The Psychology of Inequality

A PhD thesis

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Vienna, 19 June 2025

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Abstract

Inequality is everywhere in our modern societies—from wealth gaps to unpaid housework—and yet, people can often see these disparities as fair. Why do we accept some inequalities—like gendered inequalities in household division of labour—while rejecting others—like unequal distributions in an economic game with anonymous partners? This thesis explores the psychology behind inequality, judgements of fairness, and how our social environments shape the way we think about these issues.

This thesis challenges universalist models that assume humans have an innate preference for fairness in the form of equity. Instead, it introduces the concept of *relational concerns*—the idea that norms, obligations and expectations arising out of social relationships and networks—as a key determinant of fairness. While people admittedly have a preference for equality in some contexts, they also adjust their fairness judgments based on power dynamics, and cultural norms about what is "natural" or "appropriate." A central focus is on the role of *outside options*—the alternatives available to individuals if a current social or economic arrangement were to break down. I explore how outside options play a role in creating inequalities, and explaining, for example, why women in many societies continue to bear a disproportionate share of unpaid domestic labor while still perceiving the arrangement as just. A key argument is that fairness is not just about objective ideals like equity (rewarding contributions) or equality (ensuring identical shares), but also about coordination. Coordination is key for humans, and often requires people to align expectations; fairness norms can help individuals predict how resources, responsibilities, and benefits will be distributed. In some cases, inequality is perceived as fair because it helps maintain stable cooperation.

Combining evidence from fieldwork with hunter-gatherer societies, controlled experiments, and large-scale survey data, this research investigates fairness judgments in different social and economic contexts. I attempt to connect big-picture inequalities with everyday moral decisions, to understand the causal chains between structural inequalities and cognitive mechanisms. The findings suggest that addressing inequality requires not just redistributing resources, but also shifting the cultural and psychological frameworks that sustain it. Understanding how fairness functions in coordination and bargaining is crucial for designing policies and interventions that promote more equitable societies.

Contents

Introduction

The theme of this PhD revolves around two topics: *Inequalities* and *Judgements of Fairness*. In the thesis I present the socio-cognitive bases of both, and more crucially how fairness judgments are made in the presence of unequal distributions. I use the term, 'attitudes towards inequality' to refer to both, moral judgements as well as choices concerning distribution of costs and benefits.

Inequality across different domains of life—be it resource distribution, income and wealth disparity, opportunity access, allocation of basic rights, or even distribution of free time between household members—poses a serious problem across the modern world. Obama called it "the defining challenge of our time" (Kaplan, 2013), recognizing it as a challenge facing not only underdeveloped countries, but also developing and developed ones alike. Inequality not only leaves some individuals, groups and countries worse off than others, but gives rise to a whole host of secondary problems such as jealousy, violent crime, theft and robbery, firearm homicide, corruption, low social trust and fraud, amongst others (De Courson & Nettle, 2021; Kennedy et al., 1998; Krohn, 1976). Regardless, in countries like the U.S.A, India, U.S.A, Bulgaria, Austria, Germany, Luxembourg, Colombia, Sweden and UK, amongst others, Gini coefficients—the standardized measure of inequality between individuals, with higher numbers representing higher inequality—has been steadily rising (World Bank Open Data, n.d.).

The roots of inequality are many, and the question of where inequalities emerge from and how they perpetuate, can be tackled from different perspectives. An interdisciplinary approach is key for answering questions of such complexity; and diverse disciplinary perspectives can be usefully tied together by the psychological insights into people's attitudes and moral judgements towards inequality. To give a broad overview of the existing approaches:

The *evolutionary perspective* asks when and why human societies started becoming unequal; and the most supported narrative is that inequalities emerged with large-scale agriculture and sedentarization in the Holocene (Richerson et al., 2001). As soon as humans could control crop production, store crops and own the land, some individuals became more powerful than others. This wealth and (now-owned) land could be passed down along generations (Mulder

et al., 2009; Walker, 2014), leading to lineage systems which favoured members of one gender over others (patrilocality and patrilineage, Kent, 1995; Gibson & Sear, 2010), and also allowed some families to become bigger, and more influential than others (such as in clan systems, Guyon et al., 2024). Populations grew, and along with them, levels of inequality, marking a decided shift from the hunter-gatherer way of life (Draper, 1975; Dyble et al., but see Smith et al., 2010 for intergenerational inequality in hunter-gatherers). Systems of hierarchy were carried over alike, if not more pronounced, to industrialized and post-industrialized societies (Piketty, 2022). To get a glimpse into how systems of inequality changed from hunter-gatherers to the industrialized world, in chapter 2, I tackle the problem of gender inequality in hunter-gatherers, comparing their household division of labour patterns with those seen in the modern world[1].

The *economic perspective* asks about the factors that lead to inequality, and further, what stabilizes and propagates inequalities in societies (also sometimes tackled by the cultural evolutionary researchers). We are often born into random divisions of the world, like national boundaries we don't choose, into the socioeconomic category of our parents, into a race and gender that we don't pick, and with certain biological dispositions which is not to our choice, making it such that a lot of the inequalities that we are dealt, are externally imposed by socio-economic structures of the existing society (Currie, 2011). The theoretical construct of 'outside options' captures these various factors that contribute to a person's life quality and can constitute their bargaining power, a construct which can explain why some individuals are able to accrue more wealth and resources than others. This is a concept that I explore empirically in chapters 2 and 4, and briefly engage with in chapter 1. Outside options are not just luck-determined though; things like pursuing a higher education, building a skill-set specific for employability, investing in and building social networks, taking care of one's health, etc, also contribute to the outside options of an individual/ group, which can tumble into advantages within an unequal system. Overall, the fact that some individuals are bestowed (by luck or by deed) with higher status and favourable traits than others, leads to bargaining dynamics, which create, perpetuate and stabilize inequalities. Economists then spend significant effort in understanding the correlational and causal relationships driving these socio-economic systems (for instance, see Raphael & Winter-Ebner, 2001; Ecob &

[1] I am also running the same study on gender inequalities in the agricultural society of Kipsigis, to further develop the evolutionary narrative of emergence of gender inequalities in the household. Due to timing of data collection however, this study could not be part of the PhD thesis

Davey Smith, 1999) and can accordingly support policy/ systemic interventions in order to bring about beneficial changes.

Another perspective is the *ecological one* which looks at environmental factors that provide affordances for certain inequalities to emerge. Having higher natural resources like oil, soil types for supporting specific types of agriculture and related technologies (for instance the plough; Alesina et al., 2013), access to water and fertile soil, or even living in low-polluted areas (Pagalan et al., 2019) can lead some groups to be more advantaged than others. Admittedly though, with current technological progress in modern societies which can harness most environmental conditions, and the prevalence of extensive trade between geographical regions, ecological factors might come to play only a small role in creating inequality.

Threading together these sources of inequalities is the *psychological perspective,* which asks how inequalities may be perceived and justified by people. By generating explanations for such perceptions, the psychological perspective is then able to predict how inequalities might be behaviourally reproduced, and how it fits into the moral repertoire of individuals and groups. This forms the backbone of all the chapters of my thesis. There are two crucial insights from the psychology of inequalities: one the one hand, it is suggested that individuals have an inherent preference for fairness, and that under specific conditions, equality forms the cornerstone value for what is fair (Binmore, 2009). Under other conditions, bargaining power may lead people to actively prefer inequality, and provide the justification for inequalities to be considered fair: individuals who perceive themselves as having higher bargaining power than others, can expect and ask for higher payoffs from cooperative ventures, and those who perceive themselves as having lower bargaining power, can be satisfied by smaller payoffs. This is explored in chapters 2 and 4. Many external factors - such as the economic factors noted above, or social ones such as norms and expectations - can be utilized to create such justifications and expectations, which then propel behavior. The psychological perspective lends a crucial note of wisdom to the study of inequality: it is not objective inequalities that lead to a resentment of inequality, but rather one's perception of oneself (or one's group) in the social order, and the evaluation of one's position based on where one expects to be, that leads to dissatisfaction and a feeling of deprivation and unfair treatment.

The words of Amartya Sen capture this complexity well, "An observation of inequality can lead to a diagnosis of injustice only through some theory (or theories of justice). In family behavior, inequalities between men and women (and girls and boys) are often accepted as

'natural' or 'appropriate'. Sometimes the operational decisions relating to these inequalities (e.g., providing more healthcare or nutritional attention to boys vis-à-vis girls) are undertaken and executed through the agency of women themselves. The perceived justness of such inequalities and the absence of any contrary sense of deep injustice play a major role in the operation and survival of these arrangements" (Sen, 1995). He further goes on astutely to point out how individual conflicts thrive under the outwardly banner of cooperation, leaving some individuals worse off than others, "Implicit theories of justice and the traditional understanding of what is 'natural' and 'proper' can play a major part in making people with divergent interests feel united around shared perceptions of common objectives [giving] stability to extreme inequalities in traditional societies" (Sen, 1995), a perspective I take in my analysis of household inequalities in labour division

Being a woman, I recognize the problem of gender inequality to be a salient one, falling under the larger umbrella of inequality, and one which has gained considerable worldwide attention in the last few decades. For a long time in human history, particularly from the time of large agricultural societies and forward, women have been disadvantaged in various aspects of public and private life: they have been subjected to patrilocality around the world (Levinson, 1988), their movement restricted (Khalil & Mookerjee, 2019), low access to ownership of resources such as land (Borgerhoff Mulder, 1990), reduced involvement in major subsistence activities (Alesina et al., 2013), disadvantageous marriage and post-marriage practices (Ebenstein, 2021); and in the more recent times, women have faced a lack of education, employment, voting and political opportunities. A biologically-determined[2] facet of one's identity should not have such a significantly disadvantageous effect on one's life, and yet for women, it historically has. Moreover, this inequality is not just part of their public positions, but emanates from their private lives, from their households.

In an effort to understand the psychology of inequality, in a way that can explain facets of gender inequality, I developed three primary questions for my PhD research.

a) What factors can lead to unequal distributions in coordination?

b) Why do people sometimes tolerate, or even endorse, unequal distributions?

c) What cognitive and social mechanisms lead individuals to judge some unequal distributions as fair and others as unfair?

[2] In this case, excluding instances of individuals undergoing surgical procedures for sex change

To address these questions, I have taken a cross-cultural and multi-method approach, integrating evidence from hunter-gatherer societies, lab-based experimental studies, and field experiments conducted in high-income and low-income countries. This methodological pluralism is essential because fairness judgments are shaped by multiple, interacting factors—including biologically evolved predispositions, cultural norms, economic structures, and social relationships. No single method, I believe, was sufficient in capturing this complexity. Ethnographic data provide insights into real-world inequalities and how they may be perceived in diverse cultural contexts; experimental studies in the lab allowed me to isolate the causal mechanisms underlying fairness judgments, with most control; while field experiments were crucial for collecting data across populations in naturalistic settings, and getting the chance to interact with them. By combining these approaches, I have aimed to offer a more integrative account of how fairness perceptions emerge and why they sometimes support, rather than challenge, inequality.

I have attempted to provide answers which lie at the socio-cognitive interface, thus touching upon macro- as well as micro- aspects of our attitudes towards inequality. Through a sequence of six chapters I explore the psychology of inequality, its justifications, and how the cognitive processes producing fairness judgements interact with, and are sensitive to, factors in our social environments. I hypothesize that imbalances in ecological factors often lead to inequality in distributions, these shape social norms and cultural expectations, which can then actively stabilize these inequalities. My key contribution to the debate is bringing about an emphasis on **relational concerns** in fairness judgments. Most discussions of fairness focus on abstract principles such as equity (rewarding individuals in proportion to their contributions) or equality (ensuring identical distributions). However, fairness, we believe, is also about relationships and positions in social networks—people assess fairness not only by comparing resources, but by considering the expectations and obligations generated by social roles and relations. A parent providing more resources to a child with greater needs, a worker accepting lower wages in exchange for job security, or a spouse doing more household labor in response to a partner's financial contributions—these judgments are not based on strict equity or equality but on relational norms i.e., the behavioural practices and norms arising out of social roles and relationships. In many cases people perceive inequalities as fair, *precisely because they align with expectations arising out of these relational norms.* This perspective helps explain why gendered household divisions of labor are often viewed as legitimate even

when they place a disproportionate burden on women, a case study which is the key instantiation of inequality in this thesis. Relational concerns in turn, would have evolved to be part of the cognitive repertoire of fairness judgements, as they allow us to successfully coordinate in diverse relationships, where objective principles of equity might not work or even be relevant.

This thesis therefore challenges universalist theories that assume fairness is primarily about impartial distribution. Instead, I argue that fairness judgments are shaped by the social and cultural environments in which they arise, as attending to these relational cues helps one to successfully coordinate with others; in turn these fairness judgments motivate choices that aggregate and thus shape the social and cultural environments. This has significant implications for policy: efforts to reduce inequality must take into account not just economic redistribution and structural changes, but also the people's social networks, the norms and their cognitive predispositions that sustain perceptions of fairness within these networks.

Various concepts and keywords have been central in this exploration, many of which are also used in different disciplines with differing definitions. Therefore, I provide my own operationalization of these key concepts below, as I use them in this thesis (see box 1). Following this, is a roadmap to explain how the thesis unfolds and which chapter deals with which set of key concepts.

Key Concepts
Coordination: The process of choosing and aligning individual behavioural strategies for attaining a joint goal, between two or more people, with the condition that the joint goal leads to higher payoffs for both individuals, than what they could get individually. Individuals could opt for the same behavioural strategies - called correlative coordination; or behaviours which are complementary to each other - called complementary coordination. The payoffs that each receives could also be equal or unequal, for all involved. The most well-described instance is that of the Stag Hunt (Skyrms, 2004), where two individuals who can only hunt rabbits (lesser payoffs) by themselves, can decide to go together to hunt a stag (higher payoffs for both); this would entail coording behaviours for who does what and coordination would lead to production of higher value.
Egalitarianism: Referring to the quality of equality, in behavioural preferences, social ethics, or distributional factors. Such an ethic can be part of group norms such as is seen in norms of egalitarian distributions prevalent in hunter-gatherer societies (Lewis, 2017), or an individual's behavioural/ moral preference.

Fairness Judgements: These are normative evaluations made by individuals regarding a distribution (of resources, labour, or payoffs) which are deemed to be 'fair'. Rather than a prescriptive view i.e., where fairness is predetermined by some objective standards, such as equity or equality, in this thesis, I take a descriptive view of fairness judgements, where these judgements refer to outcomes that are mutually acceptable to people.
Inequality: Literally refers to 'unequal', where the feature of being unequal is applied to a distribution. It can be used broadly to refer to a number of things, such as inequality in class ranks, opportunities, wealth distribution, or division of labour. Inequality can also refer to unequal distributions based on gender, race, or other social categories.
Inequity Aversion: A preference for distributing resources in an equitable/ proportional manner and demonstrating an aversion to distributions which do not meet the criteria of proportionality. For instance, giving up their own payoffs, or taking from those who have more, in order to restore equity of payoffs, or punishing others who break inequity at a cost to oneself (prosocial punishment). This has been commonly observed in economic games played in laboratory settings, where anonymous strangers interact with one another in one-shot settings.
Outside Options: Payoffs that an individual can potentially receive if an ongoing coordination venture fails. These refer to one's fallback options while they bargain with cooperation partners and can provide one with leverage to ask for higher payoffs. In the Nash bargaining Game (Binmore et al., 1986) outside options are denoted by one's disagreement point.
Social Expectations: Expectations about how one should behave, held either by specific others who form interpersonal relationships with oneself (e.g., what my mother expects me to do), or general expectations prevalent in one's social group (how I am expected behave as a young female). Social expectations can have moral components (i.e., what is the morally appropriate thing to do) and/ or simply functional components (i.e., what one should do in order to cooperate with others around them).
Social Roles: Referring to the social positionality of an individual, in relation to specific others in a social order. These can include well-known social roles such as being someone's mother, uncle, colleague, etc or more interpersonal roles arising from a specific history of interactions, such as an older sibling taking on the role of a parent. Social roles often include normative expectations for one's behavior, and/ or can provide information about how one should behave in situations of uncertainty.

Box 1: Main keywords used in the thesis, along with their operationalizations as used in this thesis

A Roadmap

In the chapters that follow, I explore these concepts through a combination of theoretical critique, empirical analysis, and experimental work. I explain how each chapter answers the larger research questions that the PhD started with, and how I have attempted to answer them from a socio-cognitive perspective, taking into account the macro- and micro- factors underlying our attitudes to inequality.

Chapter 1: Evolved equity but inequity in the household?

Reviewing evolutionary accounts of Fairness

In this chapter, I review three major evolutionary accounts of fairness and hold them accountable for their ability to explain an important social phenomenon: gender inequalities in household division of labour. Sociological data from around the world have documented stubborn inequalities in this aspect, but evolutionary theories of fairness predict something quite different.

I try to explain the macro-level phenomenon of gender inequalities, while understanding how they come to be judged at the individual level, in the context of fairness judgements.

Chapter 2: Bargaining between the sexes

Outside options and leisure time in hunter-gatherer households

This chapter deals with a specific predictor of large-scale inequalities i.e., outside options. I study how men and women bargain for more leisure time within their households, and how their individual outside options might help them gain more bargaining power. We find surprising results, and a strong effect of cultural norms. The macro-level phenomenon which is uncovered in this chapter is the social norms of gender egalitarianism, and I explain how this shapes individual cognitive processes underlying bargaining between men and women

Chapter 3: More on Egalitarianism

This short chapter brings forth anthropological evidence on egalitarianism generally, in hunter-gatherer societies. Using this evidence, I criticize an influential theory of fairness, which has suggested that norms of fairness and equality emerged in large-scale societies with

markets. The chapter mostly deals with egalitarian norms and genetic relatedness in hunter-gatherers, with the implicit understanding that these drive individual behaviours in these societies.

Chapter 4: When do inequalities emerge?

The role of Outside Options

The chapter only focuses on the micro-level phenomena of inequalities, exploring how people prefer to distribute resources, beliefs about others preferences, and moral judgements regarding choices. I look at the economic role of outside options in begetting such inequalities, testing how it can compare with, and perhaps supersede an evolved expectation for equality.

Chapter 5: Relational Concerns in Fairness Judgements

Moving towards a Relational theory of Fairness

This chapter was born out of close collaboration with an anthropologist who has explored the ethics of care in moral judgements. Based on his insights, we jointly explored the key factors of 'social roles' and 'self image' in shaping people's judgments of fairness, and understanding how these factors might compare with ideas of equity and equality, which are more commonly associated with fairness. This chapter serves as the proof of concept for a larger relational theory of fairness. We understand social roles and other's expectations attached with these social roles, to be the social factor acting at a macro-level, shaping the individual's judgements of fairness. The fact that our cognitive mechanisms are geared towards satisfying norms prevalent in our groups and others expectations, forms a key demonstration of the socio-cognitive nature of judgements of fairness.

Chapter 6: Methodological Reflections

The epistemic value of Interdisciplinary Research

This chapter contains my epistemological reflections on which methods and combination of tools I found to be the most instructive for exploring the issue of inequality, their perception, and associated judgements of fairness. My PhD has been born out of important collaboration with anthropologists, sociologists, human behavioural ecologists, philosophers and economists; and I have found this combination of perspectives to be most useful for a robust

understanding of the research questions that I set out to answer in my 5 years of doctoral studies.

Chapter 1. Evolved equity but inequity in the household?

Reviewing evolutionary accounts of Fairness

I start the thesis on inequality and its perception, with an introduction to my key case study, i.e., gendered division of household labour (GDHL). GDHL is marked by its inherent inequality, in that women routinely do more housework across the world. But still, most people do continue to find it fair, even if they are systematically contributing more. Can the major theories of fairness explain the fact? We critically reviewed three major psychological accounts of fairness, discussing what evidence they use to support their account; and how well they can explain perceptions of fairness about gendered division of household labour. We found that only one account provided some explanation to this observation (though not a complete explanation, still) and the other two, with their emphasis on values of equity, did not. This chapter sets out the agenda for the rest of my thesis: while making judgments of fairness, humans, on the one hand, care about a much richer set of social variables than just a preference for objective standards of equity and equality, which is what we see in the case of GDHL. On the other hand, they can still arrive at equal distributions when that's the social norm, and especially, if it helps coordination, as some theories of fairness posit. This chapter focuses on inequalities in GDHL only and by means of a critical review, lays down the case that there's a need for integrative theories of fairness. We go on to propose that a crucial part of such an integrative theory will be the inclusion of *relational concerns,* which take into account the fact that people attend to their relationships even while making moral judgements, and prefer to fulfil expectations arising from those. Such a theory can explain why certain divisions of labour in households, even if unequal, can be deemed fair (chapter 5 will complement this theoretical analysis with empirical data from a set of experimental studies). The theoretical work relies on an integration of multiple factors driving fairness judgments; I therefore introduce at the end of this chapter a tool that I have been developing, ARCUS, which can help achieve such integration, by enabling cooperation between researchers from different fields studying inequality and fairness. The chapter has been written in collaboration with Christophe Heintz, and thus first-person plural pronouns are used.

1. Background

We have a world marked by various forms of inequalities which exist and are constantly propagated by generations of individuals (Kiatpongsan & Norton, 2014; Norton et al., 2014). A puzzling aspect of these inequalities is that people can still find them to be fair (Starmans et al., 2017). An important example of this is gendered division of household labour (GDHL) where women tend to do the greater share of housework as compared to men, and yet continue to find this unequal division to be fair (Braun et al., 2008; Lennon & Rosenfield, 1994; Nakamura & Akiyoshi, 2015; Geist, 2005). It is especially puzzling since several accounts of fairness posit that humans have a strong desire for equality (Binmore, 2009) or proportionality (Debove et al., 2015), as the guiding principles for how to divide resources and labour in cooperative enterprises (Dawes et al., 2007; Xiao & Bichhieri, 2010; Fehr et al., 2008; Fehr & Schmidt, 2006). How can these accounts then explain the widespread existence of inequalities and the continued perceptions of fairness within them? We demonstrate that within this system, individuals continue to perceive inequalities as fair. Then we delve into three major evolutionary accounts of fairness to understand how they fare in explaining such perceptions of fairness in unequal division of labour within the household.

Evolutionary accounts of human morality have taken up the challenge of explaining prosocial dispositions in humans. Dispositions which lead individuals to give up some of their own resources to benefit others, demand an explanation for why such behaviours would be adaptive and how they would evolve. The sense of fairness is a well-studied topic, and amongst many theoretical frameworks being posited in this area, three accounts have been exceptionally influential: fairness as social-norm following (Henrich et al., 2010); fairness as equity in a partner choice ecology (André & Baumard, 2011a) and fairness as the egalitarian solution to coordination problems (Binmore, 2009). The accounts identify key psychological mechanisms that lead to prosociality, respectively social learning, calculations of proportionality, and preference for equality; and show how these mechanisms are adaptive and–consequently–evolvable. These mechanisms are then used as explanations of people's prosocial choices, especially those documented in experimental conditions. What remains to be done however, is testing whether these theories can explain sociological data about real-world distributions, such as gendered division of labour. This test, we believe, is crucial for (at least) three reasons. First, the gendered division of labour - amongst other instances of division of labour - involves moral decision making, and requires individuals to judge the

fairness of their situations. Second, households are the fundamental unit for arranging our social lives and the distribution of labour within households is a phenomenon that holds relevance for people across cultures, and has implications for policy makers who want to promote gender equity, a political goal that we wholeheartedly approve of. Third, distributing labour on the basis of gender - in the household and in society, generally - has been a relevant coordination problem in human history and the environment of evolutionary adaptedness, and must be included in the set of problems that shaped our moral cognition. These reasons form the key motivation of the current review. We go on to propose avenues for more integrative accounts of human fairness, with evolutionary and psychological postulation. We further emphasise that while evolutionary accounts of fairness should be assessed in view of their capacity to explain sociological findings of GDHL, the reciprocal also holds: explanations of fairness judgments in GDHL must be grounded in our understanding of the human psychological make-up, and be compatible with evolutionary theory. For this, interdisciplinary integration is key and making different theoretical accounts and data sources available on an easily searchable platform, as we have attempted here with our database ARCUS (see Section 5.2), is required.

1.1. Data on gendered division of household labour and fairness judgments

Studies of gendered division of household labour (GDHL) present an overwhelming amount of evidence, showing that females routinely do significantly more work in running households than their male counterparts (Demaris & Longmore, 1996; Stratton & Gupta, 2008; Hochschild & Machung, 2012; Lennon & Rosenfield, 1994; Nakamura & Akiyoshi, 2015). National Survey of Families and Household (NSFH) and International Social Survey Programme (ISSP), two of the largest social survey databases in the world, have recorded these persistent inequalities through multiple years and across most countries. NSFH Wave 2 (1992–1993) saw the average American married woman do about three times as much routine housework as the average married man (32 vs. 10 hours per week; Lincoln, 2008). NSFH Wave 3 (2001-2003) showed a 4.9% decrease in this number for women, but the hours remained significantly higher than their male spouses (for descriptive stats from NSFH waves 1, 2 and 3, see Turk, 2012). IN NEW ROUNDS OF ISSP AND NSFH Though the rate of increase in men's absolute hours of routine housework actually exceeded the rate of decrease

in women's hours, the inequality persists because men were starting from such a low level (Lincoln, 2008). Housework is most commonly defined as unpaid work, which is done to maintain family members and/ or one's home (Coltrane 2000). The core, time-consuming household chores include preparing meals, cleaning, laundry and washing, shopping, etc (Braun et al., 2008). The ISSP, which includes data from over 30 countries, supports the above picture - despite a gradual increase in participation by men in domestic labor, there has not been any radical changes in the allocation of domestic tasks (Breen & Cooke, 2005; Crompton et al., 2005). The ISSP 2012 put the number at 71%, as the average proportion of housework done by women (Hu & Yucel, 2018), with country-means ranging anywhere between 64% in Latvia, Philippines, to 90% in Japan (Knudsen & Wærness, 2008). This has been the case despite growing liberalism in gender roles in many countries (Crompton et al., 2005, analysing data from Czech Republic; Britain; Norway). Global upheavals such as the COVID-19 pandemic only made matters worse (Carlson et al., 2022).

Admittedly, the multiplicity of questionnaires, methods of data collection, and subjectivity of respondents have produced different numbers for the exact hours of housework. But, the underlying message has been consistent - a stark, persisting inequality between men and women in the household. This has been seen to be the case for housewives as well as employed women (Voicu et al., 2009; Lachance-Grzela and Bouchard, 2010), and is found across countries with conservative (eg., Japan) as well as egalitarian gender values (eg., North America and northern Europe). Though labour-force participation of women has considerably increased in most industrialised societies and many households are now dual-earner, the gender imbalance persists (Orloff, 2002). This imbalance is further exacerbated by marriage, as women assume more housework and men tend to assume a smaller share, after they marry and have children (Coltrane, 2000).

Amidst the inequalities, there has been noted to be a continued perception of fairness in these unequal distributions. Men and women have repeatedly assessed the situation of inequality in GDHL to be *fair* (Lennon & Rosenfield, 1994; Nakamura & Akiyoshi, 2015; Braun et al., 2008; Thompson & Walker, 1989; Davies & Carrier, 1999; Dixon & Wetherell, 2004; Baxter, 2000; Baxter & Western, 1998). ISSP 2002 recorded 44.6% of women finding household distribution of labour to be fair, ranging from 25.9% in Flanders to 63.2% in Portugal. The disproportionality in labour inputs, given similar outputs for both partners (i.e., successful household and healthy children) has conspicuous disadvantages for the females, including

lesser recreational hours (Gupta & Stratton, 2008) and much higher overall workload throughout the day (Braun et al., 2008; Brines, 1993). It has also been seen to directly relate to life satisfaction, mental health of the partners, marital happiness and divorce rates (Frisco & Williams, 2003; Hu & Yucel, 2018). Moreover, Lincoln (2008) showed that the gender-inequalities in the division of labour has no benefits for wages, either for men or women (as is predicted by the specialisation explanation which posits that task-specialisation, though bringing about inequalities in household labour, benefits the couple by providing them a wage premium). *So why do women find such unequal distributions to be fair? What are the cognitive processes which lead to relevant justifications in this unequal system? And under what conditions does this perception of fairness come about?*

Sociologists have put forward some theories to explain the gap between objective division of domestic labour and subjective perception of that division (Table 1; the list is not exhaustive of the work done in the field, but is a summary of the most pertinent research). Most often, it is a combination of these theories that explain the data on GDHL (Nakamura & Akiyoshi, 2015; Horne et al., 2018; Baxter & Western, 1998). But even with this rich set of explanations, Thompson and Walker argue that the full explanation is still missing: ‘‘women’s employment, time availability, resources, conscious ideology, and power do not account for why wives still do the bulk of family work’’ (p. 857; Thompson & Walker, 1989). We believe a comprehensive theory which includes a psychological explanation of fairness judgements might help.

Bargaining Power and Outside Options (also Economic Resource Theory) Lennon & Rosenfield, 1994; O’Connor, 2019; Sen, 1987; Davies & Carrier, 1999; Treas & Tai, 2012; Braun et al., 2008	Unequal distributions can be perceived to be fair when a partner has (or perceives to have) limited options and alternatives outside of the relationship, particularly financial stability. This reduces bargaining power and modulates expectations within the relationship Availability of outside options (or lack thereof) also have a carryover effect, like lower opportunity for education, leading to lower employability and chances for financial stability, and an increasingly worse position for bargaining.

Social Comparison and Relative Deprivation Nakamura & Akiyoshi, 2015; Greenstein, 1969a; Greenstein, 2009; 1969; Dempsey, 1999; Martínez et al., 2010; Baxter & Western, 1998	Individuals compare themselves to others in similar positions, in turn lowering expectations for their own rewards. Fairness perceptions result from highly comparative processes, taking place at the level of one's peer groups, national identity, or anything in between. In the case of households, the relevant comparison referent for women is other women, such as their mothers, friends and neighbours and not their own partners.
The Gender Ideology Theory Braun et al., 2008; Blair & Johnson, 1992; Lennon & Rosenfield, 1994; Demaris & Longmore, 1996; Crompton et al., 2005; Thompson & Walker, 1989	Gender ideologies heavily underlie evaluations of fairness in the household, for both men and women. The more conservative the gender ideologies are in a society, the more likely females are in that society to perceive an unequal division of household work as fair. In fact, cultural ideologies can alter one's expectations for themselves: conservative ideologies that define household tasks as "feminine" activities, leads to acceptance of a higher load on the female partner and a skewed perception which over-emphasizes male's contribution to the "female-typed" tasks.
Other factors and theories	**Educational level** Frisco & Williams, 2003; Baxter, 2000; Baxter & Western, 1998 **Resource-dependence** (Brines, 1993) **Time Constraint Theory** (Greenstein, 1996b)

Table 1: Major sociological theories explaining perceptions of fairness in unequal gendered division of household labour.

1.2 Aims of the Review

In this review, we review three major evolutionary accounts of fairness judgements: Henrich and colleagues' social-norm following account of fairness, André and colleagues' partner choice account of fairness, and the equilibrium-selection model put forward by Binmore, with a reference to O'Connor's work. We have chosen these accounts of fairness as they have a

psychological as well as an evolutionary component to them, and have been influential in the academic world. These accounts do not directly deal with issues of gender inequity and perceptions of fairness within. However, since the issue is of high importance and relevant cross-culturally, we believe that any account of fairness, in order to be considered empirically robust, must explain this phenomenon, atleast broadly. Our review follows a threefold structure for each account: a) we provide a comprehensive summary, including the psychological mechanism posited and the evolutionary origins proposed; b) we then discuss what evidence the account is meant to explain, including evidence from the author(s), and other supporting findings; c) finally, we evaluate how the account fares in explaining our phenomenon of interest i.e., why people perceive fairness in face of inequalities in GDHL. The larger aim is opening up dialogue between the disciplines which may lead to more comprehensive theories of fairness judgements: to address this, we end our review with an outline of an integrative theory of fairness, and introduce a platform for researchers which facilitates such interdisciplinary research

2. Account: Fairness as social norm-following

This account of fairness was posited by Henrich and colleagues in 2005 (Henrich et al., 2005a). It suggests that fairness judgements are culturally learnt and result from a preference for abiding by one's local set of norms. This preference is part of social learning mechanisms (Henrich et al., 2005b; Ensminger & Henrich, 2014), which are biologically evolved. The norms on the other hand, evolve through a cultural evolutionary process which involves 'cultural group selection'. The authors suggest that norms of prosociality - which prescribe cooperation with one's group members even at a cost to the self - culturally evolve because they provide comparative advantage to the group. The account is therefore, one of gene-culture coevolution. Due to the cultural evolution of norms, they can be cross-culturally diverse.

