance	SD	SE	P
Fixed Effects						
Population (1=Mturk)	6.3509	573.0082			1.3097	<0.001
Question: Entitled	-0.8677	0.419916			0.2919	0.00
Question: Owner	-1.1688	0.31074			0.2970	<0.001
Population x Question Entitled	1.2285	3.416012			0.3400	0.00
Population x Question Owner	1.0543	2.869965			0.3419	0.00
Random Effects						
Subject			39.73	6.3034		
Vignette Version			0.01	0.1211		

Results

A general linearized mixed-effect model in with only the Land domain was used to gauge differences in the attribution of a first possessor heuristic between Achuar and American Participants within the Land domain. The model shown in Table 9. includes only the Land domain of ownership with Subject and Vignette Version held as random factors. Population and DV's are treated as fixed factors. The plots and parameter estimates in the general linear regression between societies shows that there was substantial variation in the effect of a first possessor heuristic within the Land domain, with Question: Owner having the smallest effects of a first possessor heuristic and Population the largest. The odds rations (exp(β)) associated with the First possessor parameter estimate (β) in the Land general liner model were Population, (β)= 573.01 ; Question: Entitled, (β)= 0.42 ; Question: Owner, (β)= 0.31; Population x Question Entitled, (β)= 3.42 ; Population x Question Owner, (β)=2.87. Thus, across societies, a judgment from Americans on the Ownership of Land increased the odds by less than a half unit boost in the attribution of a first possessor judgment by a factor of 0.31 whereas judgments made by Americans across the Land domain increased the odds by a factor of 573.

Discussion

The results yielded from Land domain generalized liner model yielded several conclusions. American participants attributed a first possessor heuristic (e.g., See Figure 4. for aggregate means of responses above 0.5) regardless of what the means of acquisition or the DV's may have been in all cases. The Achuar are at 50/50 chance of attributing rights to the first possessor across all DV's and conditions in the Land domain except in the Communal High Effort x Deserves condition, where rights are being attributed to the first possessor (refer to Figure 4.A) .

Artifact Domain Model

Fig 5. Summaries of First Possessor Attribution Across Societies in Artifact Domain