This account of fairness is partly compatible with the gender ideology explanation of GDHL, which suggests that local norms of gendered division of labour calibrate one's expectations of what is fair in the household. The authors specifically characterise fairness as norms of proportionality, and suggest that they are likely to emerge under selective pressures of market-integrated societies (Henrich et al., 2010). However it does not explain why, if a preference for equity would underpin cooperation in market-integrated societies, inequity in

the gendered division of labour is still considered to be fair in most industrialised societies around the world.

2.1. A review of the account

The Psychological Process

The account is based on the psychological hypothesis that humans have a preference for following behavioural norms prescribed by their local institutions and followed by their peers. This is driven by social learning mechanisms, which allow one to efficiently acquire knowledge and practices that bring fitness benefits, such as knowledge of which plant to eat and how to prepare them. Social learning mechanisms also lead people to develop – in some cultural contexts – prosocial preferences, including preference for equitable distributions, what Henrich and colleagues call our sense of fairness. In the authors' words, fairness is "whatever combination of motivations and expectations [that lead to] more equal divisions" (Henrich et al., 2010: pp 1483). The authors crucially note that such prosocial preferences are not directly beneficial to the individual; they lead individuals to generously give away benefits, or to miss opportunities to take advantage of others. They also involve a willingness to punish those who do not follow the norms even at a cost to themselves (Henrich et al., 2006). But overall, they facilitate cooperation within the group (Henrich et al., 2010), which drives their cultural evolution. The process therefore goes through three stages: individuals come to be biologically equipped with learning mechanisms; through these mechanisms, they acquire their local set of cultural norms; these norms are then incorporated into their own motivations and preferences, such that individuals come to actively prefer acting in ways that benefit the group. The account remains compatible with the preferences, beliefs and constraints model of rational choice theory (Henrich et al., 2005a)

The Evolutionary Origins

The biological evolutionary account says that social learning mechanisms themselves evolve because they are advantageous to the individual, who benefits from learning from others, instead of by himself by trial and error. These learning mechanisms allow wider-scale cooperation by the establishment of prosocial norms which, though costly for the individual, allows cooperation within the group amongst people who may be genetically unrelated or not in long-term reciprocal relationships. These norms culturally evolve through cultural group

selection, because they foster in-group trust and can increase average fitness of members, compared to other groups who don't have such norms. Fairness is one such norm for cooperation, the content of which is equity. Henrich and colleagues describe that with the stabilisation of global climates in the Holocene, sedentary populations increased in number and size. The social environment, where individuals could initially cooperate based on kin relations, changed (an assumption that I return to challenge in chapter 3). It required individuals to interact with unrelated others. In such a situation, groups that had fairness norms - what Henrich and colleagues also refer to as "market norms" - were at an advantage, because there was successful cooperation amongst growing webs of non-kin. These market norms thus led to increased fitness of some groups, with a consequent growth in their size. Further, fairness norms also facilitated establishment of large-scale institutions like markets for exchange and moralising religions, which spread and in turn, further enforced these norms (Henrich et al., 2010). Through cultural group selection, these institutions grew, supported population growth and norms of prosociality spread.

In this account, the authors therefore follow a Dual Inheritance framework (Richerson & Boyd, 2008), in that they integrate the description of why preferences for following social norms might have biologically evolved, and a cultural evolutionary explanation for what the content of those norms would evolve to be.

2.2. What evidence the account relies on

Central evidence for this account includes cross-cultural data that was collected in 2003 and 2006. A group of anthropologists conducted the Ultimatum Game (UG), Dictator Game (DG) and Public Goods Game (PGG) in 2003, and UG and Third-Party Punishment Game (3PPG) in 2006, in multiple societies varying in subsistence, ethnicity and languages spoken, from horticulturalists to pastoralists and farmers to American students. In these games, individuals are asked to make decisions about how to distribute a given sum of resources, and the decisions are said to reflect fairness judgements(for detailed protocols, see Henrich et al., 2005a). These games have indeed been shown to cue fairness and prosociality by other studies (List & Cherry, 2000; Nowak et al., 2000; Bahry & Wilson, 2006). Neuroimaging studies show that low offers can create negative emotions (Camerer, 2003) and post-game interviews have confirmed that the tasks indeed cue fairness assessments and not just

strategic play (Ensminger, 2004). The data gathered by Henrich and colleagues showed a common preference for equal distributions in larger market-integrated societies, which had a prevalence of world religions. In small-scale societies however, individuals were seen to cooperate by their own local norms, which did not always promote equity. For instance, in the Au and Gnau villages of Papua New Guinea, UG was played akin to the local gift-giving rituals, where accepting gifts leads to strong reciprocity obligations in the future and thus individuals avoid accepting them. The East African Orma perceived the PGG (but not UG or DG) to be like *harambee,* a local tradition in which they contribute to public ventures, whereas the Indonesian Lamalera played the UG in a manner closely resembling how they share meat from whale hunts (Henrich et al., 2005a). The authors presented these findings to suggest that people tend to distribute cooperative goods in ways that align with their local social environments; in market-integrated societies this would mean distributing goods equitably, whereas in small-scale societies individuals would be less equitable. In the 2006 set of experiments, empirical data was collected to show significant cross-cultural variation in punishing behaviour, further supporting the role of institutions, not only in spreading market norms, but also in enforcing them by means of prosocial punishment (Henrich et al., 2006; Henrich et al., 2010).

Other studies have shown similar cross-cultural variability in people's behaviour in these games, including a cross-cultural study which compared 16 complex, developed societies, and showed significant variability in their punishing behaviour (Herrmann et al., 2008). Kids from Western societies were shown to opt for equitable distributions more often than those from partial hunter-gatherer societies, who tend to follow their cultural norms of equal distribution of goods (Schäfer et al., 2015). Ensminger showed variations within a cultural group, based on individual variations in wage and market interactions (Ensminger, 2004). Others have demonstrated the prevalence of norm-following in fairness, not by gathering cross-cultural data, but experimentally manipulating norm-following conditions (Bicchieri & Chavez, 2010). Finally, political ideologies have also been posited as an explanation for cross-cultural variability: Goudarzi, Badaan & Knowles (2021) showed that fairness beliefs about economic distributions were not universal and instead shaped by one's political beliefs.

2.3. How the account fares for explaining fairness in GDHL

When it comes to accounting for the data from GDHL, the claim that moral preferences are shaped by culturally diverse social norms, fares quite well: there is indeed a diversity of cultural norms about the distribution of labour in the household and a diversity of moral judgements regarding these. This account then provides a plausible account of why inequity in the household is found to be morally acceptable in many cultures: these cultures potentially have evolved gender norms that are inequitable, and abidance to these norms are judged "fair", meaning that they are morally acceptable, even if they are not fair in the sense of equity. The psychological process of norm-following put forward by Henrich and colleagues is similar to the gender-ideology explanation of GDHL (Braun et al., 2008; Crompton et al., 2005), both of which suggest that the prevalent norms and ideologies in one's community will determine how individuals behave, and how they set their expectations for what is fair. So when household tasks are typed as 'feminine' and gender norms suggest that women should be taking care of the feminine aspects of housework - even though it leads to a disproportionately high workload - then persistent inequalities can be judged to be fair. This can occur at the level of the ethnolinguistic community, as Henrich and colleagues postulate (2006), or at the level of nations, as national gender ideology theory predicts (Crompton et al., 2005).

The other claim in this account of fairness, namely that market integration favours norms of equity, does not fare well. Most urbanised and market-integrated societies around the world still show perceptions of fairness in face of high inequalities in GDHL, as we note in section 1.1. In fact, we see a high degree of gender-egalitarianism in GDHL in small-scale hunter-gatherer societies (Deb et al., 2024b). The cultural evolutionary explanation of Henrich et al., 2005 is thus unable to explain why a preference for equity in the household has not become the dominant norm in large-scale, market-integrated nations which have the prevalence of world religions. Should we count that as proof against this evolutionary account of fairness? We believe an additional specification could make the account compatible with widespread inequality in the household: fairness norms can differ between different domains of activity and thus, are diverse also *within* a cultural community. For instance, while distributing the benefit of a commercial enterprise, one can apply norms of equity; but while distributing labour in the household, gender role-specific norms could be relevant. Fairness judgements, consequently, would come to depend on the task at hand (Deb

et al., 2024c; Heintz, 2013). It is implausible to assume that norms regulating social interactions in every domain of life, would evolve similarly with market integration. The cultural evolutionary account therefore, remains underspecified.

The account can also be criticised on more general grounds: firstly, it does not grapple with arguments which claim that moral intuitions cannot be reduced to mere norm abidance. There is evidence to show that people, including children, make clear distinction between moral norms and mere conventions (Turiel, 1983) and that people can have moral intuitions that they cannot justify by appealing to norms (Haidt, 2001). The second criticism is directed towards the relevance of cultural group selection theory itself: if abiding by prosocial norms is costly for the individuals as the theory suggests, one needs to assume that learning mechanisms come with *trade-offs*, such that most of what is culturally learnt is adaptive but learning prosocial norms is a maladaptive side-effect (Morin, 2014). Cultural group selection theory also assumes relative homogeneity within cultural groups and an absence of within-group conflict (West et al., 2011), which we find to be implausible. Rather than making the above assumptions, the next two accounts will focus on the adaptive consequences of making prosocial choices, explaining them as investments that the individuals make for themselves, that they will pay off in the future.

3. Account: Fairness as Equity

This account of fairness was posited by André, Baumard and colleagues in 2011 (André & Baumard, 2011a and 2011b). It suggests that humans are endowed with a sense of fairness, which takes the form of a preference for equitable distribution of costs and benefits. In the authors' words, "individuals should share their common goods equally when they have contributed equally to their production [and] be rewarded as a function of the effort and talent they invest into each interaction" (Baumard et al., 2013). They suggest that this preference has evolved for its adaptive value in a partner choice ecology (André & Baumard, 2011a). Partner choice ecologies are characterised as environments where individuals must find partners for cooperation. The account stresses that the cognitive capacities underlying fairness evolved biologically and are shared by all humans across cultures. But if humans are endowed with such a sense of fairness, why do men and women find distributions that are inequitable, to be fair?

3.1. A Review of the account

The Psychological Process

According to this account, humans have a universally evolved psychological mechanism that leads to fairness intuitions. These intuitions result from a mental calculation of costs and benefits that are involved in various cooperative activities. In this framework, what is considered to be fair is distributions which are equitable, i.e., agents who have put more effort than others in the production of a good should get more of the benefits. When the costs are equal among the agents involved, then the proportionality principle is reduced to a preference for equality; inequity aversion is thus a special case of fairness intuitions (Baumard et al., 2013). The account suggests that these fairness intuitions develop early, are found universally in humans, and need not involve conscious reasoning or deliberation. Further, the authors suggest two key features that characterise our fairness intuitions: a) fairness is insensitive to power differentials, and b) fairness intuitions can be cross-culturally variable. The first feature derives from particular dynamics of the partner choice ecology model, as will be explained in the next section. The second feature is derived from the fact that our calculations of equity are flexible. André, Baumard and colleagues suggest that it is our cultural environments that determine what constitutes a cost and a benefit, and our fairness intuitions have evolved to be sensitive to that. As a result, fairness judgements can be cross-culturally variable, or vary by context, as long as general proportionality is still maintained.

The Evolutionary Origins

Positing that fairness judgments are intuitions directly issued from a biologically evolved sense of fairness needs to be especially grounded in evolutionary theory: how can a disposition that decreases one's immediate payoff and increases the payoff of others, ever evolve? The account shows that such a preference for proportionality is adaptive in *partner choice ecologies*; while being fair does indeed involve immediate costs, these are worthy investments in reputation, which will then pay off in terms of future opportunities to engage in cooperative interactions. Partner choice ecologies (aka "biological markets") are described as social environments in which individuals can select partners for mutually beneficial activities and also compete for being selected as a partner by others. The starting premise is

that cooperation itself is beneficial, because cooperative activities produce more benefits per cooperator than both individuals doing things on their own. In such a biological market of cooperators then, reputation becomes important and it is better to forgo the maximal payoffs that one can get immediately, than to develop a reputation as a bad cooperator, be consequently left without a partner and no possibility to benefit from cooperative ventures. André, Baumard and colleagues claim that such an environment would select for the cognitive mechanisms that form our "sense of fairness" (André & Baumard, 2011a).

In a partner choice ecology, they suggest, individuals can be in a position of advantage or disadvantage and these positions are dynamic (Debove et al., 2015). In the model, differences in power are not exploited for gaining advantage: "although strong individuals are often in a position to coerce weak individuals, fairness requires them to share the benefits of cooperation equally" (Debove et al., 2015). This is because all agents might come to be in the disadvantaged position at some point in the game. The existence of these options for cooperation also compensates for local disadvantages in power (for *in sillico* experiments, the power advantage is implemented in the roles that agents take in a Dictator game–either 'dictator' or 'recipient'--or in an Ultimatum game—either 'proposer' or 'responder'; see André and Baumard, 2011a and 2011b). The partner choice ecology suggests that providing an equal or proportional split of resources would allow one to maximise one's payoff in the long term; as one is, at the same time, able to derive benefits from the cooperative activity and to have a reputation as a desirable partner for future cooperative ventures (Baumard et al., 2013). Our 'sense of fairness' generally then, is the evolved cognitive mechanism that would lead people to make these adaptive choices.

3.2. What evidence the account relies on

This evolutionary model of fairness is supported by agent-based simulations in which agents repeatedly interact, make choices about how to distribute benefits, and select their partners. One of the main models they use involves agents repeatedly playing the Ultimatum Game (UG). In the UG, a proposer must distribute benefits amongst herself and her partner (the responder), in a way such that the responder must accept the distribution. If the responder accepts, both get the proposed distribution, but if the responder declines, nobody gets anything. The authors simulate a population version of the game, where they assume classes of 'responders' in the population, who can choose their partner from the class of 'proposers'.

If either class - proposer or responder - is disadvantaged by a specific division of resources (e.g., it frequently receives less than half of the resource), it will be outcompeted by the other class and as a result will become rarer in the population. However, this rarity itself grants it an advantage in a market-like setting, as the individuals of that class will be in higher demand, which will in turn yield to the evolution of a more favourable partition. In such a partner choice ecology, the decision to offer 50% (or a proportional amount) of resources to one's partner would then evolve as the equilibrium price, as equalising the payoffs of the two classes, will be the only evolutionarily stable outcome (André and Baumard, 2011a; André and Baumard, 2011b; Debove et al. 2015). The partner-choice ecology framework is also robust to various contingencies of this evolutionary model, such as alternating roles, noisy play, prevalence of altruistic punishment and spite, and specific spatial arrays, to account for different spatial and social constraints (for a comprehensive review, see Debove et al., 2016). The evidence continues to support the thesis that, as long as a partner choice ecology operates, agents that distribute more than what is fair or less than what is fair are selected out, while those who favour fair distributions thrive and reproduce. The existence of these options for cooperation also compensates for local disadvantages in power (for *in silico* experiments, the power advantage is implemented in the roles that agents take in a Dictator game–either 'dictator' or 'recipient'--or in an Ultimatum game—either 'proposer' or 'responder'; see André and Baumard, 2011a and 2011b).

The second type of evidence relied upon are ethnographic data: Baumard (2016), for instance, explains that the Yurok hunter-gatherers, Germanic tribes of Iceland, the Philippine tribe Ifugao and Nuer pastoralists of South Sudan all have a sense of morality which might seem diverse at the outset. For instance, the harsh nomadic lifestyle of the Inuit leads them to enclose older members in an igloo to die. This might lead one to label it cruel, but on understanding the ecological conditions necessitating this, and studying the emotions of filial piety and sadness with which the action is conducted, brings forth the presence of similar moral 'intuitions' in the Inuit. Baumard thus argues that cross-cultural punishment systems are best explained by a universal intuition for fairness.

The third type of evidence are choices made (by real humans) in experimental settings: choices made in the UG and DG are compatible with the hypothesis that people would make these decisions on the basis of a preference for equity. Participants have been shown to make choices that benefit others even when it is at a cost to themselves (Rand et al., 2012; Rand et

al., 2013; Fehr & Schmidt, 2006). This happens even when no retaliation is possible i.e., participants could get away with an unfair distribution that would advantage them (e.g. Rand et al., 2012; Xiao & Bicchieri, 2010). Baumard, with other colleagues have also provided some evidence from developmental psychology, showing that preschoolers do take into account the cost that was paid by agents when distributing goods and thus maintaining proportionality (Baumard, Mascaro & Chevalier, 2012).

3.3. How the account fares for explaining fairness in GDHL

A partner choice ecology framework suggests that humans would come to prefer proportionality in their distributions. We ask, how can this claim be compatible with the observation that women judge inequitable distributions as fair? A possible answer in defence of this framework, would be that the inequity in distributions is in fact, only apparent. That is, researchers find these distributions to be inequitable only because they have not taken into consideration all the relevant payoffs. This would be the case if either, a) the relevant payoffs eventually refer to fitness gains, which have not been considered by sociologists; or b) the relevant payoffs correspond only to subjective assessments, i.e., what counts as a cost and a benefit by the situated agents matter, not those assessed by the researchers of the phenomenon. We consider these two options in turn.

a) Being an evolutionary theory, the partner choice ecology framework would specify costs and benefits as those factors, which eventually contribute to the inclusive fitness of the individuals. People would then have, through various psychological mechanisms, the ability to assess costs and benefits that reliably correspond to their impact on individual fitness. This leads to the prediction that in societies where men cannot be certain whether an offspring is really theirs, i.e., when there is high paternal uncertainty (Xia, 1992), they should contribute less to household labour as their expected fitness gains are lower. Women, on the other hand, should contribute more. Conversely, if paternal certainty is high, such as in societies where women's freedom of movement is restricted, males should contribute proportionally more. This does not correspond with evidence from agricultural societies, where women are generally relegated to the domestic sphere, in turn reducing paternal uncertainty, but still do a much larger share of household tasks (Dyble et al., 2019). There appears to be no good candidate for fitness payoffs that would, in fact, make the distributions of labour

in households equitable.

b) André, Baumard and colleagues also emphasise that moral evaluations are culturally-specific as well as sensitive to one's immediate contexts. This opens the possibility that no matter what the arrangement of labour, they can be perceived to be equitable everywhere; one only need consider the *subjective* costs and benefits as considered by the actors. For instance, the labour of child minding may be assessed as low-cost by women, which can then be used to argue that a distribution where women spend more time minding the children than men, is fair. However, this makes the psychological claim too vague or circular; if everything depends on a completely subjective evaluation, then just about *any* distribution can be said to be equitable as soon as it is judged fair. So much so that the theory becomes empty.

Considering the above, the account of 'fairness as equity in a partner choice ecology' remains incompatible with observations in GDHL. Further, we also consider the compatibility of the evolutionary environment of partner choice ecology with environments where gendered partnerships take place. The broad idea of a partner-choice ecology applies quite well to the case of marriage, as men and women participate in a "biological market" when selecting their partner with whom they then conceive a household. However, there remain some inconsistencies. The suggestion that the roles played by individuals, proposer or responder, are dynamic (spatial population-structure model), alternating (alternating-roles model; empathy based model) or open to individual choice (reputation-based model), does not always hold (Debove et al., 2015). GDHL provides, in most cultures, a striking example where partner choice is not completely free. In many countries in the global South, it is the parents, rather than the partners themselves, who often make the choice (in a custom called arranged marriages; Yeung et al., 2018). In many others, divorce might be taboo and leaving the partnership - that the authors characterise as key in a partner choice ecology - might incur great social sanctions. In addition, gender roles remain relatively stringent, and come with associated divisions of labour. Men and women - gendered groups - might not be able to alternate between the role of proposer (higher bargaining power) and responder (lower bargaining power) as groups can be stuck with systematically lower outside options in their specific ecology (Alesina et al., 2013; O'Connor, 2019). Overall, this account would need to be developed more specifically towards the case of gender dynamics, for it to be able to account for fairness in the household.

In a recent development, the authors have specified a contractualist framework to account for further aspects of our evolved morality, showing how different contexts can lead to widely different forms of morality (André et al., 2022). In this development, they acknowledge that equity would only arise in specific contexts: where individuals have sufficiently symmetrical starting points and outside options; in societies with high levels of social trust; and when the equitable solution is also the universally advantageous one. They find in fact, that when specific groups have poor outside options, when societies are low-trust, or when cooperating individuals have common interests (such as genetic relatedness), this would lead to the stabilisation, and even a moral acceptance, of such inequalities. André et al. (2021) therefore recognise that partner choice ecologies might not always implement the above-mentioned 'perfect market' features. However, this new contractualist approach, also requires hypothesising a slightly different psychological mechanism underlying fairness judgements. This mechanism would consider not only one's (own and others') strategy set of behaviour, but also, (own and others') opportunity costs. This would be akin to a preference for abiding by the context-specific Nash Bargaining contract, even if it significantly departs from proportionality. We don't review this framework here, as it significantly differs from the partner choice ecology approach, our account of interest

4. Account: Fairness as Equality

This account of fairness was posited by Binmore in his book Natural Justice (Binmore, 2005), but also appears in earlier works (e.g. Binmore, 1998). The account states that humans have a preference for equality which has biologically evolved in response to daily-life coordination problems. Like the fairness as equity account by André and colleagues, this one stresses that the intuition underlying fairness judgments is evolved and universally present, but it identifies the relevant evolutionary pressure as the need to solve coordination problems, rather than in the need to find partners for cooperation. Successful coordination involves selecting one of the several equilibria in daily coordination tasks (Binmore, 2006; 2014). In the household, for instance, any distribution of tasks among the partners is an equilibrium as long as all the tasks are ascribed to one or both partners, with mutual agreement. In Binmore's words, "fairness evolved as Nature's answer to the equilibrium selection problem in human coordination games" (Binmore, 2006), and reflects a preference for egalitarianism

in distributions. The coordination approach of the account is compatible with a game theoretic framework of households, where labour division can be modelled as a complementary coordination problem: both partners do complementary tasks and can bargain with each other (O'Connor, 2019; Gurven & Hill, 2009; Gurven et al., 2009). Binmore however concludes that these coordination problems led to psychological mechanisms that favours equality, which makes the account incompatible with the data on GDHL, which is primarily marked by its inequality.

4.1. A Review of the account

The Psychological Process

Binmore explains fairness as a universally evolved intuition, which leads to a preference for egalitarianism in the distribution of cooperative resources (Binmore, 1994; 2009). He suggests that the logic of egalitarianism - do unto others what you would have others do unto you - is like a 'Golden Rule' which is genetically written as the deep structure of human fairness. Its function is to solve daily-life coordination problems in human societies. Coordination problems are situations where two or more individuals must agree upon a specific distribution of labour or resources to attain a joint goal, the agreement itself providing highest payoffs to all parties involved. Imagine any instance where you and your partner have to distribute the benefits of a joint enterprise among yourselves, such as sharing a crop yield. There are multiple ways to do so: you could get most of it, your partner could get most of it, you could get a little more than your partner, you could both get exactly the same amount, and other distributions along the continuum. All of these comprise possible solutions to the problem of distribution, and constitute multiple equilibria, since all of them - if agreed upon - are better than a failure to coordinate itself. This leads to the equilibrium-selection problem, where individuals must agree on one of the equilibrium strategies which can remain stable across interactions; if no agreement is reached, all benefits are lost. Our sense of fairness, according to Binmore, would provide the intuitive solution for such problems and tell us how to behave.

This account also suggests that despite the universal prevalence of fairness intuitions, the particulars of what is considered fair also depends upon the specific circumstances of people that are involved in these coordination problems, including the cultures that they come from. The account remains relatively brief on how this psychological mechanism might actually work, but provides a rich description of its evolved function and the selective pressures. The

key tenet is that fairness is the mechanism that evolved to solve the equilibrium-selection problem in human coordination.

The Evolutionary Origins

The evolutionary explanation of this account relies on the occurrence of coordination problems, which Binmore suggests, are aplenty in our daily lives, and that we solve without active thought or discussion. They can occur at the individual-level, such as deciding who should go through a door first or who should speak when while having a conversation, or at the level of the group, such as deciding who the political leader of a nation should be. All these problems can be solved in various ways, and thus have multiple equilibria. Since efficient equilibrium-selection was crucial for well-functioning human societies, it posed an important selection pressure (Binmore, 2014). Binmore suggests that food-sharing was perhaps the most important coordination problem in human evolutionary history; the universally evolved solution would be that of egalitarianism. In the case of food-sharing egalitarian sharing would be particularly useful; equally sharing food provides everyone with high payoffs, while also acting as an implicit insurance contract (Binmore, 2009). The implicit insurance contract lies in the fact that if any one person is unlucky in a yield, for instance on a hunt, egalitarian sharing would ensure they and their family don't have to go hungry, and they can repay the favour when the other has similar bad luck. This becomes especially relevant when individuals repeatedly interact over a period of time, and in unpredictable and resource-scarce environments such as the ones hunter-gatherer, our evolutionary ancestors, likely lived in (Binmore, 2009). The egalitarian solution to coordination problems would therefore evolve as the most stable solution and as Binmore argues, constitute our sense of fairness.

An evolved sense of fairness which intuitively enforces egalitarian sharing also gets over the requirement of a leader, whose role is to usually facilitate coordination between group members or provide external reinforcement to ensure the equilibrium solution is followed by all (Binmore, 2006). Binmore cites anthropological findings to show that our hunter-gatherer ancestors did not have leaders, or external reinforcement institutions, and thus fairness intuitions evolved as our way to self-monitor and cooperate. Finally, the account allows for the mechanism of fairness to be broadened in scope and applied to a variety of coordination problems, by enriching it with a way to weigh up the relative well-being of people in different social roles, who likely have different utilities for well-being.

4.2. What evidence the account relies on

The main source of evidence is drawn from evolutionary game theory; Binmore employs the Nash Bargaining Game which has a continuum of efficient equilibria. These efficient equilibria are sets of behavioural strategies which provide varying outcomes to the players. He uses this game to outline the major equilibrium points, which include the utilitarian solution (Harsanyi, 1986), the egalitarian solution (Rawls, 1991), the Nash Bargaining Solution, and reversion to a state of nature which is the inefficient equilibrium (Binmore, 2009). The egalitarian solution, he then shows, is the most efficient one in an evolutionary environment of resource uncertainty, since our ancestors would have had to make choices not knowing whether they will be lucky or unlucky in the future in gathering food - especially hunting meat.

In addition to the game theoretical model, Binmore appeals to anthropological evidence that demonstrates the key moral rules hunter-gatherers use to solve their daily coordination problems. The problem he focuses on, and believes to be the most evolutionarily relevant, is sharing of food. Hunter-gatherers bring home variable quantities of food, depending on their skill, luck, conditions of the day, or a variety of other factors. In such cases, equally sharing the food with others in one's community is a practice that can be a good insurance policy: give food to others when you have had a successful day, and the cost becomes worth it because in the cases when you don't bring back food home, you will benefit from what others hunted or gathered. Equal food-sharing would allocate food resources efficiently and by providing implicit insurance, can become an evolutionarily stable strategy. From ethnographic records, Binmore observed this to be the case in multiple small-scale societies like the Kalahari Bushmen, African pygmies, Andaman Islanders, Greenland Eskimos, Australian aborigines and others, all of whom operate on a social contract based on egalitarian sharing of food (Binmore, 2014). Such parallels in food-sharing between geographically distant groups, living in starkly distinct environments, he believes is no coincidence. It is an indication that fairness norms are shared in human societies and have a deep, evolved structure.

Another important function of having an evolved intuitive sense of fairness is that it allows cooperation to become self-policing and gets over the need of external reinforcement. Binmore again draws upon anthropological evidence to support this, pointing out that a

salient feature of hunter-gatherers is that most of them lack formal leaders. Using this he goes on to say, "our foraging ancestors had no leaders or elites. Some other equilibrium selection device was therefore necessary. Fairness is our name for the device that evolution came up with" (Binmore, 2006).

4.3. How the account fares for explaining fairness in GDHL

This account of fairness, which describes egalitarian distributions to be the evolved content of fairness intuitions, does not fare well in explaining the phenomenon of GDHL, its associated inequalities and continued perceptions of fairness. There is some harmony in that the household is indeed a typical coordination problem like the one Binmore employs in his account. Partners must come to a mutually agreed-upon division of labour, which is maximally beneficial. Households therefore face the problem of selecting the most stable equilibrium, same as what Binmore posited. However, as is shown by the data on GDHL, partners almost never choose the egalitarian solution. Instead, men and women tend to follow culture-specific norms and do tasks which are gender-typed (i.e., men doing 'masculine' tasks and women doing 'feminine' tasks) with women ending up doing a significantly higher amount than men. Thus, Binmore's suggestion that the egalitarian solution is the universal one and is written in our genes, does not hold for this case. Binmore does suggest that the relative weighing of utilities might differ from person to person, and from culture to culture. However, this is not enough to explain how doing a lion's share of the work in a partnership can balance out a utility calculus which is geared toward finding equality.

O'Connor (2019) has used the coordination problem approach to understand how such *inequalities* in gendered divisions can arise and remain stable. Similar to Binmore, she suggests that humans need to solve coordination problems in their daily lives, and for that they need to select equilibrium strategies. However she departs from Binmore in her conclusion; she suggests that social categories and conventionalized behaviour can allow for easy coordination, and acting according to the conventions of one's social category will be a stable strategy, even if it leads to inequalities. She distinguishes between two types of coordination problems: those where individuals must decide on the same set of behaviours (correlative problems) and others where individuals must choose different sets of behaviours which complement each other (complementary problems). It is the latter which she says is the more prevalent coordination problem in societies - the primary case being division of labour -

and that finding a set of strategies that complement each other, naturally leads to asymmetry between social categories and lands in inequality. She models the stabilisation of category-based conventions, which are supported by psychological mechanisms of social learning (from prestigious or similar others) and individual learning (from past experience and memory of success and failure). However, she does not specify any psychological mechanism which would lead to a judgement of fairness associated with these conventional behaviours, that one socially/ individually learns. This account directly applies the model to the problem of GDHL and thus is able to explain the data on inequality, but remains limited in its explanation of how perceptions of fairness come about in such unequal systems.

5. General Discussion:

Our review exposes a problem of incompatibility in the academic literature on fairness; there is great insistence towards equity and equality in prevalent psychological and evolutionary understandings of fairness. It is precisely this insistence however, which leads to poor explanations of real-world phenomena which are marked by inequalities, such as hyper-capitalist economic systems, monarchical regimes, racial segregation in society, gender discrimination at workplaces, and as we show here, gender-based inequalities in the division of household labour. Out of the three accounts that we review, Henrich and colleagues' account can be made compatible with the GDHL data most easily, based on their claim that fairness is determined by local social norms. However, their cultural evolutionary account fails to explain why inequalities are perceived as fair even in market-integrated societies, which they suggest evolved to be more equitable. We suggest that this is likely because norms for distributing household labour differ from those governing market interactions or economic transactions between strangers. The other two accounts are more incompatible with the data on GDHL: André, Baumard and colleagues suggest that humans developed a preference for equity in order to cooperate in partner choice ecologies, while Binmore posits that a sense of egalitarianism underlies our judgements of fairness, both incompatible with the recorded inequalities in households. But if humans really did have a propensity for finding equality as the ideal for fair social systems, how do stark inequalities, such as the ones between genders, continue to be propagated and adopted through generations, informed both by individual assessments and social structures?

At the sociological level, we have some explanations (table 1), such as imbalances in men and women's bargaining power (outside options, resource dependence), top-down normative control (gender ideology), or even modulation of one's expectations for themselves (social comparison and relative deprivation). However, these theories remain limited in not explaining the underlying psychological mechanisms in appreciable detail, a task we take on in chapter 2: Bargaining between the sexes. We believe that psychological grounding for this phenomenon holds high value, especially if it can be done in an ecologically valid manner taking into account the wealth of sociological data. For this, there needs to be more initiatives for collaborative research, a call that was attended to in this PhD thesis (for instance, see chapters 2 and 6, or Deb et al., 2024c). Currently, the two fields start with a different focus: for psychological theories of fairness the main goal has been to explain human-specific cooperative dispositions, often amongst benevolent strangers; for sociological theories of GDHL, the main goal has been to explain the persistence of inequalities seen in the modern world at large, compared with other desirable states in society. There is also a major difference in the kind of evidence being used, as sociological theories use survey-based, large-scale data or qualitative interviews (Hu & Yucel, 2018) while psychologists mostly use controlled experimental paradigms (Rand et al., 2013). We think a reconciliation can be beneficial for both: for psychologists, their theories will be able to explain not only behaviours in sterile lab settings, but out in the real world; for sociologists, exploring the underlying psychological mechanisms can lend insight into causal factors that underlie justification of inequalities and better predict how changes in systems might be received by individuals (Heintz et al., 2019; Deb & Knezevic, 2021). We ourselves provide two avenues here: an integrative theory of fairness deriving from our reviews above, and a platform for researchers to explore the multiple factors that shape fairness judgements.