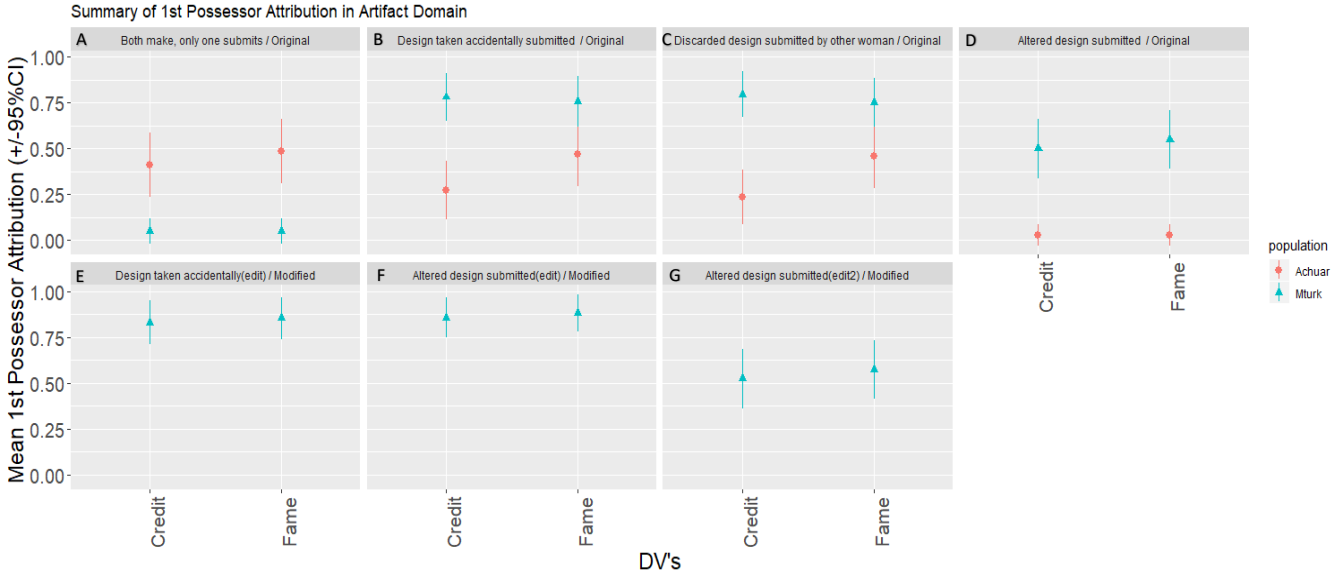

Table 10. Parameters of generalized linear mixed effects model for First Possessor Attribution across Societies in Artifact Domain

First Possessor Bank	Estimate	Exp(β)	Variance	SD	SE	P
Fixed Effects						
Population (1=Mturk)	2.2509	9.496279			0.6782	0.001
Question: Fame	0.8079	2.243192			0.3420	0.012
Sex (1=Male)	0.4228	1.526229			0.4621	0.36
Population x Question Fame	-0.7012	0.49599			0.4219	0.09
Random Effects						

Subject	8.546	2.923
Vignette Version	3.107	1.763

Results

A general linearized mixed-effect model in with only the Artifact domain was used to gauge differences in the attribution of a first possessor heuristic between Achuar and American Participants within the Artifact domain. The model shown in Table 10. includes only the Artifact domain of ownership with Subject and Vignette Version held as random factors. Population and DV's are treated as fixed factors. The plots and parameter estimates in the general linear regression between societies shows that there was substantial variation in the effect of a first possessor heuristic within the Artifact domain, with the interaction between Population x Question Fame having the smallest effects of a first possessor heuristic and Population the largest. The odds rations (exp(β)) associated with the First possessor parameter estimate (β) in the Land general liner model were Population, (β)= 9.50 ; Question: Fame, (β)= 2.24 ; Sex, (β)= 1.53; Population x Question Fame, (β)= 0.50 . Thus, across societies, a judgment from Americans on the Fame attributed from an Artifact increased the odds half unit boost in the attribution of a first possessor judgment by a factor of 0.50 whereas judgments made by Americans across all the Artifact domain increased the odds by a factor of 10.

Discussion

The results yielded from Artifact domain generalized linear model yielded several conclusions. American participants attributed a first possessor heuristic (e.g., See Figure 5. for aggregate means of responses above 0.5) regardless of what the means of acquisition or the DV's may have been in all cases except the Both Make Only One Submits(BMOS) condition (refer to Figure 5.A) and the Altered Design Submitted(ADS) condition (refer to Figure 5.D). The results of the

BMOS condition shows that American participants attribute far less rights to the first possessor than the Achuar in all DV's tested. The results of the ADS condition show that American participants are at a 50/50 chance of attributing rights to the first possessor. This changes a bit with the Modified ADS conditions (refer to Figure 5.F), where now American participants are attributing rights to the first possessor. A series of binomial tests carried out on both the original and modified set of vignettes showed that the revisions did have significant effects on judgments casted by American participants in the Modified ADS condition(*SI Appendix L*). The Achuar are at 50/50 chance of attributing rights to the first possessor across all DV's and conditions in the Artifact domain except in the Altered Design Submitted scenario, where rights are not attributed to the first possessor (refer to Figure 5.D)

General Results

Our results yield several main conclusions. On the one hand it seems that across all domains of Ownership (refer to Table 6. Omnibus model), American participants positively attributed rights in favor of the first possessor (refer to Figure 1.) regardless of the means of acquisition (via Effort or via Luck). On the other had there was a weak finding for a first possession heuristic among the Achuar, judgments reflected a 50/50 chance of claim being positively attributed to the first possessor within both the Meat and Land domains. Thus, across both societies, judgments made by Americans across all ownership domains increased the odds of giving a first possessor judgment by a factor of 3.