5.1. An integrative theory of fairness

In spite of the issues that the above-three reviewed accounts meet when tested against sociological data on GDHL, there are valid insights in each: Henrich et al's account demonstrates the important role of social norms in guiding cooperative behavior, and by this are able to explain the diversity that exists in fairness judgments across cultures (Section 2); André, Baumard et al's partner choice ecology is a reliable representation of the cooperation dynamics underlying the formation of a household, and shows how one's reputation - in front of members of the other gender, as well as other members of their group - is crucial (section

3); Binmore's equilibrium-selection approach is applicable to the household division of labour, where each division of household chores represents an equilibrium, and the problem lies in choosing which equilibrium to settle on (section 4). We find that these insights can be integrated to build a theory of fairness that better explains sociological observations from households, is based on sound psychological hypotheses, and is compatible with evolutionary theory.

We propose that judgments of fairness are inherently judgements about social role satisfaction, an idea further developed with empirical data in chapter 5 (Relational concerns in Fairness Judgements). Roles include well-known social roles that people occupy, such as being a husband or uncle or boss, but also less-defined relationships that arise out of a history of interactions, such as specific types of friendships. The psychological mechanisms underlying fairness judgments, we suggest, have evolved to be sensitive to the *normative expectations* attached with one's role. When people judge fairness, they rely on their knowledge of the normative expectations attached with the roles they occupy; they then prefer to fulfil these in order to maintain their reputation as a good cooperator within their group and thus ensure long term cooperation. This is the key contribution of this PhD thesis, which we believe can enrich existing theories of fairness, such as the ones reviewed here. Such a mechanism can evolve within a partner choice ecology, even if this ecology does not resemble a perfect job market as is assumed in some of Baumard et al's models. We outline a plausible cultural evolutionary process below, which is grounded in this psychological sensitivity to normative expectations:

a. The partner choice ecology represents an imperfect market, where individuals enter a relatively fixed and stable role - in this case, their gender role - with which they seek cooperation partners. Their roles are neither negotiable nor interchangeable with their partner. These roles already exist in communities, and are ascribed to individuals for diverse reasons, for instance biological differences. New individuals entering and participating in the market are required to provide credible evidence that they can satisfy existing normative expectations which are attached to these roles.
b. These normative expectations are subject to cultural evolution. They are shaped by the distributions of outside options that each role has. Outside options represent the possible payoffs that individuals of each role have, outside of the current coordination venture. Distributions that allow

coordination, while still providing everyone with more payoffs than their respective outside options, will stabilize. Thus, when different roles have asymmetric outside options, it will lead to stabilization of unequal distributions; and normative expectations for such unequal distributions will arise and propagate within groups. This is indeed what happens when women have worse outside options than men, and end up with unequal distribution of labour in households and lower bargaining power in society (Alesina et al., 2013).

c. In turn, the outside options are shaped by two factors: historical precedence and the existing distribution of normative expectations, but also the advent of outside options exogenous to the coordinating activity.
    i. Existing normative expectations shape outside options of each role. For instance, if all men in a group expect women to do the cooking, then the possibility of a woman finding a household where she does not have to do the cooking becomes restricted. In other words, her outside options become restricted due to existing normative expectations.
    ii. Exogenous factors can change outside options.For instance, changes in modes of production (e.g., a move to plough economies have been said to bring about changes in gendered division of labour in the household; Alesina et al., 2013) or changes in economic structures (demand for women's labour during WWI and WWII led to an enduring shift in women's participation in the economy; Goldin, 1991), amongst others.

The cultural evolutionary process therefore involves a cyclical process of outside options determining distributions by shaping roles and expectations attached to them, and vice versa, within a partner choice ecology. This cultural evolutionary process has selected for a psychological mechanism which is sensitive to roles and expectations, and demonstrates a preference for satisfying them.

5.2. Exploring multiple factors shaping Fairness Judgements: A Tool

In view of this muli-variate causality, we suggest that a step forward would include centralising information about causal dependencies. We find there is a lack of centralisation of research that is topically related, because they are conducted by different schools of

thought, which often have their homes in different disciplines. This makes cross-disciplinary communication notoriously difficult (see, e.g. Roberts et al., 2020). One way to make different disciplines - or different schools of thought within the same discipline - talk, is simply by providing a shared space.

We conclude our review by presenting a tool that provides such a space, called ARCUS (Archive of Relations in Coordination and Unfairness Studies; weblink: https://correlation-machine.com/ARCUS/index.html). This is a comprehensive database where theories, causal findings, and relevant researchers can be perused quickly and easily, and the connections amongst them can be explored. This format has been previously implemented successfully, in the field of evolutionary linguistics (Causal Hypotheses in Evolutionary Linguistics Database - https://chield.excd.org/; Roberts et al., 2020). The database is a collection of causal hypotheses and relations in the studies of (un)fairness and human coordination. It has been built to bring together multiple theoretical perspectives from different disciplines, on the topic of fairness and coordination, on one searchable platform.

The database consists of findings from a large number of peer-reviewed scientific papers. The primary message of each paper - the hypothesis, findings or the theoretical framework - is summarised using Directed Acyclic Graphs (DAG's). DAGs provide easy visual depictions of complex concepts and have been successfully used to communicate and summarise research findings (Williams et al., 2018). DAGs have nodes, which represent variables, and arrows which depict the causal relations between these variables (see Fig 1, Topt). Every paper is thus summarised in a single DAG, which remains open access on GitHub and can be updated or modified by other researchers. Moreover, anyone can contribute to ARCUS, by adding their own or other's work on the topic of (un)fairness and coordination; all one needs is a GitHub account and the website provides an easy video tutorial for adding data (https://correlation-machine.com/ARCUS/Help_AddingData.html). One can search for their variable, paper, or author of interest and expand all causal links, as included in the database, from these; for example, finding all nodes linked with the variable 'perceived fairness' (Fig 1, Bottom).

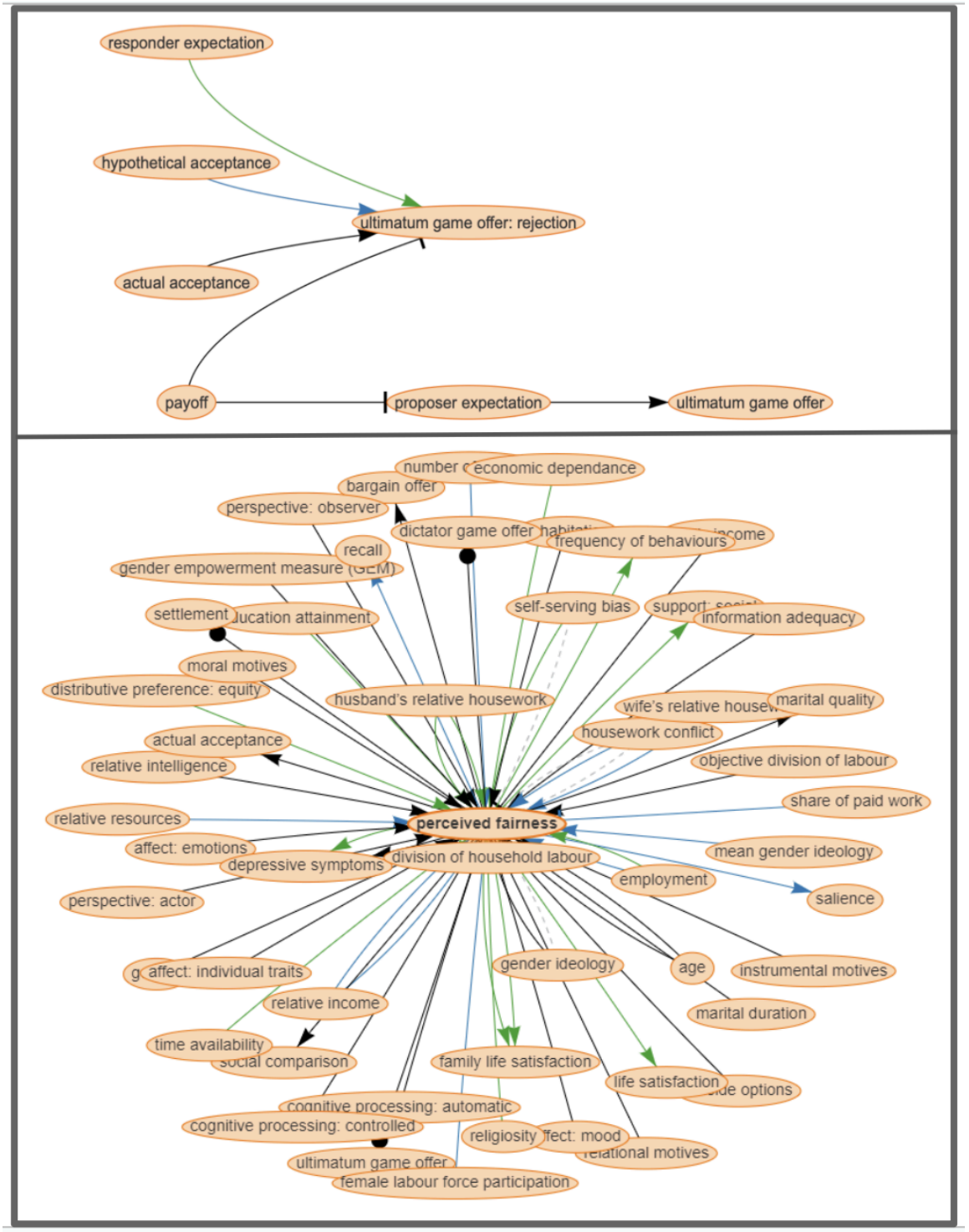

Fig 1: (Top) DAG from Aina, C., Battigalli, P., & Gamba, A. (2020). Frustration and anger in the ultimatum game: An Experiment. *Games and Economic Behavior*. The green arrow shows a positive causal relationship, blue arrow shows a negative causal relationship, black arrows show causal relationships with no directionality specified, arrow with a blocked arrowhead shows the lack of a causal relationship; **(Bottom)** Visualization of all causal relations coded in the database which have 'perceived fairness' as a node. Color scheme of the arrows is the same as the top figure.

Household division of labour has been an important area of research for sociologists over many decades, and has major policy implications. Households, due to their long-term interactions, relationship dynamics and cultural embeddedness, provide a meaningful case of human cooperation, and inequality, recurring across human societies; though the same factors also make this study difficult for psychologists, as exercising control over multiple factors to identify causal mechanisms becomes very hard. There has been a great surge in worldwide surveys and panels, conducted across decades (such as the National Survey of Families and Households, International Social Survey Panel, British Household Panel Survey, National Family Health Survey, etc), making a lot of quantitative data freely accessible. This opens up new possibilities for psychologists to test their hypotheses and theories, and update them in view of the data.

The review remains limited in approaching only three accounts of fairness, leaving out other significant ones such as procedural fairness (Thibaut et al., 1973; Tyler & Bies, 2015) which is often used in the realm of the law and organisational fairness, or the distributive justice framework (Davis, 2010; Hu & Yucel, 2018), which integrates parameters of outcome values, justifications and comparison referents. The goal here was to review psychological accounts which have an evolutionary grounding, and thus our choice of theories to review. This also set out the tone for the thesis by focusing on a concrete example of inequality, taking stock of the important literature, before moving on to our own empirical exploration of the problem of GDHL (as in chapter 2), and then opening up the discussion to the study of inequality and the psychology of fairness more generally (from chapter 3 onwards). We stress on the relevance of such a study: understanding the psychology of fairness judgements can help us understand existing systems of inequalities, and potentially bring about changes. Though this thesis focuses on the case of the household, the questions raised here can easily be extended to other social domains such as race, class or nationality-based inequalities. For such explanations however, as I will continue to argue, theoretical integration, interdisciplinary communication and methodological plurality is required (see a longer argument about this, in chapter 6). We urge academics to develop more integrated theories, where explanations of how the mind comes to perceive and judge fairness for oneself and others, can complement our observations from the social world.

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Chapter 2. Bargaining between the sexes

Outside options and leisure time in hunter-gatherer households

In this chapter, I explore the problem of inequality in households and division of labour with the help of empirical analysis. I introduce gendered division of labour in nuclear households as a bargaining problem, where male and female partners bargain over labour inputs and resulting leisure time. Within this bargaining model, I test the hypothesis that outside options[3] —an individual's fallback options for welfare outside their household, such as kin support—affects this bargaining process, providing those with greater outside options more leverage to bargain for leisure time. Outside options have in fact, often been posited as an explanatory factor for gender inequalities at large, in human societies (as I also discuss in the interlude). In this chapter, the individual effects of outside options were tested. In two hunter-gatherer populations, the BaYaka and Agta, social capital was taken as the best determinant of outside options; I used a generative model of the Nash bargaining problem and Bayesian multilevel logistic regression to test the outside option hypothesis. I find no evidence for an association between inequality in social capital and division of leisure in either population; instead, one can see remarkable equality in the division of leisure time within households. In today's world of worldwide feminist movements, with people demanding gender equalities in public and private life, it seems there are important things to learn from a hunter-gatherer way of life, not least for political and policy reasons. These societies demonstrate how various social practices, as those I point out in the interlude of this chapter, can sustain gender egalitarian relations, at least in small groups.

More generally, these findings point to the potential role of norms in shaping bargaining processes and perceptions of fairness, more than simply an individual's outside options (this will be further demonstrated experimentally in chapter 4). Individuals are sensitive to social expectations of others and commonly held beliefs in their community (here, gender egalitarianism beliefs), when they determine how to divide labour; paving the way for a relational theory of fairness, as in chapter 5. To explain the results in this chapter, I also discuss the role of non-substitutability of subsistence labour, bilocality and other behaviours

[3] This factor has already been posited by sociologists as one of the important explanations for why unequal GDHL can come to be considered fair, as was summarized in table 1 of chapter 1

which maintain gender equality, as key determinants of division of labour in the households of these immediate-return hunter-gatherers. Given the collaborative nature of the work, I have presented the text below using first-person plural pronouns.

1. Background

Households of pair-bonded males and females have long been argued to be a site for cooperation, due to shared fitness interests in the rearing of offspring (Lovejoy, 1981; Becker, 1993).[4] Given the long developmental period of the human offspring, paternal investment - especially during the critical period when females are still engaged in reproduction and lactation (Marlowe, 2003) - can be an important contributor for offspring survival. Cooperation between hunter-gatherer males and females also provides a diversified diet, with males majorly procuring fats and proteins, and females gathering carbohydrate-rich foods (Marlowe, 2007), both requiring considerable specialisation (Gurven & Hill, 2009). So, if males specialise in hunting for high-risk, high-reward foods such as big game, females can invest in gathering wild foods, an activity more compatible with mothering, both still sharing the goal of successful rearing of the joint offspring. Nonetheless, each member of the pair-bond also attends to their own interests, which might fall outside of household provisioning, giving rise to what Amartya Sen called, 'cooperative conflicts' (Sen, 1995). For instance, Hawkes argues that male hunting much more likely serves the purpose of showing off one's phenotypic quality to potential cooperation partners and mates, even more than provisioning for one's family (Hawkes, 1991; 2019; Hawkes et al., 2014; for criticism see Stibbard‐Hawkes, 2019). Females on the other hand, would bargain for higher male provisioning, so they can spend time in further reproductive effort.

Gendered division of labour (DoL) within a household is shaped by this combination of the joint interest of rearing successful and healthy offspring, and bargaining dynamics between the private interests of individuals. It is the latter that forms the phenomenon of interest here and that we investigate in this study. Gurven and Hill modelled this within a bioeconomic bargaining context, with complementary labour allocations of individuals shaped by points

[4] This text is published in Elsevier Inc. *Evolution and Human Behavior*, *45*(4), 106589. https://doi.org/10.1016/j.evolhumbehav.2024.05.003

where either individual can threaten to leave the relationship (one's viable threat points; Gurven & Hill, 2009; Gurven et al., 2009). We use this model to predict, at the level of individual households, the impact of each partners' social capital on their relative amount of work effort (measured by leisure time) invested in household labour.

Bargaining problems have been a popular characterization of household DoL, where partners often distribute household tasks in a complementary manner (Manser & Brown, 1980; Agarwal, 1997; Ott, 2012). For instance, if one partner does the cooking, the other must clean, to successfully host a dinner. If both cook and nobody cleans, both are left with a messy kitchen. The key question asked in such complementary division of tasks is, who does *what,* and how is the division of payoffs determined*?* Bargaining power provided by outside options—operationalized as, options for payoffs that an individual can have should they choose not to participate in the current cooperative venture—has been suggested to be an important determinant of DoL (Knez & Camerer, 1995; Schmitt, 2004; Binmore et al., 1991; Binmore & Eguia, 2017; O'Connor, 2019). According to the bargaining approach, the partner with better outside options will be able to bargain for a more advantageous allocation of tasks within their household. Outside options can be provided by factors, such as one's opportunities for remarrying, the ease of obtaining resources for oneself, social support from kin, etc. In this study, we consider social capital—here, a measure of how many of one's campmates are willing to share resources with them—as the major determinant of outside options and test whether having higher social capital provides an individual advantage in leisure time distribution within their household. We further run a robustness check with additional measures of real-world sharing and social networks, testing their effects on leisure time distribution in both populations.

When there are differences in outside options, it can lead to task distributions that advantage one group over another – often leading to unequal payoffs. Such distributions can become mutually acceptable and in the longer run, culturally stable (O'Connor, 2019), such as the case of patriarchal behaviours in plough-based economies. Ploughing—usually carried out by men due to greater average upper body strength—has been said to afford men more bargaining power than women, as they control the crop production. This economic stability provides them better outside options, and is suggested to contribute to patriarchal societies (Alesina et al., 2013; but see Burton & White, 1984). In turn, women's dependence on men

can increase, and their mobility and decision-making can become severely limited (Djurfeldt, 2021). Within industrialised societies, economic factors like, employment prospects (Abraham et al., 2010; Brines, 1994), relative earnings of spouses (Klein & Barham, 2018), resource dependency (Greenstein, 2000) and education gap (Fengdan et al., 2016; Ma & Piao, 2019) have been seen to provide bargaining power and shape housework distributions (also see table 1 of chapter 1). Game theoretic models of households report similar effects (Breen and Cooke, 2005). Additionally, social and institutional factors like inheritance and divorce norms (Baland & Ziparo, 2018), and national gender ideology (Mandel et al., 2020; Brines, 1994), can also determine outside options. Despite substantial exploration of household bargaining in large-scale societies, the phenomenon remains understudied in small-scale societies. Here, we study this phenomenon in two immediate-return hunter-gatherer populations—the Mbendjele BaYaka from Congo and the Agta from the Philippines—to understand how DoL within pair-bonds is shaped within small-scale and gender-egalitarian populations.

Social capital is the main constituent of wealth in such immediate-return hunter-gatherer societies, which do not accumulate much food and material resources (Borgerhoff Mulder et al. 2009). We use an experimental measure of social capital from gift-giving games, showing for each individual, how many campmates are willing to share resources with them. This measure is associated with increases in one's mate value and polygyny potential (Chaudhary et al., 2015), buffering food risk in times of resource scarcity, increase in body mass index and contributing to female fertility (Chaudhary et al., 2016). Other measures of social capital contribute to one's food-sharing networks (Dyble et al., 2016), correlate with enhanced fertility and offspring survivorship (Page et al., 2017) and aid in developing one's information networks (Migliano et al., 2017). Social capital, therefore, can be seen as the real-world measure that shapes individuals' outside options in these societies and provides bargaining power, representing the support individuals can get if they leave their household. We further corroborate the robustness of this measure in capturing one's social capital, by adding additional measures of social capital—campmate networks for Agta and food transfers in BaYaka—for both populations. Food-sharing measures, in other closely related BaYaka populations, have been shown to be correlated with status (Gettler et al., 2023), again contributing to one's social capital. To compare labour division inputs, we measure leisure

time allocation. Though energy expenditure in labour can have a direct impact on how much leisure time one requires, this is also difficult to measure as there can be great individual variations in performance of tasks and calculations of calorie expenditure. Thus, the measure of leisure time is most commonly used currency in evolutionary modelling of time and energy expenditure of behaviours, and also exploited by large-scale national and international surveys analysing public welfare across countries, like the International Social Survey Programme (ISSP; Braun et al., 2008) and National Survey of Family and Households (NSFH; DeMaris & Longmore, 1996). We therefore hypothesise that in the households of these immediate-return hunter-gatherers, the partner with more social capital has better outside options, and so will be able to bargain for a greater share of household leisure time.

2. Materials and Methods

This research was approved by the UCL Ethics Committee (UCLEthicscode3086/003), and carried out with permission from the Ministry of Scientific Research, Congo. In Agta, fieldwork permission was granted by local government units, including Mayors of the Municipalities visited, and the Department of Environment and Natural Resources (DENR) as the research took place in a protected area. All BaYaka and Agta communities agreed to participate, and informed consent was obtained from all individuals.

2.1. Participants

L2.1.1. The Mbendjele BaYaka:

The Mbendjele are a subgroup of the BaYaka Pygmies, who speak Mbendjele. They live with kin and non-kin in multi-family camps (*langos,* size: 10 - 80), with nuclear families residing in individual huts (*fumas)*. Average genetic relatedness in camp is low due to bilocality and fluid movement of individuals between camps (Dyble et al. 2016). These groups are heavily dependent on cooperative activities such as food sharing, collaborative foraging and allo-parenting (Chaudhary et al. 2016; Dyble et al. 2016; Boyette et al., 2020). Some groups occasionally engage in wage-labour (Knight et al., 2021), though this is not the case for any of the communities that were studied, who remain in mobile forest camps. These hunter-gatherers largely consume the food they hunt and gather within a few days, engaging

in an immediate-return economic system and therefore, have very little accumulated material wealth or resources (Lewis, 2017).

Gender Egalitarianism

The BaYaka are some of the most gender-egalitarian populations recorded in the ethnographic record (Noss & Hewlett, 2001). Males and females, though forming biologically and socially distinct categories, have similar social standing, equal decision-making power and no taboos allowing one gender to dominate. They are often described as being 'assertively egalitarian' (Woodburn, 1998). Each gender uses rituals to demonstrate their collective strength and playfully taunt or mock the other; the combined power of each gender neutralises that of the other and prevents domination (Lewis, 2013; Bombjaková, 2018). Egalitarianism arises from ritualised and symbolic inter-sex bargaining, which provides a particularly interesting setting for this study. Men hold the few titles of *kombeti* (elder spokesperson), *tuma* (skilled elephant-hunter), and *nganga* (healer), but these carry no authority. Women usually challenge attempts of male dominance and exercise great influence over decision-making. This egalitarianism is often concomitant with bilocality, where married couples may live with either the husband's or the wife's kin (Dyble et al. 2015); and the marital system is predominantly serially monogamous (Chaudhary et al. 2015). Households are nuclear and easily dissolvable, with new huts being set up very quickly. Women have considerable partner choice, freedom of movement within and between camps, and can survive even if they remain single. All of these provide them with outside options, and have important implications for bargaining.

Gendered Division of Labour

Despite equal social standing, men and women do play complementary roles in their camps. Women are valued for their ability to bear life, maintain solidarity in community enforcement of social norms, whereas men are valued for their physical strength, providing meat to sustain others, and procuring dangerous but desired products (Lewis, 2017). Men typically hunt and collect honey, whilst women contribute by fishing, gathering yams, and other sources of carbohydrates and micronutrients, though the gathering activities remain interchangeable.

Husband and wife share childcare, subsistence, leisure and other ritual activities, and both have equal decision-making power in marriage and cohabitation choices (Dyble et al., 2015). Kin and non-kin engage in allocare of children. Fathers among the Aka, another BaYaka subgroup, have been found to provide more direct childcare than in any other recorded culture (Hewlett, 1993). In addition, children also grow up in shared caregiving environments with support across families (Boyette et al., 2020), all of which considerably frees up mothers for other foraging activities. Such high female contribution to subsistence and economic production has been postulated as an important driver of gender-egalitarianism (Noss & Hewlett, 2001).

Demand Sharing and Social capital

The BaYaka practice demand-sharing, where anyone in need of a resource, particularly food, can demand it from the one possessing it, and it is considered the possessor's duty to share (Lewis et al., 2014). Demand sharing hypothetically ensures natural differences of skill and luck are not converted into differences in status, authority or rank, maintaining a non-hierarchical social structure (Woodburn, 1998; Lewis, 2008; Lewis, 2017). However, cooperation and food transfers are not always evenly distributed within camps and follow patterns based on kinship and reciprocity (Thompson, 2018; Chaudhary et al., 2016; Gettler et al., 2023). Consequently, individuals with more cooperative alliances based on popularity—social capital—may have greater bargaining power in interactions with their partner due to their superior outside options. It must be noted that prevalence of both the practices might lend a point of contention for bargaining dynamics, with demand sharing lowering the need for having social capital, and structured sharing based on cooperative alliances, increasing it.

2.1.2. The Agta

The Palanan Agta are a group of small-scale hunter-gatherers residing in northeast Luzon, Philippines. They are characterised by high mobility, small camps with low genetic relatedness and egalitarian social relations (Minter, 2010; Dyble et al., 2015). Their economy is predominantly based on fishing (riverine and marine), gathering and some hunting in the

tropical forests of the Northern Sierra Madre Natural Park. They also engage in trade with neighbouring farmers, logging, and now increasingly in agricultural and other paid labour (Griffin, 1996). Some households are much more sedentary than others (Page et al. 2016; Smith et al. 2016). There is also an impact of outside institutions, such as schooling, church and healthcare (Page et al., 2018). Camp sizes can vary between solitary dwellings (7 individuals) to large camps with 26 houses (156 individuals), with an average of seven houses (49 individuals; Smith et al., 2017).

Gender Egalitarianism

The Agta are highly egalitarian, similar to the BaYaka. Autonomy in decision-making is central to their lives and all adults are afforded equal standing without stratification or hereditary positions (Minter, 2010; Griffin, 2000). Some more experienced and influential members sometimes ensue the role of advice-providers or conflict-mediators (Headland 1987; Griffin 1996; Minter, 2010), but none in formal positions of authority. Subsistence activities are carried out by both males and females, though some activities might be more gender-specific than others. Agta women have been formerly famed as female hunters, combining hunting activities with no decline in fertility. Brightman observed that 85% of the Nanadukan Agta women of Luzon hunt, regardless of whether they are menstruating, pregnant or have nursing responsibilities (Brightman, 1996). In the current population however, hunting forms less than 5% of all subsistence activity and is almost entirely male-only (refer SM of Dyble et al., 2019). Fishing is done by both males and females, with males mainly spear-fishing and females beach-combing to collect octopus and other shellfish. Gathering is predominantly done by women. Over the years there has been growing involvement with agricultural and paid labour, also engaging both males and females (Dyble et al., 2019).

Marriage and Households

Men and women have autonomy in choosing their partners and young individuals often engage in ‘trial marriages’ to test compatibility and partnership values, before committing to an individual. There are rarely large age differences between husbands and wives (Dyble et al., 2021) and post marriage, both men and women have equal decision-making power on where the married couple stays (Dyble et al. 2015; Minter, 2010). Men also pay bride service (*magservi*) for the wife-to-be’s family (Smith, 2017) by helping out in various domains,

including the domestic. The Agta are serially monogamous (Minter, 2010; Headland, 1987) and divorce becomes exceedingly rare once a child is born. Allomothering in the form of childcare is a common occurrence in the Agta, where close kin or non-kin individuals care for the dependent child, and in turn benefit mothers, who can spend more time on economic activities and leisure (Page, 2021). Given their bilocal nature, Agta children become equally likely to reside with either their mother's or their or father's family.

Sharing and Social capital

The Agta foragers cooperate intensively, with regular food-sharing occurring within and between households (Dyble et al., 2016), and campmates cooperating for foraging and other subsistence activities (Smith et al., 2019), as well as childcare (Page et al., 2019). One's popularity in camp has been associated with the benefits they can expect to receive from others. Being skilled in hunting and fishing, being a respected storyteller and yielding decision-making influence, can greatly contribute to one's value as a cooperation partner, which is reflected in one's social capital (Smith et al., 2017). The position one has in their social networks has even been associated with fertility (Page et al., 2017). Social capital is therefore likely to shape Agta behaviour considerably, and in the absence of material wealth, is the most appropriate determinant of an individual's ability to survive outside of their household.

2.2. Data Collection

We analyse pre-collected ethnographic data, both observational and experimental. Data was collected from Mbendjele BaYaka communities residing in the Sangha and Likoula districts of Northern Republic of Congo, and the Palanan Agta community residing across the Northern Sierra Madre Natural Park in northern Philippines. Fieldwork for the BaYaka was conducted between April - June 2013 and March - July 2014 and for the Agta over two periods of April to June 2013, and February to October 2014. The fieldwork was carried out by researchers from UCL who are anthropologists and human behavioural ecologists and have lived with the populations for long periods of time. Due to COVID-19 outbreaks in the main duration of my PhD (2nd, 3rd and 4th year), no fieldwork took place and I could not visit the field for data collection myself. Thus, I collaborated with these researchers to learn about the populations and use data collected previously.

Data was collected from three BaYaka camps, and complete data was available from a total of 46 individuals, i.e., 23 couples. For the Agta, time allocation and social capital data was available for a total of 108 adult individuals, who formed 54 couples, from 10 camps. No statistical methods were used to pre-determine sample size, which was determined by the size of the communities the ethnographers had the opportunity to study.

2.2.1. Calculating Social capital (determinant of outside options)

We measured social capital by the honey-stick giving game in the BaYaka, where each individual must distribute three sticks of honey to any campmates as they wish, except themselves (detailed protocol can be found in Chaudhary et al., 2015). *The total number of honey sticks received by an individual, standardised by camp, is considered as that individual's social capital z-score.* Social capital z-score = (number of sticks - camp mean)/ camp std. dev. In the Agta, social capital was measured by the Sharing Game, where individuals were shown photos of 10 randomly chosen campmates amongst whom they had to divide rice tokens, in any manner they wished (detailed protocol can be found in Smith et al., 2016). *The total number of rice nominations an individual received, divided by the number of times their photo was shown to campmates, then standardised by camp, is considered as an individual's social capital z-score.* In the Agta, nobody in camp 9 shared any rice tokens with anyone and thus all individuals were given zero as their social capital score.

For both populations, the individual social capital z-scores are then used to calculate a final measure of the predictor variable 'difference in social capital between household partners; that is: male z-score - female z-score.

We ran additional analyses with other measures of social capital. In the BaYaka, we use real-world food transfer data. For this measure, households were observed by the researcher on site, recording all food produced by a focal household and the number of camp members from whom each individual received food in real-world transfers (detailed protocol can be found in Chaudhary et al., 2016). Observations were done over a series of 2 - 4 hour time blocks, total observations spanning 24 or 36 hours per household depending on the camp. In the Agta, we use campmate-network data; all adult Agta individuals were asked to name up to five individuals that they would most like to live with. This was done in an interview

format. These measures are used primarily as a robustness check for the primary measures of social wealth, honey-stick giving game and Sharing Game.

2.2.2. Calculating Leisure Time

We calculate an individual's leisure time by the total number of hours they spent resting or socialising. Data was collected using a scan sampling method for both the populations, where activities of each camp member is recorded as a 'snapshot' in time (Thompson, 2018; Dyble et al., 2019).

For the BaYaka, the data consists of 9094 scans collected over 35 days. Scans included what each individual in camp is doing between 6am and 6pm at one-hour intervals. Any individual above 18 not seen in camp, was assumed to be engaged in foraging/work or collecting water/firewood, since this is the only reason individuals leave camp during the day.

For the Agta, time-allocation was obtained by conducting four scans each day, with the first scan between 06:30 and 09:00 in the morning and three more at three-hour intervals. This resulted in a total of 10,706 scans, including individual activities and proximity with other adults. When an individual was out of camp, researchers asked those in camp what the absent person was doing, corroborating this when the individual returned (Dyble et al., 2019).

In both populations, activities recorded were broadly categorised as foraging, making and manufacturing, food processing, cleaning, carrying and collecting, childcare, socialising, resting, playing and other (Thompson, 2018). We use the raw count of resting, socialising, playing, and sleeping scans for each individual, to calculate leisure hours. Individual leisure hours are then used to derive a final measure of the response variable, that is male's portion of household leisure budget i.e., male leisure/ (male leisure + female leisure)

2.3. Data Analyses

I, along with support from a colleague at University British Columbia, Vancouver, developed two data analysis strategies. The first strategy develops a game theoretic model of household bargaining. We then estimate features of the utility function that plausibly shapes the

household division of labour in these societies. Following the recommendation of (Smaldino, 2020; McElreath, 2020, chapter 19), we find it more fruitful to fit the theoretical model directly rather than fitting a generalised linear model. The parameter estimates obtained through this strategy have theoretical meaning and the errors of the model are informative. However, due to computational limits, we can only explore game theoretical models with a small number of parameters. To explore the potential effect of confounding variables in our observational dataset, we then turn to a multilevel logistic regression.

2.3.1. Generative Model

We utilise the Nash bargaining game to model the relationship between outside options and the household division of labour. In the game, two players divide up a shared pool of leisure time. Each player has a strategy which represents what proportion of the available leisure time they want. If the sum of the two players' strategies are less than or equal to the total pool, they get exactly the proportion they want. For example, if each player asks for $\frac{1}{2}$, those are compatible demands. Similarly, if one player asks for $\frac{1}{3}$ while the other asks for $\frac{2}{3}$, those are also compatible. However, if the sum of the strategies is greater than total pool, then the household dissolves and players must pursue their outside option; so if both players ask for $\frac{2}{3}$ of the leisure time then players cannot settle on an acceptable division of labour.

We can assign utilities to these outcomes in two steps. First, for all compatible demands, we assume players prefer more leisure time to less and that their utility grows linearly with the amount of leisure time. Second, we can estimate the utility assigned to outside options using a procedure described below. We call this utility a disagreement point. Table 1 displays a simplified version of the game in which players are restricted to only three demands: low, medium, and high and the pool of leisure hours is 10. We'll use this table to provide intuition for the model in a simplified setting while introducing a more general formal description

	Player 2			
		Low	Medium	High

Player 1	Low	4,4	4,5	4,6
	Medium	5,4	5,5	d_1,d_2
	High	6,4	d_1,d_2	d_1,d_2

Table 1: Payoff matrix for the Nash bargaining problem showing payoffs for low, medium and high demands for leisure time by players. Cells along the counter-diagonal represent states of equilibria, and d_1 and d_2 represent disagreement point payoffs for player 1 and player 2, respectively.

Deliberation dynamics

For selecting the most attractive equilibrium, we use a dynamic approach, which explicitly models the learning or deliberative processes that lead agents to take certain actions (Samuelson, 1988; Skyrms, 1990), grounding the equilibria concepts in cognitive science (Binmore, 1989; Gintis, 2014). An exemplar of the dynamic approach is known as the Darwin dynamics, which we adopt in this project (Skyrms, 1990). Suppose that two agents play the bargaining game given in table 1 and are uncertain as to what they will do. We represent this by a uniform probability distribution over possible actions. Player one's distribution is the vector, $\vec{p} = \left[\frac{1}{3}, \frac{1}{3}, \frac{1}{3}\right]$. Player two's distribution is the vector, $\vec{q} = \left[\frac{1}{3}, \frac{1}{3}, \frac{1}{3}\right]$. Each player deliberates through the problem over a number of rounds to select a unique equilibrium. The deliberation happens in a number of steps.

First, player one calculates the expected utility of each one of their strategies. They consider each strategy available to player two and calculate the utility that would result from each pair of strategies. Then player one weighs each utility by the probability that player two takes the respective action. Let $eu_1(s_i)$ represent player one's expected utility of strategy i and let $u_1(s_i, s_j)$ represent the utility to player one, given a pair of strategies. The expected utility then is given by (1):

$$eu_1(s_i) = \sum_j^3 u_1(s_i, s_j)\, \vec{q}_j \qquad (1)$$

For example, suppose player 1 is calculating the expected utility of a medium demand and we assume $d_1 = 1$. That amounts to $5\frac{1}{3} + 5\frac{1}{3} + 1\frac{1}{3}$. Player two follows the same procedure to calculate the expected utilities of each of their own strategies.

Second, they calculate the probability distribution they should assign to each of their strategies on the next round of deliberation, by a process similar to Bayesian updating. The principle is that strategies that have higher expected utility should receive more weight in the next round of deliberation.

The probability player 1 assigns to strategy *i*, on the next round of deliberation is given by (2):

$$\vec{p}_i = \vec{p}_i \frac{eu_1(s_i)}{\sum_i^3 eu_1(s_i)p_i} \qquad (2)$$

The denominator represents the average expected utility of each of their strategies while the numerator represents the expected utility of the current strategy. If the ratio of the two is larger than one, the probability attached to a strategy grows from one round of deliberation to the next. In intuitive terms, players grow more confident in strategies that do better than average. For example, suppose player one is calculating the probability they should assign to strategy 2. The expected utility of this action was $\frac{11}{3}$. The average expected utility across all strategies is $\frac{31}{9}$. So in this case, player 1 should be more willing to choose strategy 5 in the next round of deliberation. Player two carries out the same deliberation, except that they are updating $\vec{q}$.

Third, the players both repeat steps one and two. On the next round of deliberation, players consider the updated probability distributions derived from round one. This process is repeated until the probability distributions concentrate all the weight on a single pair of strategies - the dynamic solution to the game. These dynamics exhibit several intuitive properties. When an individual has a low disagreement point (i.e., low utility assigned to their outside options), they will tend to favour low risk strategies like ‘demand 4’ early in the deliberation process. Players with high disagreement points can afford to take on more risk and their distribution will favour strategies like “demand 6”. These initial shifts in the

deliberation can become self-reinforcing. When you know the other player is likely to demand 6, your best strategy is to demand 4.

The full data analysis proceeds the same way as the simplified one presented above, except we allow players to have as many strategies as there are available leisure hours. One strategy asks for 1 hour, the next asks for 2 hours and so on.

Following this, the model makes a simple prediction for equilibrium selection: when an individual has a higher disagreement point relative to their partner, they will be able to enjoy a greater share of leisure time relative to their spouse, by virtue of their greater bargaining power.

Rationale and Limitations of the model

One key source of robustness for this model is that substantially different dynamics—from the deterministic Darwin dynamics model and the stochastic reinforcement learning models—make identical predictions (Börgers & Sarin, 1997). Both also predict equilibrium behaviour in laboratory experiments (Camerer, 2003, chapter 6; Crawford, 1995; Erev & Roth, 1998). We do not intend the mathematical deliberation dynamics to represent how people actually come to make their decision. The actual processes might look heterogeneous: some households might vigorously argue aloud, providing continuous information to one another about how they are making up their minds and why; others might silently and implicitly negotiate, leaving some chores clearly unfinished to prod the other partner into picking up their slack. From the right level of abstraction, these diverse practices are the same thing and the model is well motivated so long as humans perform as if they decide according to deliberation dynamics.

The model is limited due to its assumption that players start from a place of total uncertainty, and prior expectations—for example, from cultural gender norms—play no role. This assumption is necessary to let the outcome be driven by individual-level bargaining processes. , and not pre-existing beliefs. Another limitation arises from the assumption that people are behaving at equilibrium when observed. The data cannot tell us which stage of bargaining a couple is at, when observed. We assume households tend, on average, toward the equilibrium predicted and errors should be symmetrically distributed around the prediction.

Statistical estimation of disagreement points

Disagreement points are unobserved theoretical quantities, representing the utility of one's outside options. We construct a function which maps the social capital (sc) —our measure of outside options—of individual 1, in household *i,* onto the disagreement point.

$$d_{1,i} = budget_i(a + b * sc_{1,i}) \quad (3)$$

The ($a + b * sc_{1,i}$) term on the equation is multiplied by each household's total budget, to scale the disagreement point based on widely varying budgets across households. Social capital varies by individual, budget varies by household, and *a* and *b* are shared across households. We also interpret disagreement points in a way that makes them comparable with leisure hours. If a person is estimated to have a disagreement point of 2, then they should prefer leaving a relationship to staying in one that only provides 1 hour of leisure time. The assumption that utility scales linearly with leisure hours is questionable. Many well-studied utility scales exhibit diminishing marginal returns. However, to keep the model sufficiently simple and to reduce overfitting risk, we work with a linear utility on the assumption that this will provide a sufficiently good approximation of utility functions with more complex functional forms.

We estimate *a* and *b* from the data through a maximum likelihood estimation strategy. We use a grid search over plausible values of *a* and *b* to find the pair of values that maximises the likelihood of the data. This yields an estimate of the disagreement point for each household. Given that leisure hours come in integer valued increments and must be either zero or positive (based on our data measurements, which are available in one or four-hour increments), we assume the outcomes are binomially distributed around the predicted distribution of leisure hours (McElreath, 2020, Chapter 11). We use the observed budget as the *n* parameter in the binomial distribution and the proportion of the predicted leisure hours over the budget as the *p* parameter. The full statistical model can be summarised using the standard model notation.

$$male\ leisure\ hours \sim Binomial(n = budget_i,\ p = p_i) \quad (4)$$

$$p_i = deliberation\ dynamics(budget_i, d_{1,i}, d_{2,i}) \quad (5)$$

$$d_{1,i} = budget_i(a + b * sc_{1,i}) \quad (6)$$

$$d_{2,i} = budget_i(a + b * sc_{2,i}) \quad (7)$$

We conduct a series of small, computationally efficient grid searches to identify an appropriate grain for the search grid, as well as regions of the parameter space that likely contain the peak of the likelihood distribution.

In the BaYaka, we find that there are three households where one partner has both substantially greater social capital and a substantially greater number of leisure hours than the other partner. These households turn out to be highly influential which can lead to overfitting of the slope parameter. To test the robustness of the results, we also fit a model of overdispersion to the data, by replacing the binomial outcome distribution with a beta-binomial, which has a parameter, *d*, controlling the amount of dispersion. To estimate this overdispersion model, we first fixed the slope and intercept parameters at the maximum likelihood points found through the previous grid search. Second, we searched a grid of integers from 1 to 120 to find the *d* parameter that maximised fit to the data. We found d = 11, indicating substantial overdispersion. Third, we explored how the slope and intercept parameters change when using an overdispersed outcome distribution by rerunning the grid search described above. Thus, we find new maximum likelihood points and report the results.

For the Agta, we again first conducted preliminary searches of the parameter space to identify an appropriate region for applying a more precise grid search algorithm. We also checked for overdispersion with the same procedure described above and found little evidence that the data departs from a binomial distribution.

This generative model provides a direct evaluation of the theoretical model, reducing the risk of overfitting and data-dependent analysis practices (Gelman and Loken, 2013). Further, it improves the interpretability of our parameter estimates, which linear regressions cannot provide. Disagreement points are theoretical quantities and estimating the parameters connecting social capital (outside options) to disagreement points, is important for inferring the amount of leverage each partner has. We also test the reliability of our estimation procedure, by producing synthetic data assuming that the model is the true data-generating

process. Then we run maximum likelihood estimation on the synthetic data to see if we can reliably recover the sampled parameters (see SI section 3).

2.3.2. Statistical Model - Bayesian Multilevel Logistic Regression

Given the small size of the sample, we used a Bayesian multilevel logistic regression to estimate effects of confounding variables such as average age of couple, age difference (male-female) of couple, number of dependants (though dependants were not included as confounders in the Agta, as they have been shown to not impact leisure time in adults; Dyble et al., 2019) and camp effects, using weakly informative priors and validating the plausibility of the prior distribution with visual checks (refer SI section 2). The main predictor variable is the difference between male and female social capital z-scores. The effect of social capital was varied by camp. The response variable is the male's relative leisure time (male leisure hours/ (male + female leisure hours).

Since Bayesian methods don't have minimal sample size requirements (Gelman, 2006), the model can be fitted for the BaYaka, which has three camps, as well as the Agta, which has ten.

3. Results

We observe that males and females tend to divide leisure time almost equally, in both BaYaka and Agta households. In the BaYaka the average split of household leisure budget is 0.550 (s.d. = 0.146), and in the Agta, it is 0.487 (s.d. = 0.145), with 0 suggesting that the female has all the leisure time, and 1 suggesting all leisure for the male. We did not find a strong correlation between the social capital of males and females within a household. There is a small positive correlation (Pearson's r (21) = 0.314, p = 0.145) among BaYaka couples and no correlation (Pearson's r (54) = 0.036, p = 0.797) among Agta couples. In the BaYaka, males also tend to have higher social capital on average than females, with the average difference being 0.59 (s.d. = 1.146). The difference is nearly null in the Agta at -0.05 (s.d. = 0.145), suggesting that the average female might have slightly more social capital than the

average male. Further, I look at the association between partners' social capital and their relative leisure time to test the hypothesis.

3.1. Generative Model

The generative model provides a measure of disagreement points, as a linear function of social capital and then uses the disagreement points to predict how leisure time is divided in each household, depending on total leisure budgets. For estimating disagreement points, we explore the maximum likelihood values of *a* (intercept), which represents the baseline cost of dissolving a household, and slope *b,* which represents the increase in disagreement point corresponding with one z-score increase in social capital.

In the BaYaka (N household =23), the maximum likelihood values of *a* range from -0.0375 to 0.1500, and *b* ranges from 0.015 to 0.019 (refer to SI), suggesting a 1.5 - 1.9% increase in disagreement point, when the social capital z-score increases by 1. We select (*a* = -0.0375*, b* = 0.019) as values with best fit to the data, and plug them into the deliberation dynamics to predict the split of leisure time in each household. We compare these with observed splits in the households (Fig 1). On average, a 1 z-score increase in social capital, increases one's leisure time only by 1% of the household budget, suggesting a minimal effect of social capital on leisure distribution.

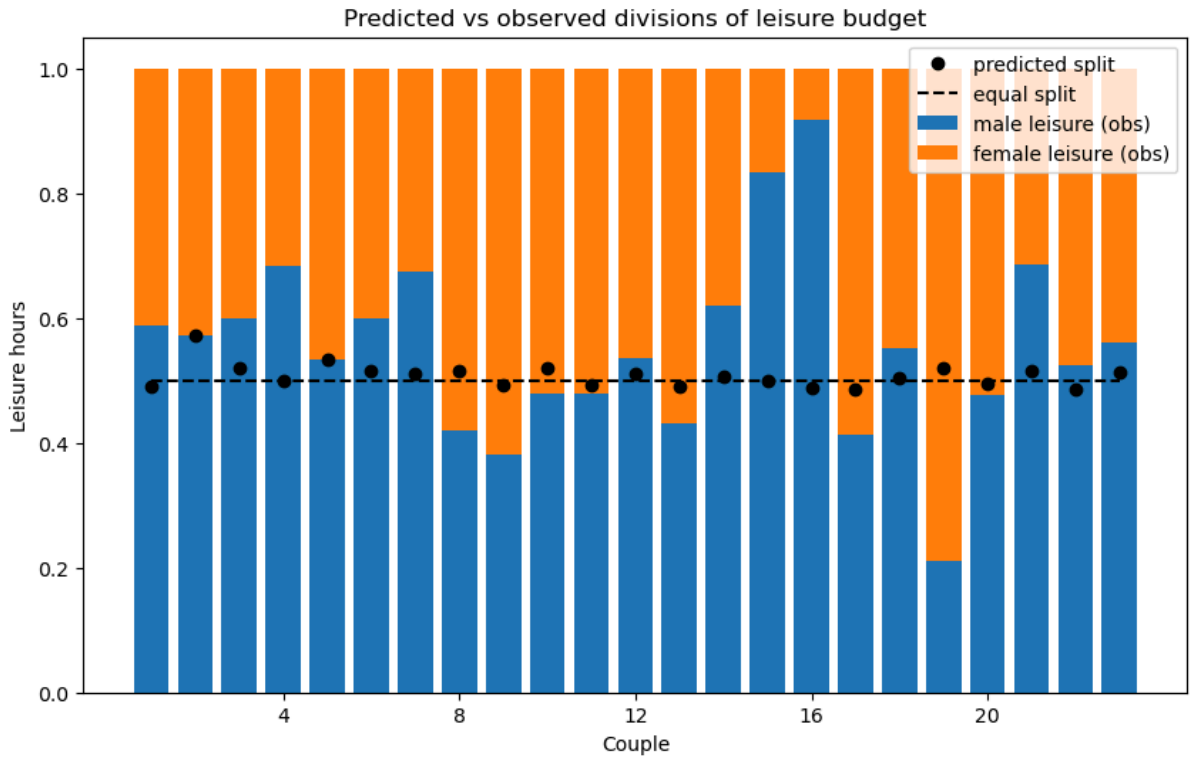

Fig 1: Stacked bar chart showing predicted split of household budget of leisure hours, the observed split, and additionally, the equal split, for each couple in the BaYaka.

In the Agta (N household = 55), we find intercept *a* ranging between -0.045 to -0.2, and slope *b* to be small and negative, with all points of highest likelihood below -0.0425 (refer to SI). This indicates that social capital slightly *disadvantages* people, such that when an individual's social capital increases by 1 z-score, their disagreement point *decreases* by 4.25%. We select the best fitting values (*a = -0.200, b = -0.05527*), and plug them into the deliberation dynamics to yield the leisure time split of each household (Fig 2). Similar to the BaYaka, the predictions suggest a nearly null effect of social capital on leisure time, with an average increase of 1 z-score social capital leading to 1.7% decrease in one's share of leisure time.

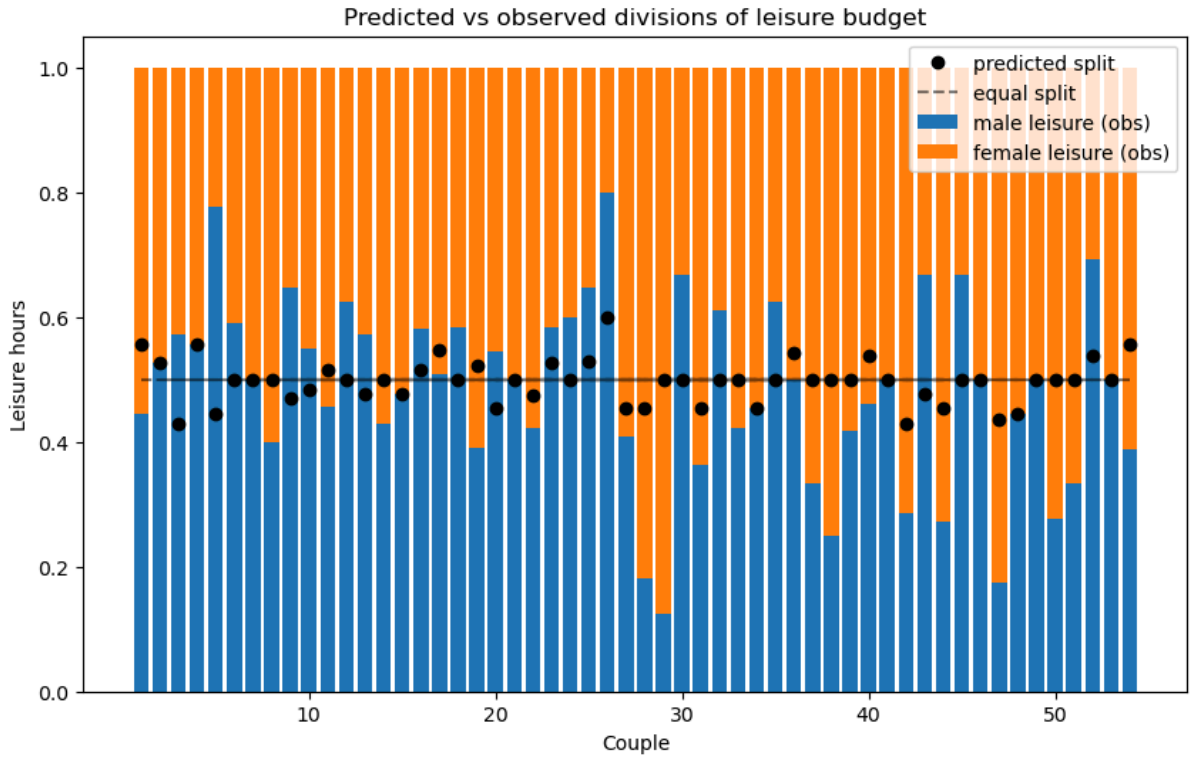

Fig 2: Stacked bar chart showing predicted split of household budget of leisure hours, the observed split, and the point for equal split of leisure hours, for each couple in the Agta

Overall, the generative model predictions align with our descriptive findings, both showing nearly equal division of leisure time across households. The generative model also shows that the effect of social capital on leisure time is non-linear i.e., not everyone gets the same boost in leisure time due to one additional z-score of social capital. It depends on how much their partner has and how much inequality there already is in the household. Inequality in leisure time generally exhibits diminishing returns; once the household is already very unequal, it takes a lot more shift in social capital to shift the leisure distribution. This is consistent with the following logistic regression model.

3.2. Bayesian Multilevel Logistic Regression

We fit a Bayesian multilevel logistic regression model on both datasets to understand the effects of within-household differences in social capital on the division of leisure time. We report the posterior distribution over all parameters of the model (Tables 2, 3) and the logistic outcome distribution plots (Fig 3 & 4) using random draws from the posterior distribution.

In the BaYaka, the estimates show that differences in social capital have an overall small positive effect on leisure hours, with high uncertainty. Camps 2 and 3 show effectively null mean effects, while we see a small positive effect in camp 1. Overall, we find no support for the predictions

	Mean	**SD**	**HDI_2.5 %**	**HDI_97.5 %**
Social capital effect	0.061	0.436	-0.776	0.925
Camp-level variation in social capital effect	0.133	0.153	0	0.405
Intercept	-0.432	0.229	-0.899	0
Camp 1 social capital	0.077	0.077	-0.046	0.234
Camp 2 social capital	-0.006	0.061	-0.137	0.121
Camp 3 social capital	-0.029	0.081	-0.217	0.123
Average age	0.016	0.007	0.002	0.029
Age difference	0.007	0.011	-0.015	0.029
Dependants	0.009	0.033	-0.057	0.073

Table 2: Posterior distribution values over modelled parameters for the BaYaka, including the mean, standard deviation and the high-density interval limits

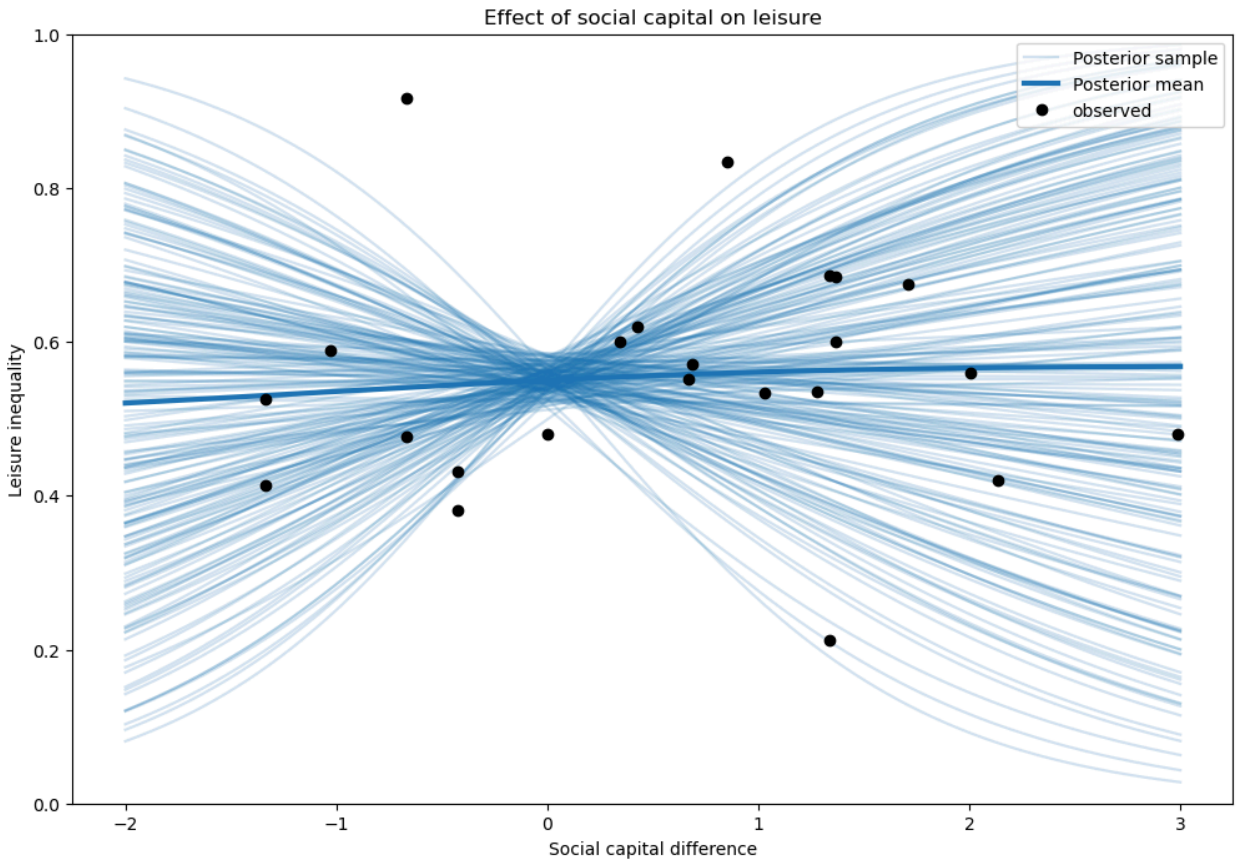

Fig 3: Outcome distribution plot over observed data from the BaYaka. Response variable (y) is male/ (male+female) leisure time, while the predictor variable (x) is the difference between the z-scores of partners' social capital (male-female). Transparent lines are 200 draws from the joint posterior distribution over all parameters. We averaged the values of the control variables to allow plotting in 2 dimensions.

In the Agta, we find a slightly negative relationship between social capital and distribution of leisure hours from budget, corresponding to the generative estimates, but again with high uncertainty. The plot shows high variability in the division of leisure time, with a small negative trend. As with the BaYaka, we do not find strong support for the predictions.

	Mean	**SD**	**HDI_2.5%**	**HDI_97.5%**
Social capital effect	-0.182	0.399	-0.96	0.602
Camp-level variation in social capital effect	0.131	0.086	0.000	0.287

Intercept	0.0	0.161	-0.322	0.306
Camp 1 social capital	0.012	0.085	-1.68	0.185
Camp 2 social capital	0.029	0.067	-0.095	0.168
Camp 3 social capital	0.007	0.114	-0.237	0.235
Camp 4 social capital	-0.099	0.139	-0.415	0.125
Camp 5 social capital	-0.043	0.135	-0.324	0.225
Camp 6 social capital	-0.188	0.150	-0.491	0.033
Camp 7 social capital	-0.001	0.124	-0.247	0.267
Camp 8 social capital	-0.061	0.081	-0.231	0.082
Camp 9 social capital	-0.019	0.164	-0.347	0.327
Camp 10 social capital	0.039	0.107	-0.161	0.27
Average age	0	0.003	-0.007	0.007
Age difference	-0.001	0.013	-0.026	0.023

Table 3: Posterior distribution values over modelled parameters for the Agta, including the mean, standard deviation and the high-density interval limits

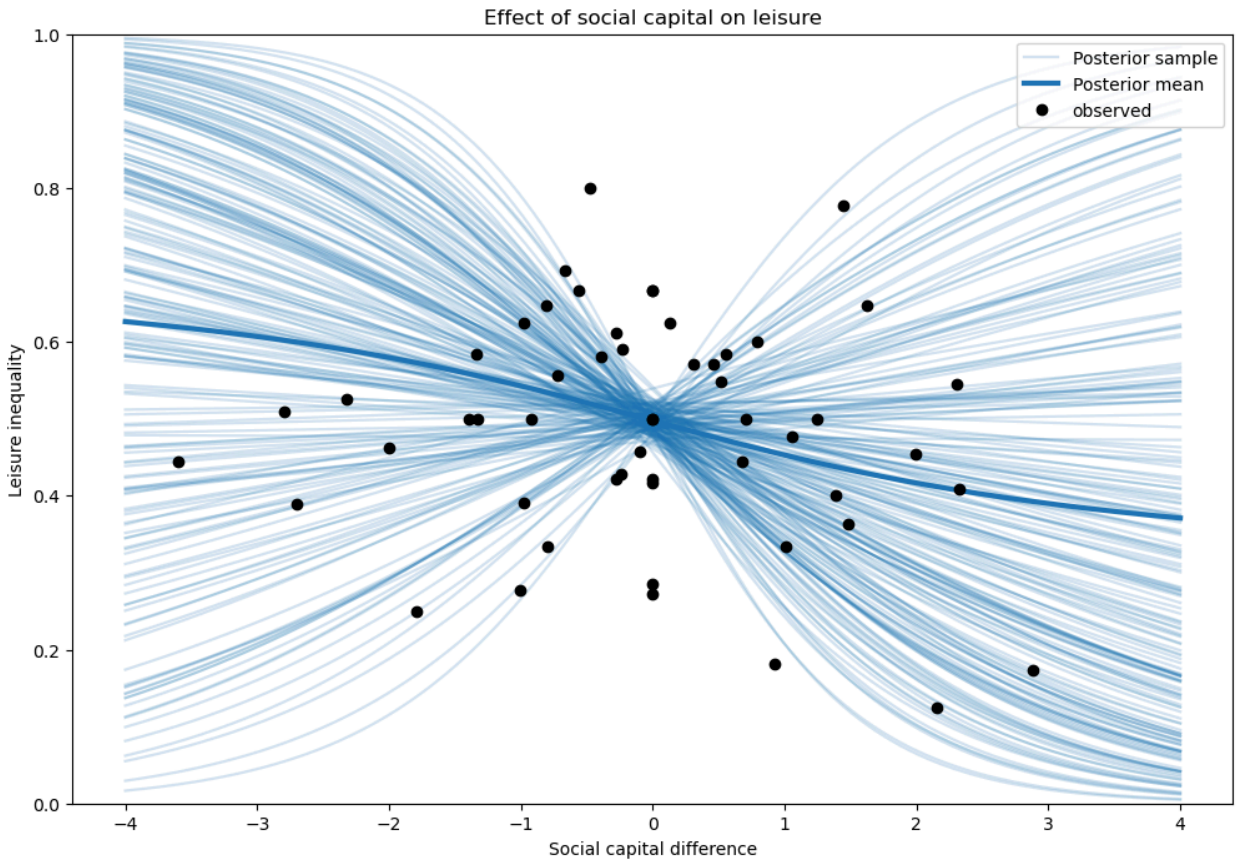

Fig 4: The response variable (y) is male/ (male+female) leisure time, while the predictor variable (x) is the difference between z-scores of partners' social capital (male-female). Transparent lines are 200 draws from the joint posterior distribution over all parameters. We averaged the values of the control variables to allow plotting in 2 dimensions.

The additional measures of social capital, i.e., real-world food transfers in the BaYaka and campmate network data in the Agta, generally corroborate the above-mentioned results. Both show a similar lack of relationship with distribution of leisure hours from budget, and a close correspondence with measures from the HSGG and the Sharing Game (Fig 4; Fig 5). Both these measures, capturing a slightly different aspect of social capital than the HSGG and the Sharing Game, provides more robustness to the general finding that social capital does not translate to relative bargaining power, which can be translated into higher share of leisure in one's household. Moreover, their correspondence with the primary measures allows to establish validity of the HSGG and the Sharing Game results.