A closer look at the Meat and Land domains (refer to Table 7. Meat and Land GLM), supports the findings from the omnibus model in that American participants again positively attributed rights in favor of the first possessor (refer to Figure 2.). Achuar participants were at a

50/50 chance of positively attributing rights to the first possessor in all cases except Land x Entitled, Meat x Owner, and Land x Owner. A weak positively attributed judgment in favor of the first possessor was given by the Achuar in the Land x Deserves (refer to Figure 2.A) and in the Meat x Owner (refer to Figure 2.B) condition. In the Land x Owner (refer to figure 2.A) condition, Achuar participants are not attributing rights to the first possessor, highlighting that Achuar participants are attributing ownership to the first to modify the land and not the first to possess it. Thus, across both societies, judgments made by Americans within the Meat and Land ownership domains increased the odds of giving a first possessor judgment by a factor of 43.

The individual general linear models conducted on the Meat, Land, and Artifact domains yielded several conclusions. In the Meat domain, rights were positively attributed to the first possessor in all scenarios except in the BS X Credit condition (refer to Figure 3.A). The results of the BS modified version show that participants now positively attribute rights to the first possessor, suggesting that the ambiguity in the original vignettes may have impacted the attribution of rights to the first possessor in the original BS x Credit condition. (Refer to *SI Appendix* for binomials The Achuar were at indifferent in the positive attribution of rights to the first possessor in all scenarios except Goes Out to Search Last Minute x Owner condition, where a weak set of rights were positively attributed to the first possessor (refer to figure 3.B). In the Land domain, American participants positively attributed rights to the first possessor (Refer to Figure 4.) regardless of the means of acquisition. The Achuar were indifferent in the positive attribution of right to the first possessor in all conditions except Communal High Effort x Deserves (Refer to Figure 4.A). A series of binomial tests carried out on both the original and modified set of vignettes showed that the revisions did not have significant effects on judgments casted by American participants in any of the other conditions (*SI Appendix L*). In the Artifact

domain American participants positively attributed rights to the first possessor in all scenarios except the BMOS (Refer to figure 5.A) and ADS (Refer to Figure 5.D) condition. The results of the ADS modified version show that participants positively attribute rights to the first possessor, suggesting that the type in the original ADS vignette may have impacted the positive attribution of rights to the first possessor in the original vignette (Refer to *SI Appendix* for binomials). The Achuar were in different in the positive attribution of rights to the first possessor across all conditions except in the ADS (Refer to Figure 5.D) scenario, suggesting that the errors in the vignette may have impacted the judgments casted.

In summary, the general linear models conducted on both Study 1 and Study 2, of how domains of ownership are assessed with respect to rights and claims of potential owners across different domains of ownership suggest that there is weak evidence for a first possessor heuristic among the Achuar and strong evidence for a first possessor heuristic with American Mturk Participants. This suggests that a first possession heuristic may not be a cross-cultural universal, thus an evolved ownership psychology may be impacted far more by cultural differences than initially thought. The judgments attributed across the domains of ownership investigated appeared to be stronger in the Meat and Land domain (Refer to figure 1A;1B) across societies when comparted to the Artifact domain. The means by which a domain of ownership came to be acquired (via Effort vs. via Luck) did not seem to make a significant difference on how rights were attributed in favor of the first possessor. Ownership intuitions across the domains and DV's within a given society appeared to have similar patterns within all three domains. The studies presented in this paper suggest that complex cultural mosaics(e.g., those experiences encountered by Achuar and American Mturk participants) may impact an evolved psychology towards ownership far more than expected; The weak support of a first person heuristic among Achuar

participants suggests that the relationship between cultural norms in response to various ecological niches may impact the claims attributed to domains of property.

General Discussion

These studies provide a diverse pattern of rights attributed across judgments between populations in where the means of acquisition are varied to see if that impacts the use of the first possessor heuristic. The findings of these studies suggest that Achuar people do not simply use an "I had it first" intuition to attribute rights to various resources being contested, in contrast to previous findings from studies in Western societies, suggesting that the first possessor heuristic is not a cross-cultural universal.