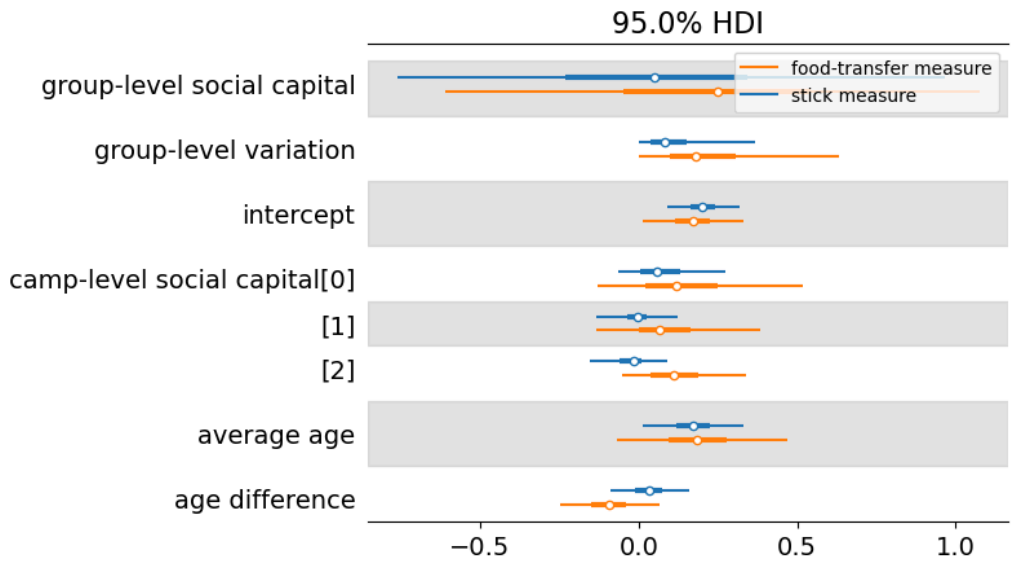

Fig 5: Forest plot for the BaYaka, showing correlation of real world food-transfer measures with division of leisure time from household budget. It overlaps with the primary measure of social capital, that is the honey-stick measure. Open circles represent the posterior mean, the thin line represents the 95% HDI and the thick line represents the central quartiles of the posterior

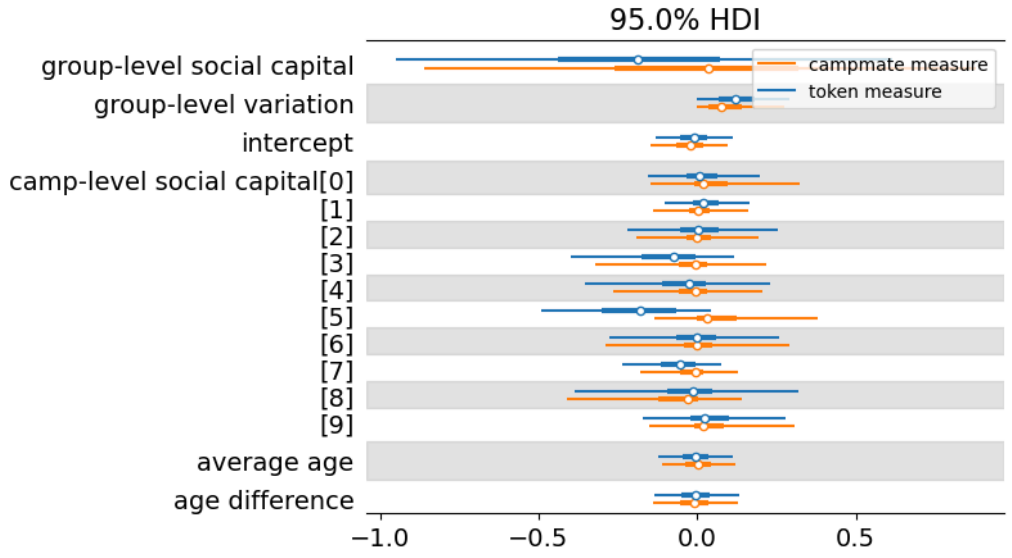

Fig 6: Forest plot for the Agta, showing correlation of campmate network measures with division of leisure time from household budget. It overlaps with the primary measure of social capital, that is rice tokens that each individual received. Open circles represent the posterior mean, the thin line represents the 95% HDI and the thick line represents the central quartiles of the posterior

4. Discussion

In both hunter-gatherer societies, the prediction that higher social capital gives bargaining power to individuals, who can then have a higher share of the household leisure budget, was not supported by the data. The BaYaka shows a weak positive association, while the Agta shows a weak negative association, although both carry great uncertainty around the slopes and are consistent with a null association. We further corroborated these findings by using different measures of social capital for both the populations. Though the generative and Bayesian multilevel logistic regression approaches model the data using different tools and use quantitatively distinct estimates, they align over the finding that social capital does not provide significant advantage in bargaining for leisure time in these immediate-return hunter-gatherer populations. In fact, we find that there is remarkable equality in how males and females divide leisure time across households in both populations. This demonstrates an important finding, diverging from evidence from agricultural (Strassman, 2017) and industrialised societies as was discussed in chapter 1 (Hochschild & Machung, 2012; Nakamura & Akiyoshi, 2015; Voicu et al., 2009; Lachance-Grzela and Bouchard, 2010), as well as patrilocal populations (Chen et al., 2023), where it is often the case that patriarchal norms are prevalent and gender inequalities thrive (Chen et al., 2023; Gupta & Stratton, 2008; Geist, 2005; Lennon & Rosenfield, 1994). Outside options have been seen to lead to inequalities within households in many large-scale societies (Shimray, 2004; Lennon & Rosenfield, 1994; Greenstein, 2000; Breen & Cooke, 2005); however the results of a null association between our measure of outside options and leisure time enjoyed, complimented by observed equal division of leisure in households, point to a potential role of some unique factors prevalent in these societies. We discuss the following considerations to explain the results: a) bargaining does not take place as individuals follow norms, specifically norms of sex-egalitarianism and patterns of gendered DoL; or individuals do follow a bargaining process to inform their choices, but instead of social capital, b1) cultural norms of sex-egalitarianism determine what payoffs they can get from the bargaining process; and b2) demand sharing and bilocality shape the quality of one's outside options and provide leverage; or c) the experimental measure of social capital itself might be inadequate for capturing outside options.

a. First, we consider that bargaining itself might be overridden by other factors such as normative prescriptions of behaviour and non-substitutability of subsistence labour. Our own fieldwork as well as other ethnographic studies have noted the fiercely

egalitarian nature of these societies, where both males and females enjoy autonomy over their own activities, both hold equal political power in camp and decision-making power within households (Woodburn, 2005; Lewis, 2017; refer to section 2.1.1 and 2.2.2). The ethos of gender-egalitarianism is prevalent in everyday activities (Woodburn, 1998; Lewis, 2017; Townsend, 2018). It is often demonstrated in the nature of dance and music rituals, where males and females assert and counter-assert power over each other, ensuring that neither gender becomes dominant (Bombjaková, 2018; Knight et al., 2021). Same-sex coalitions are common, providing social support even to individuals with limited social capital and preventing exploitation by partners. Individuals who try to assert authority over others face open ridicule and are actively suppressed (Lewis, 2003; Lewis, 2015). We expected that individual autonomy would provide negotiation space for males and females. Instead, such enforced and pervasive norms of egalitarianism can itself shape behaviour, and suppress active bargaining between individuals, in accordance with Henrich and colleagues' account of fairness as social norm-following (chapter 1). Additionally in many hunting-gathering populations, including the ones studied here, both males and females make vital contributions to the diet and often specialise (Gurven & Hill, 2009). Such specialisation and non-substitutability of labour can constrain bargaining as each partner would be required to do their own share, and cannot redistribute tasks, even if they have higher social capital and leverage.

b1. Second, we consider that gender-egalitarianism has an effect, not due to norm-following, but by shaping the payoffs individuals can expect to get from their social environments i.e., their outside options. For instance, in an egalitarian environment, if all individuals are expected to divide housework with their spouses in an equal manner, if hard work is seen as a virtue and those who try to exert authority over others or laze around are communally ridiculed, even individuals with higher social capital would have a preference for working hard and choosing equal division of labour. Within the scope of the generative model, this would mean including normative information in the form of priors, which will then shape the expected payoffs. Our bargaining model assumes that partners let their strategies be determined purely by their individual outside options; but if individuals come with prior cultural information about what options they could realistically have, this will modulate

bargaining dynamics. Expectations of DoL arising from cultural norms of egalitarianism provide exactly such prior information, a speculation that I go on to test experimentally in chapter 5 (Relational Concerns in Fairness Judgements). The model also assumes that players value more leisure time over less. But, if a society develops egalitarian social norms and players internalise those norms into their utility function, they may actively desire equal distributions of leisure. Amassing power over one's partner might be a source of shame or public sanction, which would generate a utility function inconsistent with the one used by the model.

b2. Other factors, such as bilocality and demand sharing, can also shape the outside options an individual has. Within the practice of bilocality, both males and females have decision-making power over the residence of a couple post-marriage, due to which both retain access to kin support in their adult lives (Dyble et al., 2015). This not only provides them social capital in the case of a failed marriage, but also precludes the emergence of strong lineage systems disadvantageous to either gender. Unlike large-scale societies (Borgerhoff Mulder, 2007), this can ensure that women are not suppressed living within a patrilineage. Many hunter-gatherer groups, including our study populations, also engage in a form of resource distribution called demand sharing, where individuals who need food or other resources can demand it from someone who has it and it is considered the possessor's duty to share (Lewis, 2017, Lewis et al, 2014; Smith et al., 2016; also refer to sections 2.1.1 & 2.1.2). This can provide individuals support outside of the household, removing the need to stick with an unfavourable distribution of labour. Individuals might share based on reciprocal relations or with kin, but need-based sharing dominates in resource transfers (Smith et al., 2019), leading to a low dependence on one's partner.

c. Finally, we consider the appropriateness of the measure of social capital, which differs from the conventional measures of outside options that consider economic resources of individuals, like employability, individual financial resources, control over production and relative resources (Alesina et al., 2013; Abraham et al., 2010; Fengdan et al., 2016; Diefenbach, 2002). Given the lack of material storage and resource accumulation in our study populations, social capital has been purported to

be one of the more important measures of wealth in these otherwise egalitarian and non-hierarchical societies (Borgerhoff Mulder et al., 2009). The experimental measure of social capital has been seen to be associated with food security (Chaudhary et al., 2016), access to more mates (Chaudhary et al., 2015), and is partially heritable (Chaudhary et al., 2016). Additionally, we find the experimental measures to corroborate closely with real world observational measures of social capital, such as food transfers in the BaYaka and preferences for living with a campmate and sharing resources in the Agta. Thus, we believe we are well-motivated in considering this experimental measure. However, we suggest future exploration of other measures, such as embodied wealth measures (see Borgerhoff Mulder et al., 2009), or domain-specific measures such as romantic partner desirability (Conroy-Beam et al., 2023), both of which cannot be tapped into by sharing tasks. We note that the study suffers from having a small sample size, which is a result of the small sizes of these camps of immediate-return hunter-gatherers. We address this by using Bayesian modelling which is robust to small samples.

Though we find no evidence for the primary prediction of social capital-mediated bargaining, the finding of equality in division of leisure time in households to be interesting, especially in the context of this thesis, which started out with inequalities in GDHL as its key case study. It is well-known that human social life in populations without agriculture can be significantly different (Draper, 1975). Large-scale agriculture and sedentarization that began in the Holocene (Richerson et al., 2001) brought about drastic changes in patterns of subsistence, corresponding division of labour, gender roles and customs (Draper, 1975; Kent, 1995). Agricultural societies have now been known to have significantly more material wealth and political inequalities than their hunter-gatherer counterparts (Borgerhoff Mulder et al., 2009; Walker & Bailey, 2014), and are generally a lot more patriarchal (Kent, 1995; Fandrych, 2012), though not necessarily (Singh & Glowacki, 2022). Such documented equality in hunter-gatherers not only provides insights into how males and females cooperate with one another in this distinct socio-ecological environment, but also highlights social norms and practices which can avoid the emergence of inequalities. Minimal models are replete in the game theoretic literature, which aim to find elegant solutions to the problem of human cooperation. O'Connor, for instance, argues that extremely minimal conditions - a need for coordination, and social categories providing salient cues for this coordination - are sufficient

for generating systematic inequality (O'Connor, 2019). A problem with this approach is that such minimal assumptions are in fact, not really minimal - they assume a lot about what is *not happening*. Posing minimal models side-by-side with complex descriptions can be methodologically valuable, and further question the supposed 'universality' of these models.

Households are the basic unit of human social life and how pairbonds come to cooperate with each other, reflects not only individual household dynamics but gender relations within the population. In this study, we explored the socio-cognitive process of bargaining as the mechanism shaping this DoL. Next, I go on to explore the role of social norms and conventions in chapters 4 and 5. I suggest that social prescriptions of gender can affect individual bargaining dynamics, shape the balance between cooperative and competitive interests of pair bonds, and ultimately give rise to cross-cultural differences in gendered divisions of household labour. To explore what these social prescriptions of gender really are in HG societies, and what gender-egalitarianism looks like in daily life, I add an interlude below. The interlude is a literature-based exploration of gender-egalitarianism across multiple hunter-gatherer societies, including the Mbendjele BaYaka and the Agta.

5. An Interlude: Gender-Egalitarianism in hunter-gatherer societies

The position of women in any society poses an important concern in understanding human social structures.[5] Immediate-return hunter-gatherer societies are unique in this aspect, as men and women tend to enjoy similar authority, status, and control over their own movement and production. Egalitarianism can generally be understood as the absence of stratification, hierarchies, coercion, domination, and privilege of one individual – or group – over another. When this state of social organisation is applied to understanding relations between the genders (here, we only focus on two genders, male and female, based on the biological distinction of sexes), it is defined as gender egalitarianism. A lack of hierarchical structures should not be confused for a lack of differences between the genders. In most of these societies, men and women are understood to be essentially different – often complementary

[5] This text is published In: Shackelford, T.K. (eds) Encyclopedia of Sexual Psychology and Behavior. Springer, Cham. https://doi.org/10.1007/978-3-031-08956-5_2482-1

in their abilities – and while the differences are cultivated and celebrated, they are valued equally. Gender egalitarianism, therefore, does not preclude biological differences and complementarity in gender roles but instead allows for the fact that men and women, while being different could still be equal (O'Connor, 2019; Leacock, 1998). Here, I specifically focus on social relations between genders, but as Leacock astutely points out, "the analysis of women's status in egalitarian society is inseparable from the analysis of egalitarian social-economic structure as a whole" (Leacock, 1998), and thus, general instances of egalitarianism are referred throughout. I deal with gender relations in immediate-return hunter-gatherers, which is only one type, among a diversity of foraging societies (Singh & Glowacki, 2022). Across the globe, such societies are known to be highly egalitarian people, such that there is individual autonomy, no assertion of one's decisions on others, and those who try to assert their wishes or views on others are mercilessly teased, fought, avoided, and if they persist, even exiled (Lewis, 2017). These groups are increasingly rare but form an important part of anthropological study, not just as important approximations of our evolutionary past where humans lived without agriculture (Marlowe, 2005) but also as key instances of cross-cultural and subsistence diversity.

Some assert that there has always been a divide between the genders, due to a division of labour between male hunting and female mothering (Washburn & Lancaster, 2017). However, others suggest that male domination arose out of a class-based society brought about by European colonisation in previously gender-egalitarian populations (Leacock et al., 1978). Still further back – in the nineteenth and early twentieth centuries – a different understanding was prevalent: Hunters, using Palaeolithic tools which required muscular effort and exerting force at a distance, were equated with patriarchy, whereas horticulturalists were said to be under female dominance, flourishing in an age of neolithic pottery, ornate jars, and containers (e.g., Lee, 1978; Morgan, 1877). Engels, back in 1891, suggested that gender inequalities were a consequence of privatisation of property and the emergence of sedentary lifestyles (Engels, 1942). Along this line of argument, the current market-integration and sedentarization of many hunter-gatherer societies has been said to reduce gender egalitarianism in groups such as the !Kung bushmen (Draper, 1996; for a notable comparison of sedentary and mobile !Kung bushmen, see Draper, 1975) and Agta (Dyble et al., 2019). Changes in economic activities and sedentarization have, in this context, been said to bring about strong gender-segregation and gender-asymmetric customs. The distinction between subsistence practices, such as in immediate- and

delayed-return hunter-gatherers by Woodburn was, in part, formulated to understand this observation of economic practices paving a path for specific social structures. Woodburn (1998, 2005) suggested that immediate-return foragers, who consume whatever they hunt and gather immediately, without processing or storage, are seen to assertively maintain norms of egalitarianism, where all individuals have direct access to resources and no dependencies are created. These societies maintain free circulation of goods to prevent accumulation of power, either by an individual or by a gender group (Woodburn, 2005). Overall, what precedes and precipitates gender inequality and what socioeconomic backgrounds are conducive for establishing egalitarian relations among men and women continue to remain hotly debated.

I focus on existing practices in some societies which have been characterised as gender egalitarian. Examples of the Mbendjele from Congo, the Agta from Philippines, the !Kung and San bushmen of Botswana, the Kutse, and the Batek are discussed frequently. However, these are only few among the range of immediate-return hunter-gatherer societies existing today. Others include Pygmy groups in Central Africa, like the Mbuti, Baka, and Efe; the Hadza in Tanzania; some San groups in the countries of Namibia and Botswana; various groups in India such as the Jarawa and Ongee Andaman Islanders, Hill Pandaram, and Nayaka; and the Maniq and Penan, among others in southeast Asia (Lewis, 2017). The aim here is to discuss anthropological findings that document various aspects of egalitarian relations between males and females, along with brief discussion of the established causes as well as consequences of such a lack of hierarchy. In turn, I expect to provide a detailed understanding of egalitarianism, within the household and without, which can contextualise the empirical findings discussed in the chapter. I begin by discussing the role of subsistence activities as one of the main drivers of egalitarian gender relations, followed by gender relations in different areas of social life such as marriage practices, postmarital locality, and child rearing, then moving over to a discussion on their political and social lives. Finally, I touch upon how gender relations changed with the advent of agriculture, what egalitarianism might mean in urban, industrialised societies, and why it is crucial to study hunter-gatherer groups as an important demonstration of the evolution of human social life.

5.1. Role in Subsistence

A role in subsistence activities can have a direct impact on one's status in society, as Engels famously posited in *The Origin of the Family, Private Property and the State*. Inequality and status differences in populations have indeed been linked with the spatiotemporal distribution of resources, with individuals or groups controlling access to food resources or means of production wielding more power (Smith & Codding, 2021; Alesina et al., 2013). In immediate-return hunting and gathering populations, there is often specialisation of subsistence tasks by gender, and both men and women are involved in gathering resources for the family and group. In most cases, men are involved in large game hunting, honey-collection as well as fishing activities, whereas women are responsible for gathering fruits, nuts, yams, trapping small game, and some fishing activities (but, see following sections for women hunting in the Agta). It is from this general description of labour division that the phrase "man the hunter, woman the gatherer" was coined (Sterling, 2014), which has been a cornerstone of anthropological and human evolutionary studies. A division of labour can bring about efficiency in production and economic activities, as it allows individuals to specialise and develop advanced skills in one set of tasks, which would not be possible otherwise (O'Connor, 2019). However, in hunter-gatherer societies, no specific activity—or the produce from any activity—is considered more important than the other, neither are any tasks limited to one gender on ideological grounds. This allows for equal valuation of all individuals and can lay down the foundations for egalitarian relations.

There is a general recognition that a diversity of foods is required for a healthy diet, to which each group contributes their share (Kent, 1995). Tasks are interchangeably performed by males and females (Noss & Hewlett, 2001), if need arises or if the opportunity presents itself. For instance, in Kutse, a group of sedentary hunter-gatherers in the Kalahari Desert of Botswana, trapping and bow and arrow hunting are male-dominated, while gathering is predominantly female-dominated. However, every now and then females can be seen performing the hunting ritual to encourage animals in the traps, or themselves trapping birds and small animals, just as the men can be seen routinely gathering wild plants. Women often butcher small animals like hare or even springbok by themselves and assist men in butchering large game. Neither men nor women face any normative or ideological barriers, where activities like hunting might be restricted to males or considered a superior activity in any sense (as opposed to the "primacy of the male breadwinner" ideology, prevalent in many urban and industrialised societies; Guo & Gilbert, 2012). Gendered division of labour

is simply a matter of specialisation instead of hierarchy and as Kent notes, "the concept of man the hunter and woman the gatherer has […] a very fuzzy boundary at Kutse" (Kent, 1993).

Anthropologist Jerome Lewis notes a similar trend in the Mbendjele BaYaka, who live in the rainforests of Congo. Labour is indeed marked and divided by gender, but roles are not rigorously defined such that a man cannot do a woman's work and vice versa (Lewis, 2017). Mbendjele men and women are essentially, economically independent. Both have direct and unrestricted access to food and other resources from the forest, and neither gender can control the other's labour nor the yield of the other's labour. This can be seen as the scaffolding for political autonomy and power and a rather important shaping factor for gender relations in a society (Lewis, 2002; Woodburn, 1998). Similar is the case in the Batek hunter-gatherers who live in peninsular Malaysia, where in spite of a division of labour, adults of either gender can readily obtain enough food to feed themselves. Another advantage of women being an important part of subsistence is that they carry out these activities in cooperative groups. Kraft et al. (2023) suggest that cooperative food gathering leads to stronger female alliances—within kin as well as nonkin—which can then maintain female authority, as a check to male dominance. Stymied participation in subsistence is not only a barrier in access to resources, but also to valuable social interactions (Kraft et al., 2023). Assertion and counterassertion of power is a key feature of the BaYaka as well, who have famously been called *assertively egalitarian,* as a result (Lewis, 2016; Townsend, 2018). In the Batek, this dynamic of checks and balances is suggested to be an important cause for the virtual absence of male aggression (Endicott & Endicott, 2008). In fact, a direct comparison of the Batek with the neighbouring Tsimane horticulturalists show that fewer cooperative networks among women, borne out of kin-dependence in subsistence activities, are accompanied by higher rates of intimate partner violence (Kraft et al., 2023).

The interchangeability and low ideological barriers in hunting-gathering activities are most strongly demonstrated by the Agta from northeastern Luzon in the Philippines. Nothing quite breaks the "man the hunter" stereotype as female hunting. Agta women in the Luzon and Cagayan provinces have been famed to regularly hunt game animals like wild pig and deer, fish alongside men in the numerous rivers, and barter with lowland Filipinos for goods and services (Estioko-Griffin & Griffin, 1981). As a result, both young girls and boys learn how to hunt, and women are not considered substantially different in their hunting capacities than men, though women might hunt in groups more often than men (Estioko-Griffin &

Griffin, 1981). Busting the myth of hunting interfering with childbearing and rearing, the hunting women of Agta are seen to retain their fertility just like non hunting women, even while the former keep hunting during menstruation as well as nursing periods, often carrying nursing infants on hunting trips. Other groups, such as the Aka foragers ("pygmies") of Central African Republic, also show high incidence of female hunting—especially cooperative forms, such as net-hunting—sometimes more frequently than men (Noss & Hewlett, 2001). Indeed, the "man the hunter" formulation has now successfully been challenged by other anthropologists (Hannagan, 2008; Estioko-Griffin & Griffin, 1981).

The importance of subsistence in buttressing gender roles is strongly demonstrated by some hunter-gatherer populations who have settled down, begun trading with neighbouring towns and villages, accumulating material possessions and relying on sources of nutrition outside of their hunted and gathered food. These changes have been accompanied by shifts in gendered division of labour and led to hierarchical relations between men and women. Draper, who has been studying the !Kung foragers of Western Kalahari of Botswana over 20 years, has noted that sedentarization of some of these groups were associated with a rise in gender inequalities (Draper, 1975, 1997; Kolata, 1974). These sedentary groups engage in stock-raising, gardening, and working for Bantu neighbours, all tasks showing strong gender segregation, and lesser mixing of men and women—even deference of women to men—in everyday settings. Kent (1995) appeals to the interconnected nature of acculturation, such that when a community adopts economic activities from another group, cultural values—those that directly enable the economic activities, but also others—are adopted too. In the case of many Kalahari tribes, adoption of activities from Bantu and other European neighbours has therefore been posited to increase gender segregation and inequalities. Though there is definitely some criticisms against a purely economic basis of gender egalitarian relations, these groups are an example that when males and females are considered equally important contributors of the group's subsistence, it is a major factor for inculcating nonhierarchical relations.

5.2. Practices Around Marriage and Child Rearing

Where gender inequalities thrive—most often, males being dominant over females, in patriarchal societies—there are patterns of marital processes, postmarital residence patterns, and childcare practices, where one group tends to suffer from low decision-making power and authority. In egalitarian immediate-return hunter-gatherers however, both men and women enjoy high autonomy and equal decision-making power in these domains of adult life.

A remarkable feature of hunter-gatherer groups has been said to be bilocality (Dyble et al., 2015) or bisexual philopatry (Hill et al., 2011). Both describe the phenomenon where men and women enjoy equal decision-making power in the choice of postmarital residence. Dyble and colleagues document this extensively in the Agta from the Philippines and the BaYaka from Congo, where both the men and women have equal say in the residence of a couple after marriage. They model that even if every individual selectively chooses to live with kin, camp composition at the group-level becomes unbiased toward any one gender due to such equal decision-making power (Dyble et al., 2015; Minter, 2010). And indeed, low genetic relatedness is a widely observed phenomenon across hunter-gatherers in other parts of the world, such as the Amazonia (Walker et al., 2013; Walker, 2014). Bilocality is the norm among mobile hunter-gatherers, unlike agro-pastoralists, who tend to be patrilocal (Dyble et al., 2015) or even chimpanzees and bonobos who display hierarchical male philopatry. The !Kung bushmen show similar bilateral residence arrangements, where either gender has the free choice to disperse or live close to their natal group. As a result, adult brothers and sisters are often seen to coreside. Women are rarely, if ever, in the position of living away from their own kin. This further has the effect of lowering domestic violence, as a woman cannot be mistreated by her husband, nor be controlled or intimidated by their husbands' kin, because her own relatives are typically close by (Draper, 1997; Hill et al., 2011). There are no gender biases in the residence of parents either, who can end up living with adult sons and daughters alike (Hill et al., 2011). A consequence of such bilocal postmarital residence is that kin relations are traced through both, mothers and fathers, unlike in non foragers and more sedentary groups, where patrilineage is a lot more common (Marlowe, 2004). Yet another instance of this phenomenon is the Batek, where conjugal families are seen as independent and autonomous units. The husband and wife make decisions jointly, regarding the family's movements, and neither partner has greater authority than the other, over such decisions (Endicott, 1988).

In cohabiting partnerships between men and women (whether through marriage rituals or not), an important source of autonomy for both partners is an individual's ability to leave the marriage/ household. In the BaYaka of Congo, for instance, households are predominantly nuclear and easily dissolvable, with new huts being set up very quickly, facilitating high mobility. In fact, about one in four marriages end in divorce in some BaYaka populations and most of them are initiated by women (Hewlett, 1993; Lewis, 2017). Thus, women have considerable partner choice, freedom of movement within and between camps, and can survive even if they remain single. Lewis points out that, "men cannot control the destination of women in marriage since they cannot oblige a woman to marry anyone against her wishes, and a woman wishing to divorce a man simply leaves him without any requirement to justify herself" (Lewis, 2017). Similar is the case in the Agta foragers of Philippines, where divorce can be initiated by both men and women, who face no social taboos (Estioko-Griffin & Griffin, 1981). However, the Agta are serially monogamous (Minter, 2010; Headland, 1987) and divorce becomes exceedingly rare once a child is born. Both adult men and women have autonomous sexual lives, and notions of complementarity of the genders are widespread. In the BaYaka, for instance, conception is usually seen as a team effort by both husband and wife, where the couple jointly maintains the development of the foetus by constant intercourse throughout the pregnancy. Agta women voluntarily space their children by various herbal concoctions and can autonomously decide when to have the next child (Estioko-Griffin & Griffin, 1981). Both boys and girls in the Agta can have sex with similar ease, with no normative discrimination against any one gender. Men and women have autonomy in choosing partners, and young individuals are seen to engage in "trial marriages" to test compatibility and partnership values before committing to marry (Estioko-Griffin & Griffin, 1981; Minter, 2010). Agta men also pay bride service (*magservi*) for the wife-to-be's family by helping out in various domains, including the domestic (Smith, 2017). Other sexual acts, such as rape—most commonly seen as an act of domination of one individual over another (Goetz et al., 2008)—are extremely rare in hunter-gatherers, as documented among the !Kung (Draper), Agta (Estioko-Griffin & Griffin, 1981) and Kutse (Kent, 1995).

Childrearing and providing extended periods of care to infants has been suggested to be an important factor that can remove women from subsistence and economic activities in adult life (Sanday, 1981; Kramer, 2010). Because human infants need to be weaned for a long period of time, women are said to be constrained to stay at home after birth, facing a steady

relegation into the domestic sphere of life. This in turn can be seen as a precursor to lowering female authority in political and economic matters. However, in many immediate-return hunting-gathering societies, the presence of allomothers and established practices of alloparenting can alleviate the burden on new mothers, who then have more freedom of movement and can spend more time in subsistence activities (Bove et al., 2002; Mitani & Watts, 1997). In fact, allomothering has been said to be a key foundation for distinguishing humans in their ability to cooperate (Burkart et al., 2014). For instance, Kutse grandmothers are seen to carry their daughter's infant or toddler around for hours, and grandfathers along with grandmothers often look after their daughter's or daughter-in-law's children when they are out of camp. In fact, this forms a common engagement of all old people across camps who no longer can partake in hunting, trapping, or gathering (Kent, 1995). Another example is the Efe from the Ituri rainforests of Congo, where allocare encompasses a wider range of individuals than just grandparents and relatives, and a single infant can come to be cared for by as many as 24 adults. The number of caregivers in these groups have been seen to be positively correlated with the time mothers get to spend away from camp acquiring food, essentially removing the dual demand of childcare (Ivey, 2000). Similar trends have been noted in the BaYaka, as well as the Aka—another subgroup of BaYaka from Congo—where allocare spans all age groups and relationship categories and forms a crucial part of their social lives (Meehan et al., 2013; Chaudhary, 2017). Fathers among the Aka, in fact, have been said to provide more direct childcare than fathers in any other recorded culture (Hewlett, 1993). Such involvement of both genders in childcare forms the scaffolding for egalitarian relations, as it frees up mothers for other subsistence activities (Noss & Hewlett, 2001). Allocare is also a key observation in the Agta (Page et al., 2019). The J/hoansi have non parental supervision at camp when mothers go for food collection, but mothers often also carry infants and toddlers along on foraging trips (Kent, 1995).

5.3. Political Power and Social Life

This section discusses instances of authority (Woodburn, 1998), how it is distributed and regulated; the locus of group-level decision-making and the power to direct others' actions (Boehm & Boehm, 2009); and the adoption and enforcement of normative forms of behaviour, as matters considered political. A simple description of power, as taken from Boehm and Boehm's seminal book, is a dominant's ability to intimidate, take away

something from someone, or direct others' actions, in which the locus of power can be both, individuals or groups (Boehm & Boehm, 2009). In immediate-return hunter-gatherers, women and men are understood—even celebrated (Lewis, 2017)---as being different, and their ethos of egalitarianism is practised in providing everybody equal status. Most commonly, women predominate in some spheres of behaviour, and men in others, creating an overall relation of give and take (Lee, 1978). Strong norms of sharing, assertion, and counterassertion make egalitarianism not just a passive state but also an active process that is *made* to happen (Boehm, 1997; Woodburn, 1998).

A great instance is that of the Mbendjele BaYaka, where men and women operate on systems of dominance and counter dominance in social life. Men hold the few titles of *kombeti* (elder spokesperson), *tuma* (skilled elephant-hunter), and *nganga* (healer), but these carry no authority. Women challenge any attempts of male dominance, exercising great influence over decision-making (Lewis, 2013; Bombjaková, 2018). Elder Mbendjele women participate in an institutionalised process of shaming called *moadjo,* to ridicule stupid, arrogant, or otherwise unacceptable behaviours of individuals, in front of the camp. Though the perpetrator is never named, this practice helps in communally mapping out the moral high ground, discouraging other individuals from future acts of arrogance (Lewis, 2017). Specialist roles, such as *konja mokondi* (spirit guardian), *kombo* (song composer), and *lipwete* (speaker), are assigned to both men and women. Crucially, they do not provide any privilege or special treatment to the holders (Lewis, 2017). Same-gender coalitions in the BaYaka are strong, and the collective strength is often demonstrated by playfully taunting and mocking the other group, in rituals and music performances (Lewis, 2013). Extensive studies by anthropologists thus converge on the general observation that the combined power of each gender neutralises that of the other, making these groups "assertively egalitarian" (Woodburn, 2005). Though the idea of dominance is often attributed to men due to their biological capacity for physical aggression (Hannagan, 2008), in immediate-return hunter-gatherers, group-solidarity of women—often derived from subsistence activities of gathering, fishing, and collecting in groups—is said to keep such dominance in check. At times, they even reverse the hierarchy: "I have witnessed women joining together to beat a man with large sticks in order to prevent him from beating another woman" (Lewis, 2002; p112). In such ways, immediate-return hunter-gatherers are proof that humans have the cognitive ability to form group-wide coalitions which can prevent individual-level dominant/self-aggrandizing behaviour from arising, by asserting the power of the group

(Boehm et al., 1993; Cashdan, 1980). The pyramid of dominance – where individuals dominate the collective – is, thus, effectively turned upside down (Boehm, 1997; Gavrilets et al., 2008).

A lack of property and material wealth accumulation has been posited to allow for such reverse dominance hierarchies to exist. Goods circulate between individuals, in a practice called demand sharing (Lewis et al., 2014), such that nobody then has to depend on any specific other for their needs, and no individual can assert authority by controlling resources (Woodburn, 1998, 2005). In the !Kung bushmen, the political and social core of groups are formed by both men and women, where the primary focus remains in maintaining adaptability to changing ecological circumstances, rather than maintaining exclusive rights to land. Though Lee is able to give certain examples of hierarchy, where some people with great oratory or mediatory skills are vested with specific functions, or where belonging to a long line of such individuals or marrying the daughter of a leader can provide some sort of leadership status, the !Kung people explicitly deny the existence of such roles, when asked (Lee, 1978). The lack of property and land ownership allows the !Kung to avoid development of hierarchical power positions between the genders. This is made most salient by direct comparison with some recently sedentary !Kung groups (previously foragers), who then begin to show strong gender segregation. This is studied by Draper, who notes that, "with greater property accumulation comes greater male control over property, particularly the more prestigious forms of property[6] such as livestock and cash. The work of women is increasingly domestic and confined to the village locale" (Draper, 1997).

The Agta are yet another instance of politically egalitarian hunter-gatherers, where all adults are afforded equal standing without stratification or hereditary positions (Dyble et al., 2015; Griffin, 2000). Autonomy in decision-making is central to their lives, and even children have the freedom of movement independent of their parents' wishes. Some more experienced and influential members sometimes ensue the role of advice-providers or conflict-mediators (Headland, 1987; Griffin, 1996; Minter, 2010), but none in formal positions of authority. However, just like the !Kung, some Agta foragers who are now

[6] I importantly note that it is institutions, generally, that play a major role in the cultural evolution of societies: instead of being simply egalitarian vs hierarchical, individualistic vs collectivistic, I recognize that there's a process of cultural evolution which comes about by the development of various social institutions, of which property is an important one. Here I focus on property, but the argument can be extended to other institutions such as lineage systems or notions of ownership, etc.

largely settled and engaged in wage labour and agriculture (Dyble et al., 2019) do show emergence of hierarchical political systems. They lack a strong ethos of egalitarianism and demonstrate effects of sedentarization, material wealth accumulation, and market integration (Page et al., 2023). Other immediate-return hunter-gatherer groups such as the Batek and the San continue to demonstrate egalitarian relations between the genders in their political and social lives. In the Batek, as noted by Endicott (1988), both older men or women can be termed natural leaders, based on others' reverence for their intelligence, experience, and good judgement; meanwhile in the San, all participate in processes of group decision-making and planning, lacking a clear locus of authority (Lee, 1978). Across these groups, women are seen as primary reinforcers of social norms which restore group cooperation and peace. Though they never are the "deviants" themselves, they are important participants in curbing and condemning deviant behaviour (Hannagan, 2008; Lewis, 2017), making them important political and social actors. In matters political, the participation of men has received such high attention that specifically focusing on women's role in decision-making and normative enforcement is required to arrive at a balanced view (Hannagan, 2008). Immediate-return hunter-gatherer societies are able to provide such instances, where females not only are autonomous and have decision-making power over their own lives but also play an important role, along with men, in regulation of the group's social life.

5.4. Gender Relations Outside a Hunting-Gathering Way of Life

To understand the uniqueness of these small-scale hunting-gathering societies and their ethnographic records, we need only look at those who live a non-hunting and gathering lifestyle. Large-scale agriculture and sedentarization that began in the Holocene (Richerson et al., 2001) brought about drastic changes in patterns of subsistence, corresponding division of labour (Kaplan et al., 2000), gender roles, and customs. Agricultural societies have now been known to have significantly more material wealth and political inequalities than their hunter-gatherer counterparts (Borgerhoff Mulder et al., 2009; Walker, 2014) and are generally a lot more patriarchal (Kent, 1995; Fandrych, 2012; Gibson & Sear, 2010). They practise virilocality, wherein after marriage the woman moves to the man's side of the family and has to create new social networks, and patriliny, where economic wealth – the crucial determinant of fitness in these groups (Borgerhoff Mulder et al., 2009) – gets transmitted via the male lineage. This is seen in groups such as the Arsi Oromo of Ethiopia

and Kipsigis of Kenya, among others (Gibson & Sear, 2010; Sørensen, 1992). Fertility in these societies is often high (Bentley et al., 1993), but women's contribution to subsistence significantly decreases with intensification of agriculture (Burton & White, 1984). Technological innovations such as the plough (Alesina et al., 2013; Boserup et al., 2013) and the use of cattle in farming (Burton & White, 1984) have been posited to be some of the reasons for this decrease. As a consequence, there is a general relegation of women to the domestic sphere of life, taking care of household and child-rearing activities, exercising lesser control over economic resources (Sørensen, 1992), and the emergence of inflexible gender roles. The status and autonomy of women in agricultural societies, therefore, is quite distinct from those of egalitarian immediate-return hunter-gatherers where both men and women bring in their own share of a balanced diet, and routinely take over each other's subsistence tasks.

Horticulturalists, who practise small-scale and low intensity farming, are more alike agricultural societies than hunter-gatherers; they have a more sedentary lifestyle, have larger settlements with high genetic relatedness, and practise greater political inequality (Walker, 2014; Walker & Bailey, 2014). However, they have lesser wealth storage like hunter-gatherers (Walker, 2015) and unlike patrilocal agriculturalists, they practise uxorilocality—where women tend to live with more kin—leading to distinct relations between men and women (Walker et al., 2013).

Within most large-scale, industrialised societies, gender inequalities have again marked many domains of social life. However, extensive sociological surveys now show that forms of gender equality might be on the rise in some modern industrialised and post-industrialized societies. The best studied cases are those of the United States of America (Bolzendahl & Myers, 2004), but even more so, in some Nordic countries such as Finland, Denmark, Sweden, and Norway (Guo & Gilbert, 2012; Roder & Muhlau, 2014). As has been the noted pattern in hunter-gatherers, in post-industrialized societies one's involvement in subsistence activities again plays a major role in driving sociocultural changes. A major focus of feminist movements has in fact been in challenging the primacy of the male breadwinner role. Other factors, such as a country's welfare regime (Guo & Gilbert, 2012), dominant religious ideologies (Treas & Widmer, 2000), and educational reach (Roder & Muhlau, 2014), also play a major role in bringing about changes in gender relations. The measures used in studying gender relations in these countries decidedly vary from those used in hunter-gatherer populations. While the latter relies to a significant extent

on the ethnographic method, including quantitative measures (Chaudhary, 2017; Draper, 1975); the former is studied by methods such as surveys, big data analysis as well as quantitative indexes such as the Gender Parity Index (GPI), Gender Empowerment Measure (GEM), Gender Development Index (GDI), or the Gender Inequality Index. The fundamental idea of egalitarianism remains that of an equality of status, an equal ability to provide for oneself and have autonomous decision-making across both genders. However, one must take care to not conflate equality with equivalence of gendered individuals. As Harry Walker eloquently observed, "What we find throughout much of Amazonia, I think, is not egalitarianism but a tendency towards what I shall call 'equality without equivalence', corresponding to a kind of 'individualism without individuals', where a strong sense of the common leads directly to a politics of alterity and singularity: to a politics of the multitude" (Walker, 2020).

6. Final Notes

The empirical findings of the bargaining model presented in this chapter provide impeccable proof of equality within BaYaka and Agta households, a domain of life where gender inequalities most starkly persist in larger, industrialised societies (Lennon & Rosenfield, 1994; Lachance-Grzela & Bouchard, 2010). These groups and others like them, have been known to be some of the most egalitarian ones in all of human history (Woodburn, 2005; Townsend, 2018) and are indispensable for an evolutionary understanding of humans in the Late Pleistocene, before agriculture came about (Marlowe, 2005). Perhaps, some norms and behavioural trends, as I have tried to outline above, can be adopted into our own groups for attaining goals of reaching gender equality.

My work remains limited in scope for not discussing in detail some other aspects of social life, such as courtship and marriage practices, and everyday communicative practices between the genders, as well as a detailed look into other important hunter-gatherer groups, which I would like to look at in the future. It is noteworthy to mention that the current market-integration—including trading with neighbouring towns and villages—and sedentarization of many hunter-gatherer societies, has a direct consequence on norms of gender egalitarianism. Patricia Draper's compilation of ethnographic resources, collected 20 years apart, is a brilliant demonstration how sedentarization and change in economic activities have changed the social fabric of !Kung bushmen, including gender relations

(Draper, 1997). It may indeed be difficult in the present day to find many hunter-gatherer groups who have absolutely no interactions with neighbouring market economies. This makes these decade-long ethnographies ever-more-valuable for understanding a way of human life which embodied equal status for individuals, and no power hierarchies between men and women. Even more crucially, this makes interdisciplinary collaborations and multi-method research urgent, such that our theoretical models of human evolution and experimental paradigms for testing cognitive processes, can be informed by such ethnographic work.

Finally, I believe this chapter is a demonstration that gender equality is truly possible in human societies; and the crucial point that we go on to show here is that social norms and others' expectations matter. Inequality is not only a spontaneously emerging phenomenon that is out of our hands, but has a definitive conventional aspect and we can most likely decide, with public policy intervention, which conventions to promote and which to demote. The policy relevance of these findings is not a topic that I have been able to address in this thesis, but as I will note in chapter 6 and the conclusion, this is something I hope to work on in the future, as this can provide crucial information for intervention.

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Chapter 3. More on Egalitarianism

I take the scope of this chapter to bring forth further instances of cooperation and egalitarianism in hunter-gatherer societies, instances which go broader than the scope of gender equality. The purpose of this chapter is to review an influential theory of human fairness, which has suggested that norms of equity and fairness evolved as community sizes grew, markets and institutions stabilised and world religions came about; essentially suggesting that norms of equity might be a recently evolved phenomenon in human societies, specifically in the domain of ephemeral interactions with unknown others. I argue against this: norms of equity in distributions are not a recently evolved disposition in market-integrated societies, but likely existed in hunter-gatherers too, who cooperated extensively based on principles of need, and equity, and have high prevalence of food sharing, cooperative hunting and alloparenting, outside of genetically related others.

The psychological assumptions of this theory are already reviewed in chapter 1, where we found that it provided a better explanation of GDHL and associated fairness, than others theories of fairness. In this chapter however, I review the fundamental assumptions underlying the cultural evolutionary part of this theory—namely that humans predominantly interacted with kin in the evolutionary past, and that they did not have formal norms of cooperation. I show that these assumptions are mistaken, and that some claims of the theory might be in need of revision. This chapter is a short one, and was included in order to form a bridge between an ethnographic exploration of inequality and egalitarianism (as in chapter 2), to an experimental one (as in chapter 4).

1. A seminal account of Fairness

The account on the evolution of human fairness, published by Henrich and colleagues in 2010 (hereafter H2010), posits that a preference for equitable distributions came about as human societies grew and became more complexified.[7] They call this a ‘sense of fairness’,

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describing fairness as "whatever combination of motivations and expectations [that lead to] more equal divisions" (Henrich et al., 2010, pp 1483). They build their account on cross-cultural data from Ultimatum and Dictator games (Henrich et al., 2005). The fairness account is as follows:

With the stabilisation of global climates in the Holocene, populations started to become sedentary and increasing in size. This resulted in a gradual decrease in genetic relatedness, a new selection pressure in an environment where individuals previously cooperated *based on kin relations and reciprocity*. In response to these new pressures, institutions that supported cooperation amongst growing webs of strangers, emerged and stabilised. These institutions supported such cooperation by enforcing behavioural norms of equitable distributions. Such norms of equity, the authors suggest, facilitated trust between strangers and reduced transaction costs in anonymous interactions. This was unprecedented in previous nomadic small-scale societies, where cooperative interactions were *limited to kin* and other long-term relationships. Due to an overall surge in cooperation in these growing populations, norms of equity and the institutions enforcing these norms co-evolved, and the behavioural norms spread over time via social learning.

The account rests on two key assumptions:

1) To account for a progressive decrease in genetic relatedness in larger agricultural societies—the major selective pressure for the evolution of fairness norms—the assumption is that *humans lived in small-scale societies in our ancestral past, where genetic relatedness was high and people mostly interacted and cooperated with kin.*

2) The authors suggest that fairness as a sense of equity was internalised and enforced only in larger societies, with markets and world religions, supporting this by experimental evidence from ultimatum and dictator games (Henrich & Henrich, 2007). This rests on the implicit assumption *that there was a scarcity of norms of equity in hunter-gatherer societies.*

I challenge both these assumptions, using data from contemporary hunter-gatherer groups. The data I present suggests instead, that norms of equity and cooperation amongst unrelated individuals have existed in human societies since the time of hunter-gatherers, and the evolution of fairness, as forwarded by this account, might be in need of rethinking

1.1. Questioning the Key Assumption

H2010 suggest humans went *"from kin-based foraging bands to complex, intensely cooperative societies [..]"* (Henrich et al., 2010; pp 1480). Contemporary data differs; it has been shown that "*hunter-gatherers display a unique social structure where [...] most individuals in residential groups are genetically unrelated*. These patterns produce *large interaction networks of unrelated adults* [..]" (Hill et al., 2011; pp 1286).

Walker R.S., working with various groups in the Amazonia, has shown that from hunting-gathering to agro-pastoralist societies, as communities grew in size, there was a significant *increase* in genetic relatedness within groups (Walker, 2014). With the domestication and control over food production, genetic relatedness went up, and is said to be the glue which allowed settling communities to grow in size, without killing each other in internecine warfare (Walker et al., 2013; Walker, 2014). Increasing genetic relatedness not only protected groups from fission processes, but also led to a change in the social dynamics, such as hierarchical structures with the presence of headmen, and emergence of political inequality, which meant not sharing on a strictly equal basis, but more often on the basis of social status and roles (Hill et al. 2011; Walker & Bailey 2014; Walker 2014). It can therefore bring to question the claim that it was with growth and market-integration of societies, that the need for cooperation with unrelated others arose. However, Henrich and colleagues are correct in assuming that reciprocity (direct and indirect) did indeed form a major part of resource sharing in small-scale societies[8].

The finding of low genetic relatedness in hunter-gatherers is not purported only by this group of anthropologists working in the Amazonia, but also others who study contemporary hunter-gatherer groups in faraway geographical areas, such as the Philippines. Dyble and colleagues from the University College London have demonstrated an even lower genetic relatedness in the Agta HG's. They attribute it to post-marital residence patterns, where both females and males have equal decision-making power over where the couple should reside post marriage (Dyble et al., 2015). Walker and Bailey, studying kinship marriage patterns, conclude that hunter-gatherers have limited kin relations within groups, as they tend not to marry within. It is the more intensive economies however, whose genealogies show high

[8] To which, I would like to further add the assertion that reciprocity-based sharing also forms a significant part of lives in large, market-integrated societies. A clear comparison of which kind of societies might engage more in a specific kind of sharing, remains wanting.

levels of genetic relatedness, supported by practices of inbreeding, polygyny and marriage exchanges (Walker and Bailey, 2014). A notable instance of this is Pakistan, where over 60% of marriages happen between cousins, the vast majority of them being with first cousins (Hussain & Bittles, 1998). Such empirical proof goes against the (central) assumption of H2010, which posits a progressive decrease of relatedness with increasing community sizes and sedentism, and an increasing need for cooperation with unrelated others, as a consequence. As I will argue in the next section, hunter-gatherers were already well-equipped to cooperate intensely with others who were non-kin or long-term relations.

It can, alternatively, be understood that Henrich and colleagues' account assume only that the amount of interactions with strangers increased in large-scale societies, and not that such interactions were absent in small-scale societies. However, this clarification is not made explicit in their work and I believe a better explanation of the cooperative environment of small-scale societies, as I attempt above, is required in order to understand the extent to which cultural norms of equity evolved in large-scale societies.

1.2. Questioning the Second Assumption

When Henrich and colleagues find in market-integrated societies, "norms and institutions that facilitated successful exchanges and interactions [...] beyond local networks of durable kin [...]" (Henrich et al., 2010; pp 1484), they go with the assumption that in hunter-gatherers, *cooperation mostly happened within kin relations*. Yet, we have plenty of evidence for *widespread cooperation with unrelated others in the past.*

Chaudhary and colleagues, who have spent several years studying the Mbendjele BaYaka hunter-gatherers in Congo, have emphasised two features of mobile hunter-gatherers: low within-camp relatedness, and fluid meta groups (Chaudhary et al., 2016). Both these features have been taken to suggest that cooperation often occurs *outside* of kin relations, especially as individuals keep moving to new camps. The same is true for the Agta foragers of the Philippines, studied by the same group of researchers (Dyble et al., 2021). There has been seen to be a preponderance of interactions between individuals unrelated to each other, across multiple social and economic domains. The Agta, along with taking care of their own households, also share food based on factors such as need and reciprocity (Smith et al., 2019). They hunt, gather, and fish cooperatively. Smith and colleagues note that extensive

sharing makes sense, as the lack of storage possibilities meant a decreasing marginal utility of keeping resources for oneself (Smith et al., 2019). Alloparenting—caring for children who are not genetically related to oneself—is also common in these groups (Page et al., 2019). In fact, a lot of these interactions are crucial for ensuring reproductive success within these groups (Page et al., 2017). Other hunter-gatherers, such as the Vezo of Madagascar observe similar practices of alloparenting, not necessarily between related others, also known as social parenthood (Astuti, 2001).

Other instances of cooperating outside of one's immediate circles, are the practices of demand and need-based sharing, some of the most well-studied social norms of contemporary egalitarian hunter-gatherer groups. Woodburn, Townsend and Lewis amongst others, have written extensively on demand sharing, a practice where sharing of resources does not occur based on kin relations or even ability and skill, but instead upon demands of individuals who might need something (Townsend, 2018; Woodburn, 2005; Lewis, 2017; Lewis, 2016). This applies to sharing of food, material possessions, and other forms of help. For decades, it has been known to anthropologists that meat, one of the main sources of calories in these groups, is often shared in ways which provides no advantage at all to the hunter or his kin (Kaplan et al., 1984; Hawkes 1991) In fact, the experimental and ethnographic data provided by Henrich and colleagues themselves, give instances of anonymous-sharing of hunted meat in small-scale societies, such as in the Lamalera of Indonesia and Aché of Paraguay (Henrich et al., 2005). In the Mbendjele BaYaka of Congo, Thompson (2018) notes that though men from the same household—like a father and a son—might cooperate in snare hunting, many other important partnerships are often formed beyond kinship and household ties. For instance, men often cooperate in hunting with firearms with unrelated others. "Indeed, such partnerships are necessary given that a third of men in our study lived in camps with no male kin of suitable age to accompany them hunting", says Thompson (2018). Though the specifics of how people cooperate might vary from society to society (and surely varies between various large-scale, market-integrated societies as well), the assumption that cooperation in our evolutionary past was very different and limited to close-knit circles of kin and long-term relationships, does not hold up. It is likely that humans have always had foundations for the cooperation norms that we utilise in our large-scale societies today.

2. In place of a Sweeping Conclusion

Observations on the prosocial nature of humans are not new. Extensive cooperation, especially amongst non-kin has been said to be the foundation for enabling cumulative culture in our species (Tomasello et al., 2012). The sentiment goes all the way back to Sahlins, who characterised hunter-gatherers by a form of 'generalised reciprocity', where cooperation took place with unrelated others, without even a concern for one-on-one reciprocation (Sahlins, 1972). Such generalised reciprocity is akin to what H2010 describes as fairness in market-integrated societies. However, formal norms of cooperation which the authors term "market norms", did not arise only with the advent of formal institutions in large-scale societies, but have been around in human societies which are much smaller in scale. For instance, after a successful hunt, the Aka of central Africa follow strictly formal procedures for distributing meat, where the participants who kill the animal, the owners of the tools used for killing (*konja*) and those involved in the transport and butchery of the animal, all receive specific parts of the animal (Bahuchet, 1990; Kitanishi, 1998). Such formal procedures are most common for food and resource-sharing, but also in other domains of life such as gift-giving (Baker & Swope, 2021) and participating in ceremonies and rituals (Lewis, 2016). On the one hand, it seems certain that cooperation between unrelated individuals existed before market-societies came about; at the same time (and one can know from personal experience that) even in market-societies, social relations based on kinship and long-term reciprocity still drive many cooperative interactions.

I suggest that this influential account of fairness has overlooked important anthropological evidence, and that assumptions underlying the account might be in need of revision. The literature I cite above challenges the credibility of this account which has enjoyed great popularity for over a decade. If fairness is described as a way of cooperating with genetically unrelated others, anthropological data shows this has been around in human societies from the time of hunter-gatherers, who are known to be highly egalitarian, mobile and fluid (Deb, 2023). I duly note that contemporary hunter-gatherer groups are quite diverse in their social dynamics, and must not be treated as a homogenous whole (Singh & Glowacki, 2022). While the BaYaka and Agta (amongst others), are nomadic and cooperative outside of kin relations, there are other hunting groups such as the Urania of Peruvian Amazonia, who share food and cooperate within highly kin-based groups. Though I focus only on a subset of HGs here, it

nonetheless serves to demonstrate that norms of equity and fairness, as they exist amongst these hunter-gatherers, cannot be newly evolved.

Binmore, the influential economist who put forward his own evolutionary account of fairness, one that was reviewed in-depth in chapter 1, suggested that due to high mobility and low genetic relatedness in hunter-gatherers, norms of equality provided implicit insurance contracts, and thus evolved to form the basis of our sense of fairness[9] (Binmore, 1998; 2014). Indeed, this need for predictability in coordination and the ability to have implicit insurance contracts, is something that we see experimentally in the next chapter (Chapter 4). Another hypothesis is that low genetic relatedness arose due to bilocality—in which both males and females decide the couple's post-marital residence location (Dyble et al., 2015) —and it is this bilocal, egalitarian system that provided the selective context for expanded social networks and cooperation among unrelated individuals. In any case, it is likely that the human sense of fairness arose under decidedly different selective pressures than what is suggested by H2010, and arose in hunter-gatherer societies itself. If fairness is described as a propensity for preferring equitable distributions, much anthropological evidence goes on to point that our evolutionary ancestors were as 'fair' as we are. To test the human propensity for preferring equality and find the factors under which inequalities might emerge, I next move on to an experimental exploration of the topic.

[9] This account of fairness was also reviewed in *Chapter 1: Evolved equity but inequity in the household? Reviewing evolutionary accounts of fairness*. In that review however, this account was seen to have poor explanatory power for gendered division of labour in households, and associated perceptions of fairness.

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Chapter 4. When do inequalities emerge?
The role of Outside Options

This series of studies was conducted as a follow-up to chapter 2, where we tested the role of outside options in creating inequalities, using natural observational data from small-scale societies. Though we found that in the context of hunter-gatherer households outside options do not create inequalities, not when spouses bargain with each other, I wanted to explore if outside options can create inequalities in the context of our industrialized societies, and in anonymous settings of distribution. After all, the effect of outside options in begetting inequalities is a widely-documented one[10], warranting a deeper exploration. To understand the psychology of facing unequal outside options and its role in shaping economic distributions, I test the outside options hypothesis experimentally with participants of different nationalities, found on Prolific. The goal was to find out the minimal circumstances under which inequalities might start to emerge, in the context of an economic game played with anonymous others.

This chapter has been written with a short introduction, as the primary concepts being used i.e., outside options and justifications of inequalities, have been theoretically discussed along with their literature background in other chapters—the concept of outside options discussed extensively in chapter 2, and the justification of inequalities discussed across nearly all chapters. This chapter focuses on presenting an extensive series of experimental studies, and discussing their results. The theoretical and experimental design, data collection, data analysis and writing was carried out independently by myself, and thus the chapter uses first-person singular pronouns.

[10] For instance see Alesina et al., 2013; Lennon & Rosenfield, 1994; Gurven & Hill, 2009, for the effect of outside options in shaping gendered divisions of labour, or Knez & Camerer, 1995; Schmitt, 2004; Binmore et al., 1991 for the effect of outside options on economic and resource bargaining. More discussed in section 1.2 of this chapter

1. Background

A massive debate abounds in the study of human distributional preferences: on the one hand, experimental psychologists and evolutionary game theorists have insisted that humans have a strong preference for equality in distributions, and demonstrated as much using game theoretic modeling tools and in experimental settings (Binmore, 2014; Debove et al., 2015; Haselhuhn & Mellers, 2005); something that I presented from my review of theories of fairness in chapter 1. On the other hand, sociologists and other social scientists show, using survey, demographic and interview data, that unequal distributions abound in our societies across multiple domains of human cooperation (Nakamura & Akiyoshi, 2015; Starmans et al., 2017; Kiatpongsan & Norton, 2014). In this chapter, I investigate the conditions and factors that are likely to lead to unequal distributions of resources. I especially focus on the role of 'outside options' as well as 'social categories' in potentially overriding a preference for equality and leading to spontaneous generation of unequal distributions in a coordination scenario. Outside options are the payoffs that an individual can expect to receive if they were to leave the current cooperation venture. This denotes their fallback options and has been posited to be a key factor in stabilizing inequalities, such that when outside options vary for two individuals who are trying to cooperate with each other, their bargaining power is unequal, and can lead to unequal payoffs. This is tackled in the first half of the chapter, i.e., studies 1a, 1b, 2 and 3. I then study how assigning people into known social categories, such that these categories come with fixed outside options and are recognizable in one's community, can culturally stabilize inequalities. I suggest that processes of social comparison might be responsible for this, as individuals, even when they have low outside options and payoffs, find similar others to compare their payoffs with, and thus find a justification for inequalities. This is explored in the second half of the chapter, in study 4. To study both these factors, I utilize the template of a simple coordination game where two people can coordinate with each other repeatedly, in real time.

1.1. Preponderance of Equality Preference

There is a sizable literature arising out of economic games, which suggest that when faced with strangers in an experimental setup and asked to divide certain resources, people tend to distribute equally (Dawes et al., 2007; Xiao and Bicchieri, 2010; Fehr et al., 2008). This preference for equality is reflected when people show negative emotions when faced with

unequal incomes (Dawes et al., 2007), or when they distribute a sum of money equally with a stranger, even though they could keep the entire sum for themselves (Engel, 2011). This has been said to be a part of our evolved prosocial preferences, which have historically allowed us to cooperate with others (Deb & Smith, 2021). Some have said that such preferences likely co-evolved with growing community sizes and expanding markets, ensuring individuals can cooperate seamlessly and not suffer losses in ephemeral and anonymous exchanges in marketplaces (Henrich et al., 2005; but see Deb, 2025 for a criticism of this account). This preference for equality has been supported by survey data from the International Social Survey Program, which spans 16 countries, multiple socioeconomic groups, age groups and political beliefs, where people were seen to want equality in incomes (Kiatpongsan & Norton, 2014; Norton & Ariely, 2011). Some have even said that equality is more important in making distributional decisions, than certain other prosocial preferences, like reciprocity (Xiao & Bicchieri, 2010). The preference for equality is present in children beyond the age of 4, as was seen with distribution of sweets in an experiment[11] (Fehr et al., 2008); in fact, children of ages 4-8 might show a higher aversion to inequality than their young adult counterparts (Sutter, 2007). This finding has in turn been utilized to argue for the evolutionary origins of such a preference (Fehr et al., 2008), with eminent game theorists like Binmore suggesting that developing a preference for equal distributions was crucial for humans to coordinate in their societies, and to succeed in resource-scarce and unpredictable environments (Binmore, 2009).

Further, this preference for equality has been said to underlie not only how we prefer to distribute resources, but also how we come to morally judge these distributions. The relevant moral judgement here is that of *fairness*; and equality and egalitarianism have long been said to be the basis of our evolved sense of fairness (Binmore, 2005; 2009). Individuals often judge equal distributions to be the fair one, with the terms equality and fairness nearly becoming conflated at times. This takes root in contemporary Western philosophy, for instance John Rawls' theory of justice, which prescribes egalitarian distribution of primary goods and equality of opportunity as the roots of a just society (Rawls, 2017). Experimentally, the Ultimatum and Dictator games are often taken as the standards to elicit fairness judgements. In these setups, individuals must decide how to distribute resources with anonymous others, under various informational conditions. Experimenters have assumed that

[11] Though the same study has shown that this preference for equality is conflated with parochialism, such that children have a stronger preference to be equal with members of one's own group, than with members of others.

distributional decisions are primarily motivated by considerations of what is fair, so when equal distributions of resources are observed - especially in cases where participants could have gotten away without doing so - it is inferred that these choices arise out of fairness considerations.

1.2. Preponderance of Inequalities too

Outside of experimental setups however, we rarely see as many instances of equality in our societies. Children who are born into lower socioeconomic groups get lower educational and health opportunities (Stephens & Fryberg, 2012; Kim & Park, 2015), women shoulder a disproportionately higher workload in households compared to their male partners (Davis & Greenstein, 2004; Jaspers et al., 2022), people from lower castes face poorer employment prospects than others, in India (Siddique, 2011). Women often face a glass ceiling at workplaces (Purcell et al., 2010) and mothers have to pay a motherhood penalty in their careers, while fathers receive a fatherhood premium in terms of their salaries and career progression (Wang & Ackerman, 2020; Fuller & Cooke, 2018). Inequality, one might say, is in fact, the norm in the real world. The question arises then, if humans have such a high preference for equality in experimental situations of anonymity, what are the factors that cause and stabilize such inequalities in our societies?

Outside options has been posited as one of the primary factors, one which can account for the economic, ecological and social conditions of an individual, and determine their bargaining position. When individuals who want to cooperate have unequal outside options, it can lead them to distribute the payoffs from cooperation, unequally. Take the case of plough agriculture, which has been suggested as one of the major precipitators of gender inequality: with the advent of plough in agriculture, men - with higher average upper body strength - came into control of the fields and crop production. This provided them with better outside options, as they were able to fend for themselves, and allowed them to have a better bargaining position by being in control of key resources. On the other hand, this took away outside options of women, who now became dependent on men for their sustenance. Overall this led to the generation of gender unequal behaviours and norms, which is seen across the world in the form of rise of patrilineage (Murdock, 1967; Sanderson, 2014), and overall worsened bargaining positions for women (Alesina et al., 2013). The same effect of outside

options has been found in experimental setups (Pargneux & Cushman, 2024). The Nash Bargaining Game conceptualizes outside options in terms of disagreement points, that is the points at which a bargaining venture to cooperate, will fail. It predicts that for a stable equilibrium to be reached, payoffs of all players should be distributed such that nobody receives less than their individual outside options, else cooperation itself is not beneficial (Nash, 1950). It is interesting to note that when unequal outside options are involved, the unequal distribution of payoffs also becomes the equitable one. Outside options denote one's opportunity cost for coordinating, and since an equitable distribution must take into account all costs and benefits, unequal outside options should lead one to distribute benefits in an unequal manner; indeed, this is what contractualist theories of morality suggest (Andre et al., 2022). As will be discussed later, this has interesting implications for the given set of studies.

The distribution of outside options can also influence moral judgements and what is considered to be fair. For instance, by providing an unequal distribution of power in a modified UG, whatever is considered to be a fair division, has been seen to change (Mallucci, Wu & Cui, 2019). It can also lead people to hold different moral standards for those with higher or lower outside options (Pargneux & Cushman, 2024). By such justification of inequalities, outside options bring about their stabilization. If one has high low outside options, coordinating at a payoff which is higher than these outside options, though lower than one's partner, is still beneficial for the individual; and this justification can lead to perpetuation of inequalities. Moreover, if one is bargaining with an individual (or group) who can have high payoffs without coordinating with oneself, it is rational - and fair - to give them a larger piece of the pie. This is what contractualist theories of morality suggest: if two individuals (or groups) must coordinate with each other over a long period of time, the payoffs that both receive from their coordination venture must be sensitive to their individual outside options; anyone who has to coordinate at payoffs which are worse than their outside options, will find another partner, and the interaction will thus not be evolutionarily stable (Debove, 2015; André et al., 2022)

1.3. The Coordination Game

This chapter explores these two alternative explanations of fairness judgements and distributional preferences, as alternative hypotheses, using an economic coordination game.

In this first half of the chapter, I test the role of outside options in creating unequal distributions and further study whether inequalities can come to be justified (or not) in view of unequal outside options. I study this in the context of two anonymous individuals coordinating with each other repeatedly, under various information conditions. The second half of the chapter will then explore the effects of social categorisation and social comparison.

The studies utilize the template of a simple coordination game, which requires two players to coordinate their decisions on how to distribute a sum of money, which they do repeatedly over 10 rounds. Both partners have fallback payoffs - i.e., their outside options - every time, in case they fail to coordinate, and these are mutual knowledge to both. The choices in such a coordination game show not only distributional preferences but also reflect people's judgements of fairness. Further, it can also reflect their strategic behavior as they continue to play with the same partners over multiple rounds. Using this game I answer the following questions:

a) Do choices in a coordination game depend on outside options-based bargaining power, or a preference for equality?
b) Can outside options justify inequalities, or does relative deprivation lead to feelings of unfairness?

Following are my hypotheses and associated predictions for results:
H1: People are motivated to be equal in distributions and will thus, distribute the money equally with their partners.
If this is the case, I will see average choices close to 5. The relevant psychological mechanism here is a preference for equality, which will be insensitive to factors such as unbalanced outside options.
H2: People are sensitive to outside options and will thus, distribute the money unequally with their partners.
If this is the case, I will see unequal average choices, with advantaged individuals having higher choices than disadvantaged ones. The relevant psychological mechanism here is that of bargaining, which is sensitive to one's relative outside options

Ethical approval for all the studies presented below was given by the Institutional Review Board at Flame University (IRB Approval number: 2023/09/02/FUL).