The strong findings of a first possessor heuristic in the American sample within the Meat domain sample may be indicative of differences in ownership psychologies among Americans when it comes to sharing food(meat) resources; A possible by-product of the different ecologies that Americans occupy and the dependence on a market providing food rather than having to hunt and gather for one's own resources. The weak findings of a first possessor heuristic among the Achuar within the Meat domain may be due to the strong meat sharing norms held around hunted and foraged foods in Amazonian cultures. The indifference seen in the attribution of rights to the first possessor may be reflective of norms created around the duty to share game meat overriding the attribution of a sole owner to the domain. The modifications made to the Meat domain, the explicit statement that the meat was seen by both individuals at the same time, did not have significant effects of the rights attributed to the possessor (See *SI Appendix K*).

The strong findings of a first possessor heuristic in the American sample within the Land domain may be indicative of differences in ownership psychologies among Americans when it

comes to sharing Land acquisition; American's appear to have a strong ethos and history (i.e., manifest destiny) of claiming land through the use of a perceived (i.e., not acknowledging the indigenous identities who were first on the land) first possession claim. The lack of a first possessor heuristic among the Achuar sample within the Land domain suggests that Achuar communities place a higher value on the modification of land as a signal of ownership over the first possessor heuristic (e.g., the first one to step on the land is the rightful owner). This seems to align with the type of homesteading principle that the Achuar employ in acquiring unoccupied land.

The results reflected in the Artifact domain, suggest that Achuar participants tended to positively attribute more rights to the individual that first submitted the design rather than to the individual that created the design (i.e., first possessor). This is an interesting finding when compared to the judgments attributed by Americans because it suggests that Achuar participants attribute rights at a higher rate to the individual that makes a design public, despite if they are the creator or not while Americans attribute rights to the creator of an artifact at a higher rate. The modifications made to the Artifact domain did not have significant effects of the rights attributed to the possessor (See *SI Appendix L*).

Some important limitations to highlight in the following studies are the ways in which the vignettes were presented to both participant populations; American Mturkers were able to read the vignettes presented to them, allowing for a numerous amount of unknown confounds while Achuar participants were read the vignettes out loud due to literacy differences between populations. It is possible that information presented in the vignettes was interpreted differently

due to the ways in which the information was presented. This is both a limitation and strength of cross-cultural work in between large scale and small-scale societies.

Future Work

The present research offers a possible example of the ways in which our various cultural mosaics and ecologies can create variations across large- and small-scale societies in the attribution of rights based on the first possessor heuristic. The emergence of different attributions of the first possessor heuristic across the domains of ownership tested in this study (e.g., Meat, Land, Artifact) suggests that there may be a more nuanced approach needed to test the rights attributed cross-culturally to various domains of contested resources. The results of ownership attribution found in this study related to the Meat and Land domains makes intuitive sense when considering the different ecologies that Achuar participants live in compared to American participants. The results found in the Artifact domain, suggests that American participants attribute far more rights to the creator of the idea and not to the individual who submitted the design first while Achuar Participants attribute far more rights to the individual who was the first to make the idea public. This highlights an interesting area of questions yet to be explored within the biological and cultural evolution literature related to the ownership of intellectual property(e.g., knowledge, ideas). Further work is needed to begin to parse apart ways in which information can have value and be owned and how said value varies across cultures. The use and creation of theories from the perspective of evolutionary psychology can allow us to better understand contemporary property law and how folk intuitions are or are not always reflected in the legal literature (Jones and Goldsmith 2005; DeScioli and Karpoff, 2015). Research on an intuitive ownership psychology from an evolutionary perspective can offer us insights into the

ways in which legal policies can often be skewed by individual biased intuitions and are often not reflective of layperson intuitions (Haidt 2001;DeScioli and Karpoff, 2015).

In conclusion, the present studies suggest that the first possessor heuristic may not be a cross cultural universal, the variation of different cultural mosaics may impact ownership psychology far more than initially proposed. We observed a nuanced pattern of rights attributed between Achuar and American populations, suggesting that more cross-cultural work is needed to further explore ownership rights attributed when the acquisition of various property domains is done so through various means. Further research can begin to create an empirical and descriptive taxonomy of the key features that make up an intuitive ownership psychology.

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