2. Part A. Outside Options

2.1. Study 1a: Simple coordination game

The coordination game is played online between two participants in real time, using SMARTRIQs (Molnar, 2019; pre-registration and experimental materials can be found on: //osf.io/ztsry). Each participant is given numbers from 1 - 10, and they must choose a number such that the sum is 10 or less. When the sum of chosen numbers is below or equal to 10, then the coordination will be successful. If the sum is above 10, then the coordination will have failed. Participants have to make their choices without communicating with each other, and they only see each other's choices and the success/ failure of their attempt after both have made their choices. In the case of successful coordination, both participants will be awarded the points that they have chosen (e.g. if Participant A has chosen 4 and B has chosen 5, since $4+5=9 < 10$, they will be awarded 4 and 5 points respectively). If coordination fails, both participants will receive their individual outside options, shown to them as their 'default points'. These outside options are allocated to them by the experimenter (myself) and both participants can see each other's outside options in every round. The points that participants win in each round (their chosen number in the case of successful coordination; their outside options in the case of failed coordination) are added and given to them as money at the end of the game, with more points meaning more money. Participants play this game for 10 rounds, through which they can see each other's dashboard, showing their choices i.e., 1-9 and their outside options. The 10 rounds are implemented to ensure participants understand the structure of the game, and are able to develop a communication/ coordination strategy. Responses were manually reviewed to be able to award participants bonus as per their total points collected. I implemented two conditions:

a) **<u>Unequal outside options</u>:**

   Both participants are given different outside options, in a way that one participant, randomly chosen, systematically has lower outside options (hereafter, the disadvantaged player) than the other (hereafter, the advantaged player). The

disadvantaged player will sometimes get 1 and sometimes 2 as their outside options, while the advantaged player will get 7 and 6, correspondingly. The sets of outside options therefore become 1 - 7 and 2 - 6, randomly assigned throughout 10 rounds. Choices made as per outside options can still lead to gains for both participants: for instance, if choices are 2 -8 (when outside options are 1-7) or if choices are 3 - 7 (when outside options are 2-6). Choices made in view of a preference for equality will lead to the advantaged player getting fewer points than what she/ he could have from their outside options, which would correspond to irrational behavior

b) **Equal outside options:** both participants receive the same outside options (default points). These are either 2 - 2, or 4 - 4, randomly assigned over 10 rounds. This serves as the experimental control.

Participants were automatically assigned to be Player 1 or Player 2; and randomly assigned to either the unequal or equal condition. In the unequal condition, player 1 is the 'advantaged' player and player 2 is the 'disadvantaged' player. In the equal condition, both players have the same outside options.

The screen order of the game follows as such:

1. Debrief and Consent.
2. Instructions
3. Comprehension check question testing understanding of rules: no exclusion criteria imposed; if participants reply incorrectly, they have to re-read instructions and answer the comprehension check question repeatedly, till they answer correctly.
2. Participant matching screen
3. Choice screen with default points
4. Successful/ Failed coordination message, with information about partner's choice

I calculated the average choice for each participant by averaging over 10 rounds of the game. These were analysed using ANOVA and pairwise contrasts.

2.1.1. Participants and Recruitment

I collected data from 148 participants overall, recruited via Prolific, from South Africa. 96 participants were given the unequal conditions game, while 52 of them were given the equal (control) condition. South Africa was chosen as the source population as the value of the GBP (currency on Prolific) has high purchasing power. The participants were from the ages of 20 to 60, with the mean age of 28.426 (s.d. = 6.546), and their socioeconomic status ranged from lower-middle class to upper-middle class. The gender composition is 70 F and 26 M participants in the unequal conditions game, and 39 F and 23 M participants in the equal condition game. Each participant was given a baseline payment and bonus awarded according to their total points earned.

2.1.2. Results

I found that the average choices across both conditions (equal outside options and unequal) reflected a high preference for equality, in support of the first hypothesis. There was no significant difference between individuals who had lower, higher, or equal outside options ($F = 2.825$, $p = 0.063$, $n2 = 0.038$). The players who were given higher outside options and thus could bargain for more money, did not do so (no significant difference between advantaged and disadvantaged players, $t = 1.664$, $p = 0.098$). Moreover, coordination success was remarkably high (88.1 % in equal condition; 83.5% in unequal condition (83.5%). The only significant difference was found in round 1 of the unequal condition: where the disadvantaged participants tended to choose a significantly lower amount of 3.7, than the advantaged one who mostly chose 4.7 ($F = 7.78$, $p < 0.05$; Fig 1).

The overall perception of the game was very positive, in terms of fairness judgements, how much blame was assigned to partners and one's reported feeling of agency (Table 1), and none of the groups of participants—advantaged, disadvantaged, or in equal condition—differed significantly from each other in these self-report measures. Most participants said their main strategy was, 'trying to communicate with their partner' or 'coordinate with the partner', and only 4 people reported trying to 'win as many points as possible'.

Behavioural Measure	**Disadvantaged**	**Advantaged**	**Equal**
Mean choice (s.d.)	3.915 (s.d. = 0.818)	4.218 (s.d. = 1.071)	4.327 (s.d. = 0.77)

Coordination Success	83.5%		88.1%
Self-Report Measure	**Disadvantaged**	**Advantaged**	**Equal**
Judgment of Fairness (scale: 1 - 7)	6.375 (s.d. = 1.231)	6.229 (s.d. = 1.276)	6.46 (s.d. = 1.146)
Blame on Partner (scale: 1 - 7)	1.833 (s.d. = 1.642)	1.792 (s.d. = 1.529)	1.904 (s.d. = 1.729)
Perceived control (scale: 1 - 7)	5.313 (s.d. = 1.639)	5.042 (s.d. = 1.868)	5.635 (s.d. = 1.621)

Table 1: Descriptive Statistics for study 1a

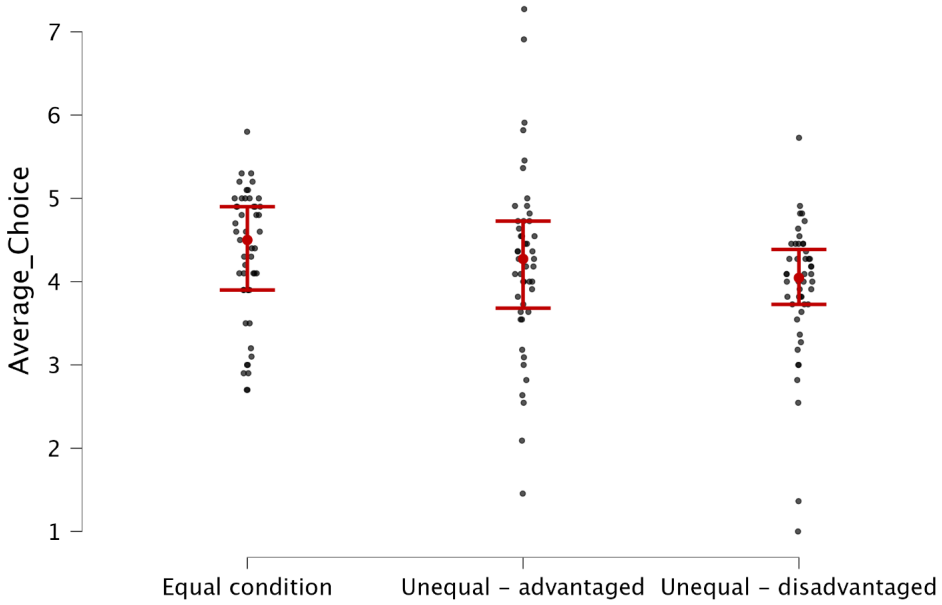

Fig 1: Beeswarm plot showing average choices of participants with equal outside options, and unequal (advantaged and disadvantaged players) outside options; Study 1a. Red bars denote quartiles of data distribution.

The evolution of choices:

There were no consistent upward or downward trends throughout the rounds (see Fig 2), which would suggest a learning pattern in participants.

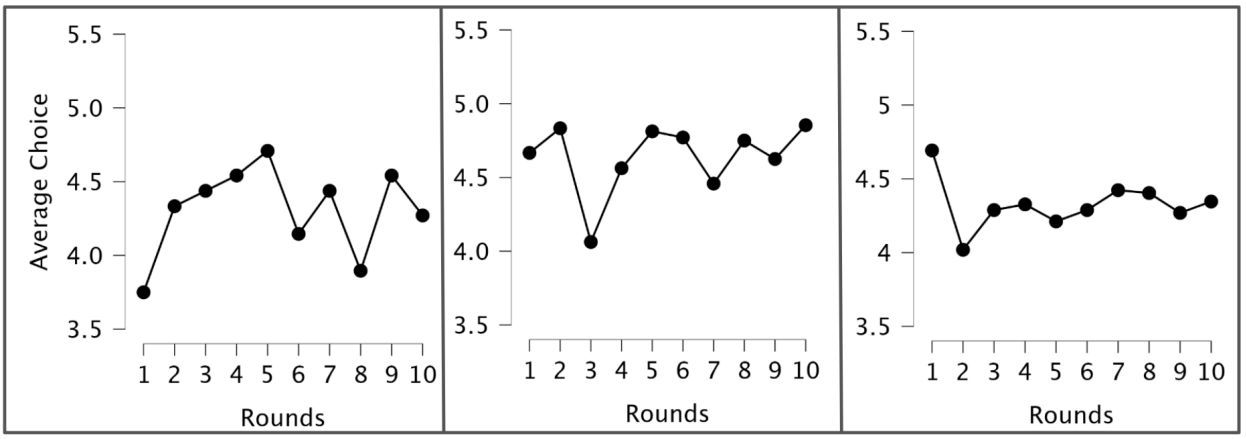

Fig 2: The evolution of choices across rounds for disadvantaged (left), advantaged (center) and equal (right) participants of study 1a

2.2. Study 1b: A Cultural Replication

The results of study 1a demonstrated a high incidence of equal choices across participants and a weak effect of outside options. To test the robustness of these results, I ran a *cultural replication* with a larger sample size, using the same coordination game and protocol.

2.2.1. Participants and Recruitment

I utilized a UK standard sample from Prolific (pre-registration and experimental materials can be found at: https://osf.io/arwsn), testing whether such a preference for equality would hold across another cultural group. The previous sample was highly gender-biased with a skew towards women, so I opted for a Prolific standardised sample which balances age, gender and ethnicity. Given the weak effect in study 1a, I re-estimated a larger sample size for the cultural replication (d = 0.3), with 278 participants in unequal condition (139 advantaged + 139 disadvantaged) condition and 139 in the equal condition. The study design, hypotheses tested, and analysis remained the same

Due to incomplete data, I had to exclude 33 participants from the unequal condition and 14 participants from the equal condition, resulting in a final dataset of 245 (unequal condition) + 115 (equal condition). The participants were from the ages of 20 to 60, with the mean age of 37.998 (s.d. = 11.468) and their socioeconomic status ranged from lower-middle class to upper-middle class. The gender composition is 122 F, 123 M and 1 Other participants in the

unequal conditions game, and 55 F and 61 M participants in the equal condition game. Each participant was given a baseline payment (0.90 GBP) and bonus awarded according to their total points earned.

2.2.2. Results

I found a similarly small effect size in our UK Prolific sample ($F(2, 357) = 5.469$, $p = 0.005$, $n2 = 0.030$). Those who were given higher outside options chose slightly higher than their disadvantaged partners ($t = 3.195$, $p = 0.002$), but the magnitude of difference remained small and neither advantaged or disadvantaged participants differed significantly from those in the equal condition (Fig 3).

The overall perception of the game was again positive, though fairness ratings of the disadvantaged participants was statistically significantly lower than those in equal condition ($t = 2.945$, $p = 0.003$). The disadvantaged participants also blamed their partners more and reported feeling a lower sense of control (see Table 2 for average scores). In the unequal condition, more than half the participants said their goal was coordination, and the second highest reported strategy was 'wanting to win as many points as possible', higher than what was seen in study 1a. 'Communicating with partner' was the least reported strategy (24 participants).

Behavioural Measure	**Disadvantaged**	**Advantaged**	**Equal**
Mean choice (s.d.)	4.433 (s.d. = 1.113)	4.863 (s.d. = 1.334)	4.750 (s.d. = 0.499)
Coordination Success (no. success/ total rounds)	83.8%		93.2%
Self-Report Measure	**Disadvantaged**	**Advantaged**	**Equal**
Judgment of Fairness (scale: 1 - 7)	5.659 (s.d. = 1.688)	5.984 (s.d. = 1.299)	6.193 (s.d. = 1.120)
Blame on Partner (scale: 1 - 7)	2.740 (s.d. = 2.095)	2.179 (s.d. = 1.589)	2.325 (s.d. = 1.888)
Perceived control (scale: 1 - 7)	4.837 (s.d. = 1.776)	5.423 (s.d. = 1.531)	5.474 (s.d. = 1.668)

Table 2: Descriptive statistics for study 1b.

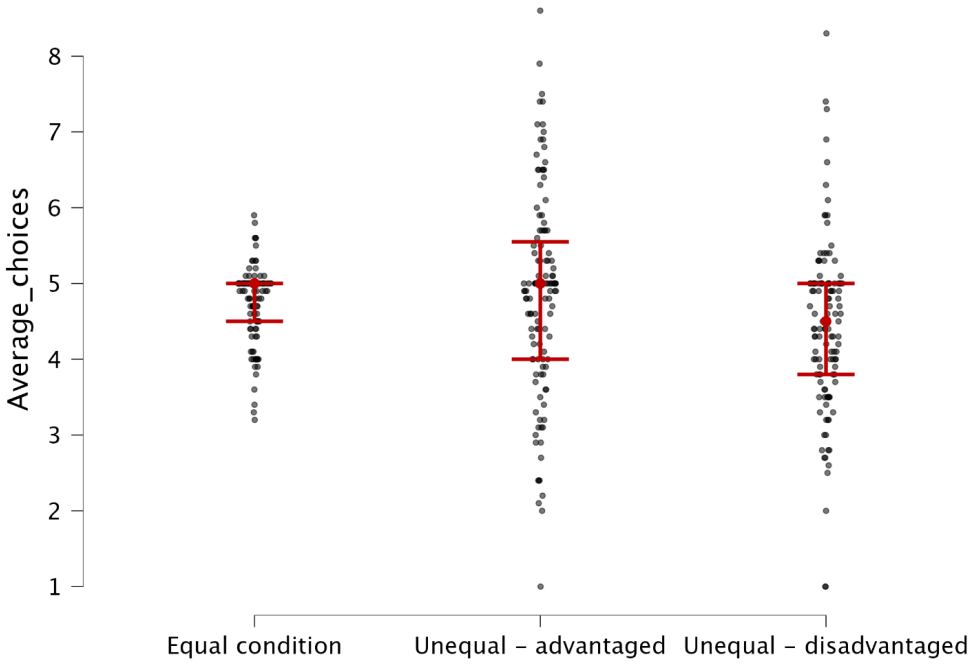

Fig 3: Beeswarm plot showing average choices of participants with equal outside options, and unequal (advantaged and disadvantaged players) outside options; Study 1b. Red bars denote quartiles of data distribution

Evolution of Choices:

For the disadvantaged participants, we find a significant difference across rounds ($F(9,1602) = 4.386$, $p < 0.001$), with an upward trend in choices from successive rounds, suggesting that they begin playing in accordance with their low outside options but eventually learn that they can ask for higher points, given their partner's preferences for equal distributions (see Fig 4). For the advantaged participants, we also note a significant difference across rounds ($F(9,1602) = 2.202$, $p = 0.020$), with an overall upward trend. Removing the data from the first round pushes the significance much higher $F(8,1424) = 2.795$, $p = 0.004$.

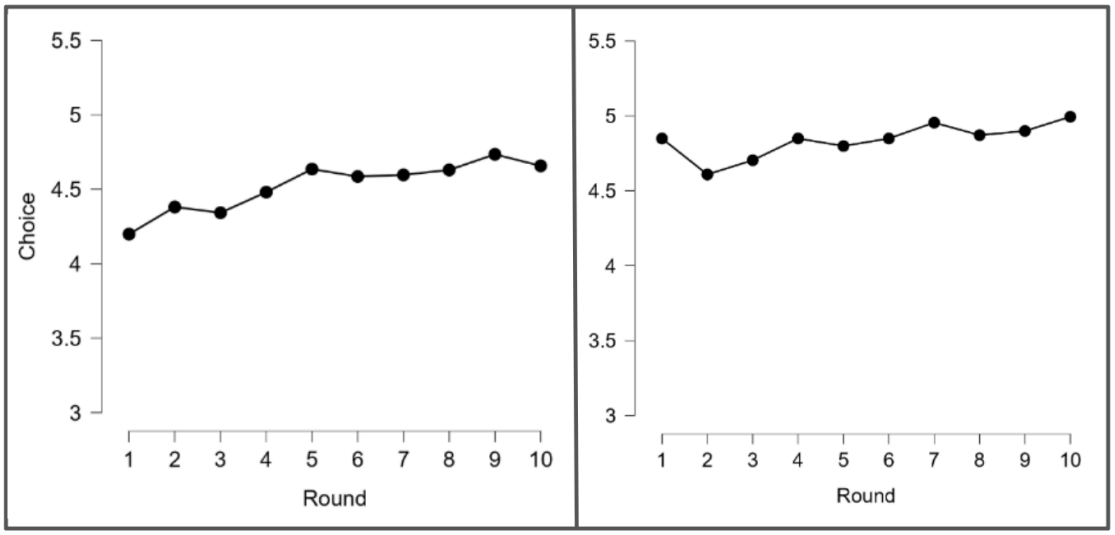

Fig 4: The evolution of choices across rounds for disadvantaged (left) and advantaged (right) participants of study 1b

2.3. Study 2: Coordinating with a payoff-maximising partner

Both studies 1a and 1b show a high incidence for equal distributions across disadvantaged and advantaged participants. Coupled with participants' reports of coordination being their main goal, this can be understood as when even one partner shows a preference for equal distributions, the other is likely to follow in order for successful coordination. However, what happens if one is paired with a partner who wishes to maximise their payoffs and chooses in accordance with their outside options?

In case of outside options 1 | 7, rational choice would predict that the disadvantaged player should choose 2 most often, which is one point higher than their outside option but also provides their partner with one point more than their outside option; and the advantaged player choosing should accordingly choose 8 most often. It is also rational for the disadvantaged player to sometimes choose 3, to get higher payoffs, but without asking their partner to take less than their outside option.

In case of outside options 2 | 6, rational choice would predict, according to the logic outlined above, the disadvantaged player would most often choose 3, and sometimes 4; while their advantaged partner would most often choose 7, and sometimes 6.

This is based on the psychological assumption that an individual will attempt to maximize her/ his expected financial benefit, and predict that their partner will do the same. In this

study, I pre-program the above choices into the game (hereafter, computer agent), which are shown to participants as choices made by their partner. The recruited participant is made to believe that they are playing against a real person, and are unaware that the choices they receive are pre-programmed. I then study how the recruited participant behaves in response, and test the same hypotheses as before.

In the computer agent, I implement choices 2 and 8 (in response to outside options 1 | 7), choices 3 and 7 (in response to outside options 2 | 6) 70% of the time, and and choices 3 | 7 and 4 | 6 the remaining 30% of times respectively, corresponding to the explanations above. This is to ensure some variability in choice, as one would expect from a human player, while still maintaining the rationality of not choosing lower than one's outside option. In real life, we can often see people in power and those with higher leverage, to uphold systems of unequal distribution (e.g., in gender unequal systems) and I test similar dynamics in the current experiment: do people surrender when stuck with a partner who chooses in view of their (high) outside options, or do they still show a preference for equal distributions, even when their partners won't reciprocate?

2.3.1. Participants and Recruitment

I utilized a UK standard sample from Prolific, which balances age, gender and ethnicity. Expecting a weak-moderate effect, I pre-registered a sample size of 278 with 139 in advantaged and 139 in disadvantaged conditions, using G*Power (d=0.3, pre-registration and experimental materials can be found at https://osf.io/uf3jm). The study design remained the same, but responses of one of the partners were pre-programmed. I predicted more unequal responses compared to what was seen in study 1b.

The participants were from the ages of 20 to 60, with the mean age of 37.568 (s.d. = 11.221) and their socioeconomic status ranged from lower-middle class to upper-middle class. The gender composition was 71 F and 68 M advantaged participants and 73 F and 68 M advantaged participants. Each participant was given a baseline payment (0.90 GBP) and bonus awarded according to their total points earned.

2.3.2. Results

There was a significant effect of group ($F(3,526) = 50.414$, $p < 0.001$, eta^2 = 0.223): advantaged participants playing with the computer agent had significantly higher average choices than their disadvantaged counterparts ($t(526) = 11.913$, $p < 0.001$) as well as advantaged players in study 1b who were playing with real partners ($t(526) = 3.217$, $p = 0.001$; see Fig 5). Disadvantaged participants who were playing with computer agents also had significantly lower choices than disadvantaged participants from study 1b, who played with real partners ($t(526) = -5.494$, $p < 0.001$; see Fig 5).

The overall perception of the game differed significantly for advantaged and disadvantaged participants. Those who were advantaged reported the game to be more fair ($t = 13.659$, $p < 0.001$), perceived higher control over their choices ($t = 8.361$, $p < 0.001$) and blamed their partner much less ($t = 6.845$, $p < 0.001$; see Table 3 for average scores). 55.6% of disadvantaged and 49.3% of advantaged participants reported their main strategy to be 'coordinating with partner'; while 23.23% advantaged and 36.61% disadvantaged participants said they want to 'win as many points as possible'. A sizable number of participants also said they wanted to 'communicate with their partner'.

Behavioural Measure	**Disadvantaged**	**Advantaged**
Mean choice (s.d.)	3.563 (s.d. = 0.971)	5.381 (s.d. = 1.616)
Coordination Success (no. success/ total rounds)	49.29%	93.9%
Self-Report Measure	**Disadvantaged**	**Advantaged**
Judgment of Fairness (scale: 1 - 7)	3.514 (s.d. = 1.905)	6.007 (s.d. = 1.127)
Blame on Partner (scale: 1 - 7)	3.627 (s.d. = 2.126)	2.092 (s.d. = 1.680)
Perceived control (scale: 1 - 7)	3.500 (s.d. = 1.931)	5.190 (s.d. = 1.530)

Table 3: Descriptive statistics for Study 2

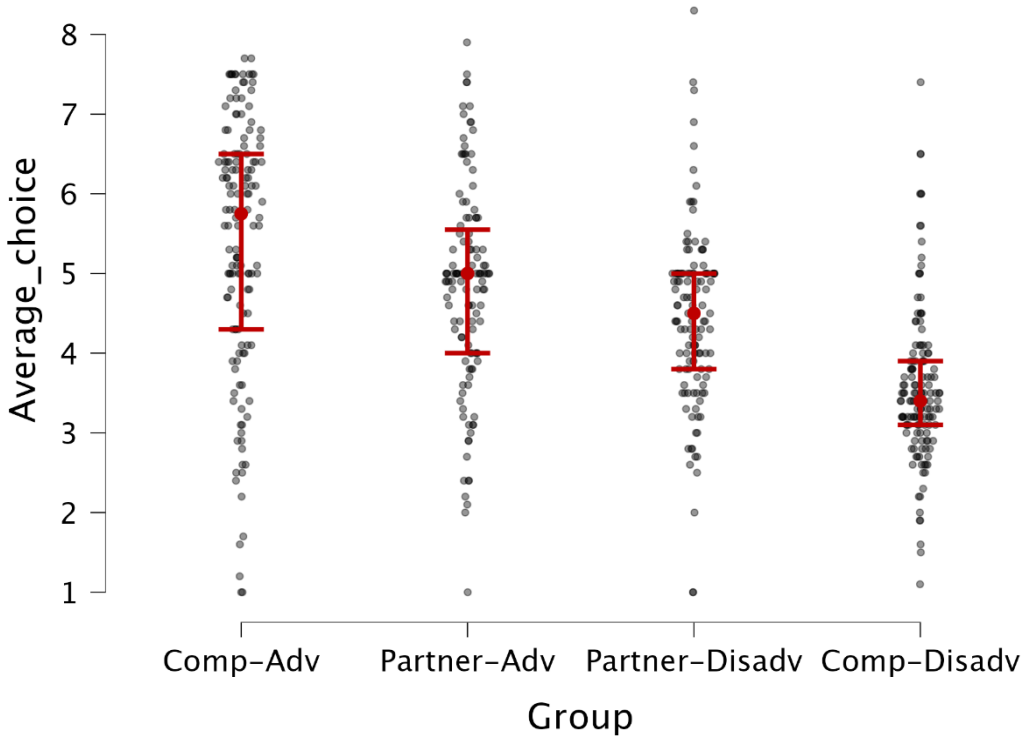

Fig 5: Beeswarm plot showing average choices from study 2 and 1b. Comp-Adv denotes advantaged participants playing with a disadvantaged fake agent; Comp-Disadv denotes disadvantaged participants playing with an advantaged fake agent in study 2; Partner-Adv denotes advantaged participants from study 1b playing with real disadvantaged partners; Partner-Disadv denotes disadvantaged participants from study 1b. Red bars denote quartiles of data distribution

Evolution of choices:

In disadvantaged participants, I found a significant difference across rounds ($F(9,1269) = 6.512$, $p < 0.001$), and a downward trend in their choices through rounds, slowly reducing their payoffs in response to a partner that won't yield (computer - advantaged) unlike the disadvantaged participants playing with a real player. Similarly, the advantaged players slowly increase their payoffs through the rounds and show a significant difference across rounds ($F(9,1287) = 6.505$, $p < 0.001$; see Fig 6).

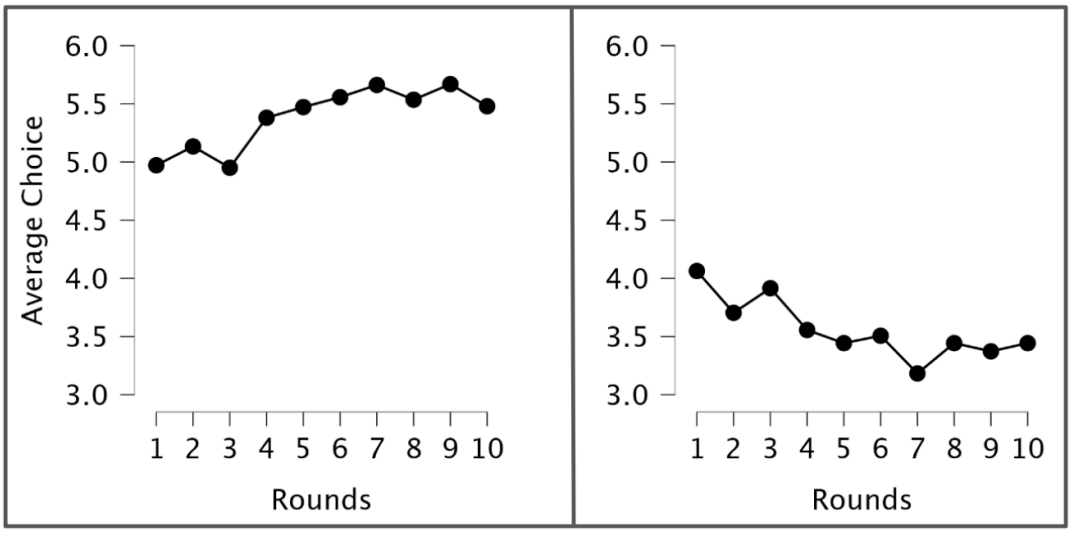

Fig 6: Average choices across rounds for advantaged (left) and disadvantaged (right) participants of study 2

Being paired with an economically rational agent in study 2 does lead to significantly unequal choices, more than what was noted when participants played with human partners, in studies 1a and 1b. However, the amount of inequality is still not as high as the given outside options would dictate. In particular, it was surprising that advantaged players didn't choose higher than 5.7 (which was the highest average, in round 7), even though they were paired with partners who chose as low as 2 or 3. We understand these results by appealing to (atleast) two explanations:

1. People are genuinely aversive to inequity, and both advantaged and disadvantaged individuals prefer to distribute payoffs equally. On the part of the advantaged persons, it also shows prosociality, as they give up potential benefits from their outside options to retain equal distributions.
2. People go for equal distributions as a sort of insurance strategy: if they choose 5 when they are the advantaged one, they can count upon their partner to be generous when they might end up disadvantaged i.e., with low outside options. This reasoning occurs as if, from behind a veil of ignorance, and in such cases equality is the Nash equilibrium (Binmore, 2014).

In the next study, I strove to rule out the second explanation.

2.4. Study 3: Setting Expectations in Coordination

I conducted the same coordination game as study 1a and 1b, with two participants coordinating with each other in real-time, but while setting each person's expectations for their future payoffs. After being matched with a partner, participants were told that the game algorithm assigns each person to either higher, lower or equal outside options. Then they were told that once they are assigned high (or low), they will continue to be assigned high (or low) default points throughout the game. If participants are assigned equal default points, that's the trend that will continue. This ensures participants know their future status in the game and don't need to rely on insurance strategy. I also added two comprehension checks, after round 1 and round 7, where participants were asked what their default points are relative to their partner - 'higher', 'lower', or 'equal', followed by asking them 'are you sure'. I planned to exclude those who would answer either both checks incorrectly, or the second check incorrectly, allowing for the fact that some participants might take a few rounds to understand the concept of outside options. Those who answered incorrectly for the first check but rectified themselves in the second, were retained in the dataset. Using this setup, I test whether people are averse to inequalities, when they know they are—and will continue to be—advantaged in a coordination game? Are they averse, if they know they will be disadvantaged? I implemented two conditions: **Unequal,** where participants receive unequal outside options; and **Equal,** where participants receive equal outside options.

2.4.1. Participants and Recruitment

I utilized a UK standard sample from Prolific, which balances age, gender and ethnicity. Expecting a weak-moderate effect, I pre-registered a sample size of 278 in unequal condition (139 advantaged + 139 disadvantaged) and 140 participants in equal conditions, using G*Power (d=0.3, pre-registration and experimental materials can be found at: https://osf.io/469pr). The hypothesis was that once the veil of ignorance is removed, people are more likely to play according to their outside options, especially the advantaged participants, who I predicted, will choose significantly higher than 5. Based on the exclusion criteria, 31 responses were excluded from the unequal condition and 39 from the equal condition from the first round of data. To reach sufficient sample size more data was collected, then excluded, till the pre-registered sample size was reached

The participants were from the ages of 20 to 60, with the mean age of 37 (s.d. = 11.824) and their socioeconomic status ranged from lower-middle class to upper-middle class. The gender composition was 132 F and 148 M in unequal condition, and 59 F and 81 M advantaged participants. Each participant was given a baseline payment (0.90 GBP) and bonus which was awarded according to their total points earned.

2.4.2. Results

Advantaged and disadvantaged participants in the unequal condition significantly differed from each other ($t(418) = 6.929$, $p < 0.001$,) with an estimated difference of 0.935 points, while participants in the equal condition did not differ from each other ($t(418) = 0.394$, $p = 0.694$). There was also find a significant interaction effect of condition (unequal, equal) and player type (advantaged, disadvantaged and player 1, player 2) ($F(1, 418) = 13.545$, $p < 0.001$, eta^2 = 0.029), where disadvantaged participants differed statistically significantly from participants in the equal condition. However, this difference was not as large as with advantaged partners (see Fig 7).

The perception of the game was more positive than what disadvantaged participants of study 2 had. However it was still significantly different for advantaged and disadvantaged partners, with advantaged players reporting the game to be more fair ($t(418) = 5.613$, $p < 0.001$), perceiving higher control over their choices ($t(418) = 7.227$, $p < 0.001$) and blaming their partner much less ($t(418) = -4.034$, $p < 0.001$; see Table 4). A majority of participants in the unequal condition said their main strategy was ‘coordinating with partner’; the second highest reported strategy was ‘winning as many points as possible’, and communicating with partner was the least reported.

	Unequal Condition		**Equal Condition**	
Behavioural Measure	**Disadvantaged**	**Advantaged**	**Player 1**	**Player 2**

Mean choice (s.d.)	4.286 (s.d. = 1.174)	5.220 (s.d. = 1.419)	4.845 (s.d. = 0.602)	4.770 (0.694)
Coordination Success (no. success/ total rounds)	82.13%		91.05%	
Self-Report Measure	**Disadvantaged**	**Advantaged**	**Player 1**	**Player 2**
Judgment of Fairness (scale: 1 - 7)	4.964 (s.d. = 1.897)	5.979 (s.d. = 1.230)	6.030 (s.d. = 1.206)	6.176 (1.206)
Blame on Partner (scale: 1 - 7)	1.972 (s.d. = 1.682)	2.884 (s.d. = 1.997)	2.403 (s.d.= 2.038)	2.514 (1.954)
Perceived control (scale: 1 - 7)	3.500 (s.d. = 1.931)	5.190 (s.d. = 1.530)	5.507 (s.d. = 1.471)	5.554 (1.597)

Table 4: Descriptive statistics for study 3

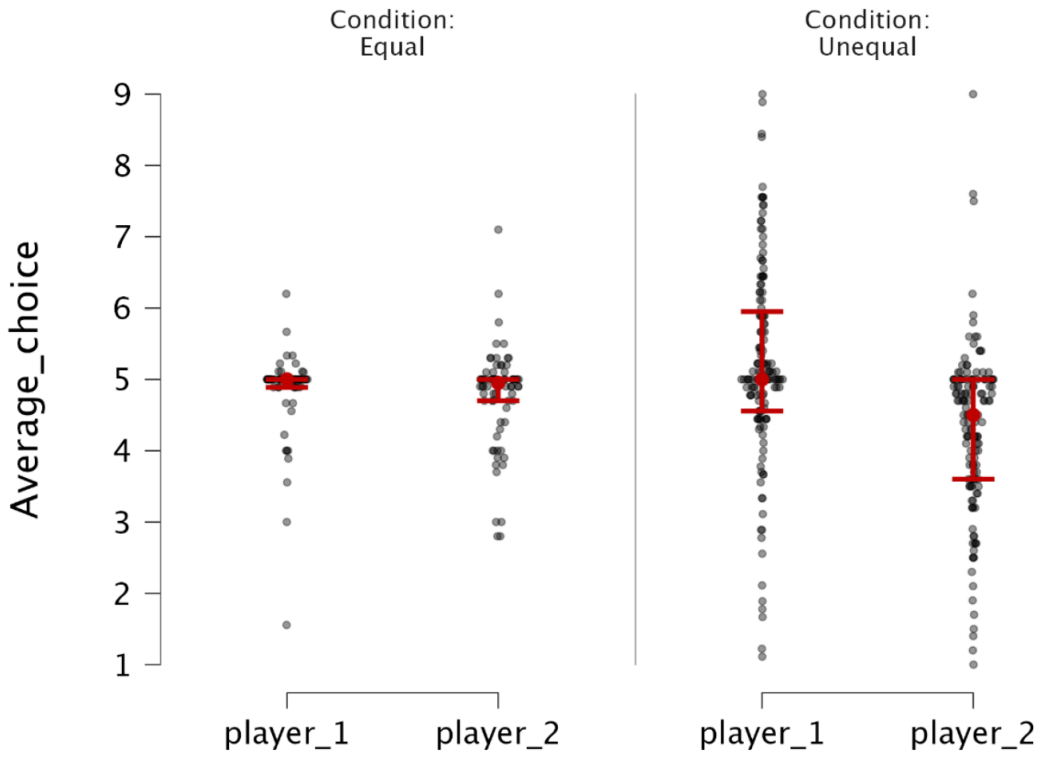

Fig 7: Beeswarm plots for average choices of participants in equal and unequal condition. In the unequal condition, Player 1 refers to advantaged and player 2 to disadvantaged participant. In the equal condition, both player 1 and player 2 have the same outside options. Red bars denote quartiles of data distribution

Evolution of choices:

We see choices to be relatively stable for both, advantaged and disadvantaged participants with no upwards or downwards trend (refer Fig 8).

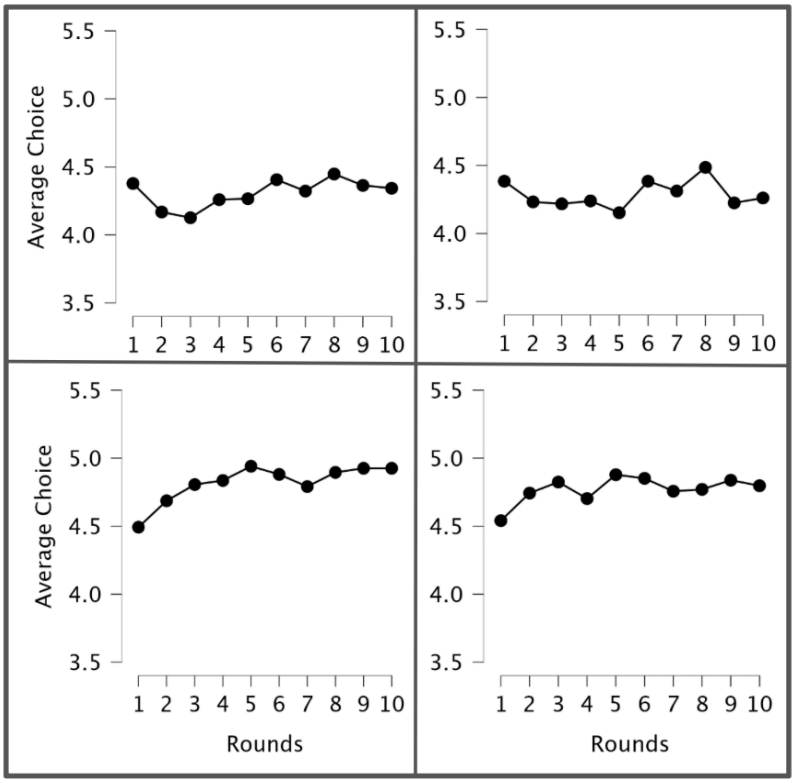

Fig 8: Beeswarm plots for average choice in each round for advantaged (top left), disadvantaged (top right) in the unequal condition, and participants pairs (bottom left and right) in the equal condition.

2.5. Interim Discussion:

The studies above form the first half of this chapter, where I tested whether providing unequal outside options could cause a spontaneous choice for inequalities. The prediction was that those who have positions of advantage i.e., higher outside options, would go for high payoffs in a coordination game, while those with positions of disadvantage i.e., lower outside options would be willing to coordinate at lower payoffs. I didn't find results supporting this prediction in study 1a, and instead found a high incidence of nearly equal distributions (note: this incidence of equality was against an equitable outcome, as participants did not balance the costs of cooperation i.e., their outside options). In study 1b, data was collected from a larger sample of a different cultural group, and a similar effect size was found as before in people's preference for equality. I then formulated two post-hoc hypotheses, which I tested in following studies: a) equal choices might be driven by the desire to coordinate, beyond the desire to maximise financial gain (as also reported by participants); since 5 provides a

mutually salient[12] choice for coordination in situations where you cannot communicate, if one of the partners starts to choose 5, one might follow that, in order to coordinate. To test this, in study 2, I paired participants with (fake) economically rational partners who would not choose 5/5 allocations, but instead choose according to their outside options; inequalities started to emerge between advantaged and disadvantaged players. b) another post-hoc explanation is that equal choices provide an insurance strategy to players: choosing 5 could establish a norm which, in the future, could be advantageous to oneself in case one is left with low outside options. To test this, I conducted study 3 where all players were guaranteed that their outside options (advantaged or disadvantaged) would remain the same throughout the game. Again, significant inequalities between advantaged and disadvantaged players' choices were seen, and the post-hoc hypothesis—that choice for equality is partially motivated as a means for being insured against varying outside options—was supported. A third post-hoc hypothesis, which could explain the prevalence of equality, is our sampling from a WEIRD population (Henrich et al., 2010): participants from a WEIRD sample are likely to prefer equal distributions in anonymous interactions, as this forms the social norm in these communities. Such social norms can then create prior expectations for behavior in novel situations, such as an abstract coordination game (Henrich et al., 2005). This post-hoc explanation remains untested at this stage, since it requires additional fieldwork, but has been planned for after the PhD thesis submission.

In both studies 2 and 3, the magnitude of inequalities created by participants - significant though they were - did not correspond with the magnitude of inequality in outside options that they were provided. The greatest inequality was seen in study 2, where the choices of the disadvantaged participants dropped most significantly (mean choice = 3.564) as they faced their 'economically rational' partner, learned their behavior, and tried to play accordingly, even if unwillingly. This is reflected in their self-reports, as these participants give the lowest fairness rating of the game. However, they don't blame their partner any more than disadvantaged participants in the other studies, nor report any lower perception of control. Surprisingly, the advantaged participants in study 2, despite being paired with someone who always chooses low payoffs, did not take advantage of the fact and remained close to 5 in their choices (mean choice = 5.381). Indeed, choices of the advantaged participants across all four studies are noteworthy: under no condition do they go much higher than 5, and in studies

[12] See Arjona et al., 2022; Grueneisen et al., 2015; Zachník, 2021, for discussions on the concept of salience in solving coordination problems

1a and 1b they choose, on an average, even lower than 5. It is interesting to note that the unequal distribution in all of the studies also corresponded to the equitable outcome, since outside options represent each individual's opportunity cost for coordinating (Bonalumi et al., 2019), and to take these costs into account, one would have to be unequal in payoffs. Thus, in choosing equal distributions, participants went against the well-known equity hypothesis of fairness, which posits that people favour equitable allocations sensitive to all costs and balancing benefits accordingly (André et al., 2022; Debove et al., 2015).

There was a general consistency between what people chose on an average across the rounds and their *judgements of fairness* about the game: higher choices i.e., 5 (+- 0.3), were correlated with higher fairness ratings, suggesting what is considered fair is close to being equal. Allocated outside options might not have much to do with these judgments; as when players got high payoffs, despite being allocated low outside options, they came to rate the game as highly fair. Close to equal payoffs also led to lower blame on partners and a higher reported sense of control (with some exceptions, albeit), and inequality tended to lead to a drop in these ratings for the disadvantaged participants. A combination of these self-reports point to the fact that people might be most satisfied with an outcome of equality in such coordination scenarios, where they play with anonymous others, though circumstances such as a guaranteed advantaged position, or being stuck with a payoff-maximising partner, may give rise to some inequality. Fairness however, remains linked with equality.

I further note, that it was always the *relative* difference between choices of advantaged and disadvantaged participants in each study that correlated with their fairness judgements, blame on their partner and perceived agency. This points to potential social comparative processes, i.e., comparing with others' payoffs, which motivate people's choices in the game and shaping their judgements. In the second part of this chapter, I explore the effects of social categorisation and social comparison on distributional decisions.

3. Part B. Introducing Social Comparison

3.1. The Social comparison Framework

Using game theoretic models of distributions, O'Connor has shown that minimal conditions might be enough to bring about cultural stabilization of inequalities. These are, a) a need for coordination, and b) the presence of social categories to ease such coordination (O'Connor, 2019). Being in a social category is often correlated with fixed outside options, and once members of one category systematically have lower outside options than members of the other category, with whom they have to coordinate, the model predicts that the payoff will systematically be distributed in unequal ways. There are many relationships demonstrating such asymmetries in bargaining power, which are stabilized into social roles (Bacharach & Lawler, 1981; Emerson, 1962) Relevant social roles include employer and job applicants, parent and child, supervisor and graduate student relationships. Roles come with specific expectations, which spark our intuitions about what is appropriate behaviour, which then guide our actions and lend to our judgments of what is fair (as well be further discussed in chapter 5).

There are two key mechanisms at play here: social categorisation and social comparison. Social categorisation can be understood as the mechanism by which individuals are segregated into and perceived to be members of a specific social category. This involves categorizing individuals based on a trait or label that they share with others, allowing one to identify those that are similar to them, those dissimilar, and consequently providing reference points against which one can evaluate one's own payoffs. This becomes the precursor enabling the second key mechanism i.e., social comparison. Social comparison refers to the process where individuals tend to find relatable others, against whom they can compare their own payoffs, formulate expectations for future payoffs and shape their judgements of fairness (Smith & Pettigrew, 2014; Smith et al., 2012). It has long been known that it is not just the objective payoffs that matter, but payoffs compared to others, especially those similar in some respect to oneself, that affects one's choices and feelings of fairness (Boyce et al., 2010). Having relatively higher incomes for instance is much more important to people than having high absolute earnings, and has the neural fMRI signatures corresponding to the joy of outperforming one's peers (Dohmen et al., 2011). In this half of the chapter, we introduce categories to explore the question, *can social categorising—with categories being associated*

with unequal outside options—lead to justification of inequalities, or are standards of equality still maintained? O'Connor's theory would predict that having social categories will lead to spontaneous creation and justification of inequalities, such that those in disadvantaged positions might come to judge low payoffs to be fair if they see other similarly disadvantaged people also having low payoffs; and the converse might be expected of advantaged people.

The next question then arises, who forms the relevant point of reference when people engage in social comparison? Social comparison theory suggests that individuals tend to compare mostly with others similar to themselves (e.g., in the same gender, employment position, SE group, racial ethnicity, or in our case with the same color group). One of the first studies on relative deprivation looked at American soldiers in WW2. The researchers noted with puzzlement, soldiers' extreme frustrations over promotions, although theirs was the department with the highest promotion frequency, more than the military police department for instance, where, incidentally, officers were more satisfied with promotions. They could only explain this by positing that it was one's *own peers* that one compares oneself to, in order to set expectations for oneself, and the frustrations would therefore arise out of a feeling of *relative deprivation* (Stouffer et al., 1949) and not an absolute one. The phenomenon of relative deprivation now forms a robust finding across various domains of human social interactions (Fitzsimmons-Craft et al., 2015; Crosby, 1976; Atkinson, 2014; Smith et al., 2012). For instance, studies exploring how women come to judge fairness of their household workload, have seen that women often tend to compare their workloads, not with their male partners, but with other women around them who might be similar in other ways (Himsel & Goldberg, 2003). Financial satisfaction can dwindle and feelings of unfairness can arise when one compares themselves with similar others who are better off (Kim et al., 2018). The other side of this is relative gratification, in which, finding that one is doing better than similar others on some domain of comparison, can increase feelings of wellness (Moscatelli et al., 2014). In the above studies, I only provided payoff information from one's partner, who thus becomes the natural referent for comparison. Now I test how distributional preferences might change, when players are socially 'categorised' and can have payoff information from similar and dissimilar others, to compare against. I expect categorisation would allow individuals to detect others who are similar or dissimilar to them, and social comparison processes would motivate one's behaviours in and perceptions of the game, by comparing own payoffs against these similar/ dissimilar others.

3.2. Study 4: Coordinating with social categories

We introduce two abstract categories, labeled by *'Red' and 'Blue', with Reds always having higher outside options of 7, and Blues always having lower outside options of 1.* We explore how information about others' payoffs influence people's distributional preferences and associated moral judgements. We implement 3 different conditions to explore under which source of comparison—partner's payoffs, similar other's payoffs, dissimilar other's payoffs—participants might go for the highest inequalities, and how it affects their moral perception of the game. We implement a 4th condition to test how participants behave when they can potentially compare with two different sources: similar others and their own (dissimilar) partner. Participants are assigned to a category, shown the outside options associated with their category as the outside options they will receive, they are then paired with a partner of the opposite category. Following this, they receive different information, based on the condition they are assigned:

C1 - Partner's choices and payoffs: Participants in this condition are given feedback about success/ failure as well as what their partner chose in each round. After rounds 5 and 10, they are also told about all the choices they and their partner made so far, indicating the payoffs each will get.

C2 - Payoffs of similar others: Participants in this condition are shown the success/ failure in each round that they coordinate, but without being shown what exactly their partner chose.

Instead, they are shown the average payoffs of players who are of the same category as themselves: for instance, a Blue player will be shown, "While you continue to play, here's how some other Blue players are performing. Given below are their average points per round". This information is provided after they play the first round, and is hypothetically constructed information, where the average payoffs correlate with the outside options of the particular category. Thus, blue players are shown to have low average payoffs, and red players are shown to have high average payoffs.

C3 - Payoffs of dissimilar others: Similar to C2, participants are only shown success/ failure of their own coordination with their partner. Then they are shown average payoffs of players of the opposite category as themselves: for instance a Blue player will be shown, "While you

continue to play, here's how some other Red players are performing. Given below are their average points per round". This hypothetical information is again provided after the first round with the average payoffs correlating with the outside options of their category.

This condition tests whether a comparison with a dissimilar other can only happen when the individual is one's partner, or also with more distant dissimilar others who one doesn't interact with.

C4 - Partner's choices + payoffs of similar others

In this condition, participants are shown what their partners chose. They are also shown the (hypothetical) average payoffs of players who are of the same category as themselves after they play the first round.

Hypotheses and Predictions:

H1: Choices in the game are based on their preference for equality
Based on this, expected average choices are, condition 1 = condition 2 = condition 3

H2: Choices in the game are based only on their Outside options
Based on this, reds will have higher average choices than Blues; also there will not be significant differences between Reds across conditions, or Blues across conditions.

H3: Choices are based on outside options + Social comparison
If this is the case, then the magnitude of inequality between Reds and Blues will vary
Comparison with similar others → acceptance of inequalities → highest inequality;
Comparison with partner/ dissimilar others → wish to earn more → lower inequality

Each participant is given only a single condition, thus we conduct a between-subject analysis using ANOVA. We will also compare the results with our previous studies, where no categories were provided.

3.2.1. Participants and Recruitment

We utilized a UK standard sample from Prolific, which balances age, gender and ethnicity. Expecting a moderate effect, we pre-registered a sample size of 576 individuals in total (144 per condition), using G*Power (d=0.3, pre-registration and experimental materials can be found at: https://osf.io/kafxs). The participants were from the ages of 20 to 60, with the mean age of 38.285 (s.d. = 12.747) and their socioeconomic status ranged from lower-middle class to upper-middle class. We excluded 7 participants due to incomplete data. The gender composition is 284 F and 292 M participants. Each participant was given a baseline payment (0.90 GBP) and bonus which was awarded according to their total points earned.

3.2.2. Results

There was significant difference (inequality) between advantaged Red and disadvantaged Blue participants across all four conditions ($F(1,563) = 211.151$ $p < 0.001$, eta^2 = 0.267), with the highest inequality seen in C3, where participants were given payoff information about dissimilar others ($t(563) = 8.211$, $p < 0.001$). However, there was no significant difference between the 4 conditions ($F(3,563) = 4.308$, $p = 0.005$, eta^2 = 0.016). Pairwise contrasts showed that Reds and Blues differed from each other in similar amounts, in C1 ($t(563) = 6.254$, $p < 0.001$), C2 ($t(563) = 6.641$, $p < 0.001$), C3 ($t(563) = 8.211$, $p < 0.001$) and C4 ($t(563) = 7.974$, $p < 0.001$) (see Fig 9). That is, participants of one category had relatively stable choices, across the conditions. On examining average choices we also note that this study shows one of the highest average choices by advantaged participants; and also the lowest average choices by disadvantaged participants, both in condition C3 and very close to what was seen in study 2, where participants played with a (fake) payoff-maximising partner.

Fairness judgments in this study were among the lowest, compared to the studies conducted before. These also varied by condition ($F(2, 560) = 8.673$, $p < 0.001$, eta^2 = 0.044), with the lowest fairness ratings seen in C3, closely followed by C4. The highest fairness ratings were seen in C1 (compared with C3 advantaged participants, $t(417) = 3.059$, $p = 0.002$) and C3 disadvantaged participants, $t(417) = 3.201$, $p = 0.001$). Surprisingly, unlike previous studies, fairness ratings were not significantly different between the advantaged and

disadvantaged participants (F (1, 560) = 3.672, p = 0.056, eta^2 = 0.006; see Table 5). When it came to reports of perceived control over one's choice, disadvantaged participants on an average always reported lower control than advantaged ones (F (1, 560) = 80.972, p < 0.001, eta^2 = 0.123), and there was a small but significant difference between the four conditions (F (2, 560) = 2.795, p = 0.040, eta^2 = 0.013). The same difference was not seen in participants' blame for their partner, which were similar for advantaged and disadvantaged across all conditions.

	C1: Partner's choices		**C2: Similar Others**		**C3: Dissimilar Others**		**C4: Partner + Similar Others**	
Behavioural Measure	**Disadvantaged (Blue)**	**Advantaged (Red)**	**Disadvantaged (Blue)**	**Advantaged (Red)**	**Disadvantaged (Blue)**	**Advantaged (Red)**	**Disadvantaged (Blue)**	**Advantaged (Red)**
Mean choice (s.d.)	3.892 (1.095)	5.260 (1.524)	3.577 (1.185)	5.029 (1.339)	3.628 (1.145)	5.401 (1.646)	3.986 (1.021)	5.703 (1.306)
Coord Success % (no. success/ total rounds) *100	82.76%		83.47%		83.86%		93.062%	
Self-Report Measure	**Disadvantaged (Blue)**	**Advantaged (Red)**	**Disadvantaged (Blue)**	**Advantaged (Red)**	**Disadvantaged (Blue)**	**Advantaged (Red)**	**Disadvantaged (Blue)**	**Advantaged (Red)**
Judgment of Fairness (scale: 1 - 7)	4.563 (1.857)	4.900 (1.729)	4.203 (1.703)	4.435 (1.736)	3.625 (1.569)	4.000 (1.899)	3.781 (1.627)	3.958 (1.795)
Blame on Partner (scale: 1 - 7)	2.662 (2.021)	2.386 (1.730)	2.594 (1.768)	2.391 (1.873)	2.486 (0.206)	2.014 (1.597)	3.068 (2.207)	2.514 (2.096)
Perceived control (scale: 1 - 7)	4.141 (1.775)	5.057 (1.760)	3.594 (1.768)	4.580 (1.794)	3.806 (1.881)	5.417 (1.489)	3.630 (1.814)	5.417 (1.726)

Table 5: Descriptive statistics for study 4 (conditions 1 - 4)

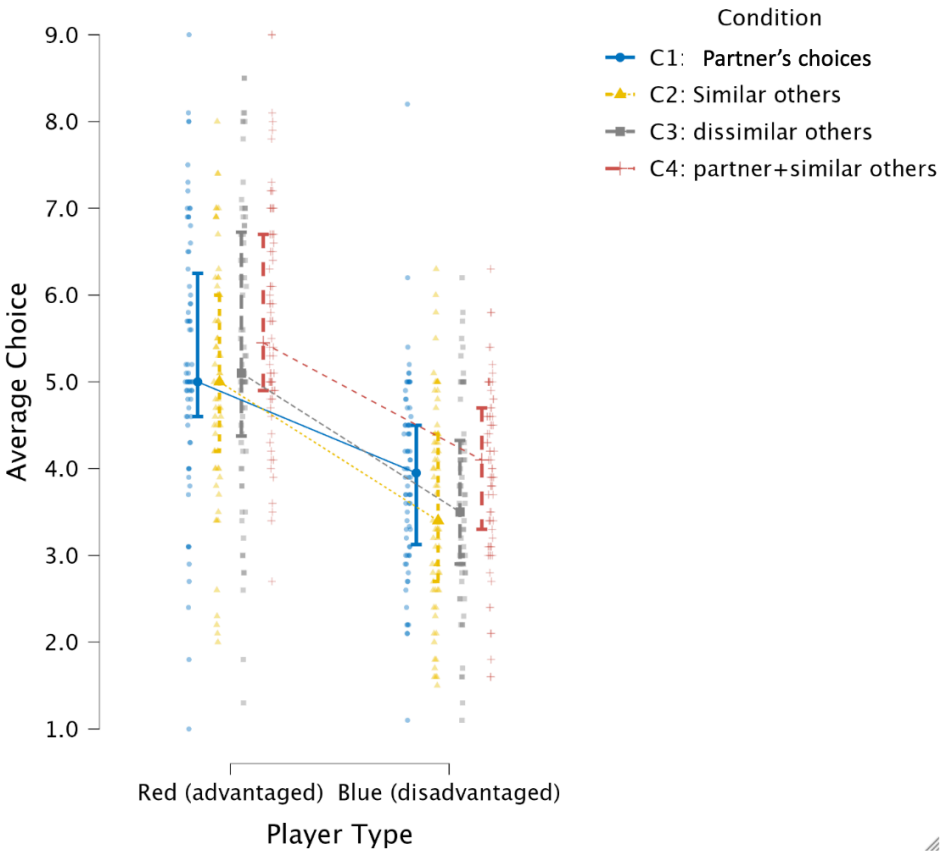

Fig 9: Beeswarm plots for average choices of disadvantaged and advantaged participants across the 4 conditions of study 4; each condition denoted by a different colour, as given in legend. Bars denote quartiles of data distribution

Evolution of choices:

We note the significant difference between advantaged and disadvantaged participants in each round of the game. Only in C4 do we see a general trend of choices going upwards, both for advantaged as well as disadvantaged participants (see Fig 10). However, in the other conditions, players' choices remain relatively stable or random.

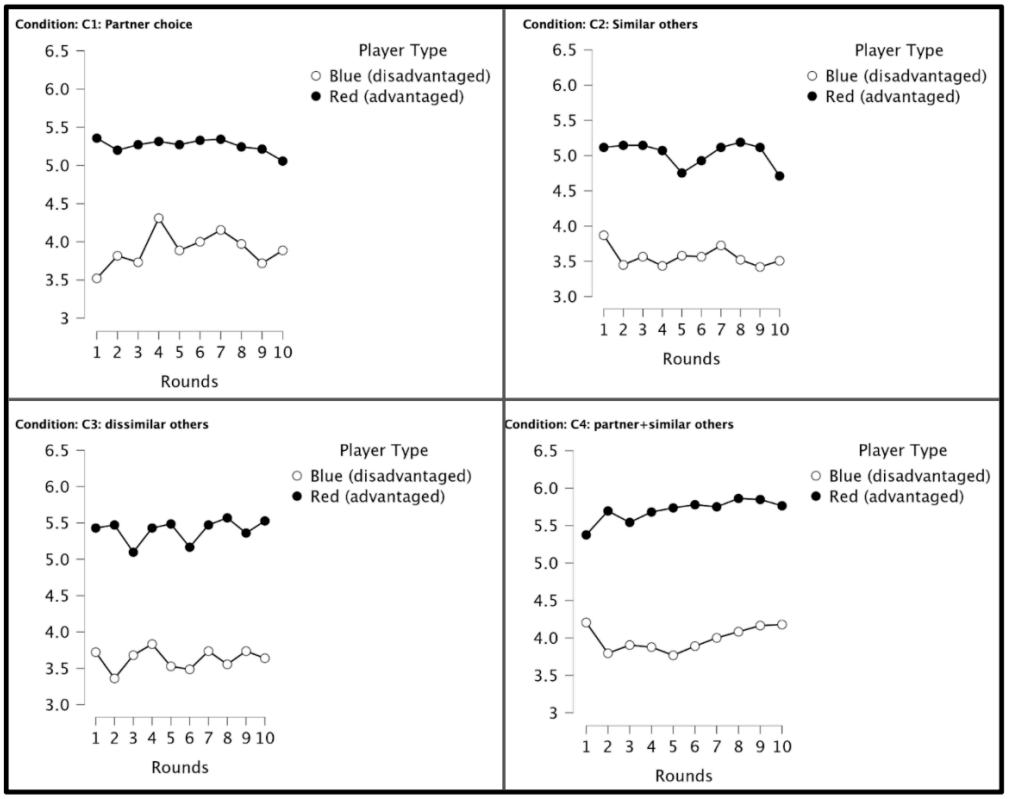

Fig 10: Average choices across rounds for disadvantaged Blues (white dots) and advantaged Reds (black dots) in study 2, from C1 - C4 (left to right).

3.3. Interim Discussion

This study shows that, where outside options by themselves might not be able to create inequalities, adding social categorisation can. This is evident from comparing condition C1 (where participants were categorised and told about their partner's choices), against studies 1a and 1b from part I of the chapter (where participants had the same information about partner's choices, but were not categorised). Significant inequality is seen in C1 and not in studies 1a or 1b, suggesting that having unequal outside options *within* the framework of social categorisation, even if they may be arbitrary categories, has a stabilizing effect on unequal distributions. This is reflected in results from the other conditions as well: magnitude of inequalities between advantaged and disadvantaged participants in C2, C3 and C4, is higher than most of the previous studies. Moreover, this study produced some of the highest as well lowest choices documented overall, using this coordination game. Taken together, the effect of social categorisation in creating inequalities becomes evident.

Why might social categories have such a role, that outside options by themselves did not have? One reason could be that they provide some sort of justification for inequalities: while randomly allocated outside options might seem like (and are) windfall money, associating these with categories suggests that it is *because* one is in a particular category that one gets high (or low) outside options. Thus, it might become more legitimate to use the bargaining power accorded by these justified outside options[13]. Further, social categories might provide a guarantee of stability of one's future outside options: if it is because of one's social category that one gets high outside options, since social categories are more or less fixed, outside options remain so too, and it becomes safe to use them in distributional decisions. This is akin to the effects of culturally stable social categories (like gender or race) in our societies. A similar effect of guaranteeing stable outside options was also seen in study 3.

Fairness perceptions of the game were not highly linked with average choices, unlike in studies 1-3. Fairness judgements varied significantly from C1 - C4, suggesting that it is not due to the amounts of inequality; and surprisingly, did not differ much between advantaged and disadvantaged participants of any condition. Certain conditions elicited generally lower fairness ratings by both advantaged and disadvantaged participants, and even those participants who had average choices close to 5 did not find the game to be particularly fair. In fact, the fairness ratings here were some of the lowest that were seen across all studies done so far, and there was no correlation between fairness and equality. This goes against predictions of social comparison (relative deprivation and relative gratification), which would suggest that having social information of similar others can enhance feelings of fairness.

4. General Discussion

This series of studies examined how people choose to coordinate and distribute costs and benefits with each other; on the one hand, equality presents to be a strong attractor for distributional decisions, especially in the context of coordinating with anonymous others with no social information. On the other hand, additional information in the form of social categories, inasmuch they legitimise and stabilise outside options, can lead to emergence of inequalities. Overarching both these observations is the finding that people, overwhelmingly,

[13] Of course, *why* one gets to be in that specific social category and not another, also begs to be questioned. However, given the preponderance of non-meritocratically assigned social categories in our contemporary societies, this might be less frequently questioned.

value coordination, in ways that they can even sacrifice some of their payoffs in order to make sure that it is successful. This is clear from participants' reports, as a majority of them said that 'coordination with partner' was their main strategy, much more than 'winning as many points as possible'; corroborating this, most pairs were able to successfully coordinate at least 80% of the time, usually more. Coordination is key for human cultural success and much of our social cognition likely evolved to solve daily coordination problems emerging in our daily lives (Binmore, 2009). Seamless coordination however, requires a focal point i.e., a behavioural solution that stands out amongst a range of possible solutions, and which is mutually salient for all parties involved (Arjona et al., 2022; Grueneisen et al., 2015; Mehta et al., 1994). This series of studies show that the point of saliency, when not much social information is available (such as is the case in studies 1a and 1b), is distributing resources equally i.e., a 5/5 allocation; however, as soon as recognizable forms of social information becomes available, such as social categories attached with outside options, the salient point for coordination shifts, and inequalities emerge. Social categories can therefore be seen as legitimising factors that beget inequalities. Both these findings correspond with O'Connor's theory on the origins of inequality, where she suggests that a) a need for coordination, and b) the presence of categories to aid coordination, are sufficient to create inequalities in societies

Another aspect to these findings is that, when uncertain of one's environment and future payoffs, people tend to go for strategies that provide implicit insurance to them: distributing resources equally even when you have high outside options, can promote social practices that ensure that if and when you are left with poor outside options in the future, you will be taken care of by your partner. As was also discussed in chapter 1, evolutionary game theorists have suggested that this is why norms of equal sharing prevailed in hunter-gatherers, who had to navigate resource-scarce environments (Binmore, 2005; 2006; Wilson et al., 2023[14]). This can be seen from the results of studies 1a and 1b in this chapter, where participants coordinate without knowing their future outside options, and end up preferring equal distributions. Then, when the uncertainty is removed and participants know exactly what their outside options will be in the future, as in studies 3 and 4, inequalities start to emerge. The latter might in fact, be the ecologically valid representation of how people make choices, as I argue in chapter 4, since we rarely get to act from behind the 'veil of ignorance'.

[14] Wilson et al., 2023 further show that when resources become predictable, not abundant and easy to monopolize, inequalities emerge in agent-based models.

My original predictions arose from reviewing a large number of studies, which have shown that individuals who have higher bargaining power tend to care less about others and have lower social preferences, in terms of being more egocentric (Galinsky et al., 2008; Willis & Guinote, 2011), reluctant to delegate decision rights (Fehr et al., 2013), give less in bargaining situations (Draganska et al., 2010), are less attentive to others (Fiske, 2018; Gruenfeld et al., 2008; Schmid Mast et al., 2009), and often display high degrees of moral hypocrisy (Lammers et al., 2010). It has been debated whether such behavior might be driven simply by economic interests to maximise one's payoffs, or is it because those with power tend to think they deserve more in negotiations (Mallucci et al., 2019).

If all the studies conducted and presented here are taken into account, the results show a somewhat rosy picture of human nature: people do not immediately use their windfall bargaining power, it takes some legitimising and justifying of these inequalities for them to start doing so. Social structures and social norms usually provide this justification. In the next chapter, chapter 5, I will go on to argue that these norms are a crucial part of our relational concerns, which shape our judgements of fairness. The results here bring out the queer discord that stands in the academic literature on inequality: inequalities in division of labour and resources are highly common in the world; however, using abstract economic games like Ultimatum, Dictator, Public Goods Games or other similar money-division games with anonymous others in socially-sterile environments, equal distributions become increasingly common. One reason could be that the context of these abstract games are peculiar and do not correlate with real-life domains of activities, where money has to be earned, windfall endowments are rare, and where rich social information about others whom we coordinate with, is usually available; a problem that I tackle in the next chapter by bringing more socially relevant experimental stimuli. The other reason could be that, both, a preference for equality and a motivation to be unequal, coexist in our social cognitive repertoire and are used in different contexts; I believe this second explanation is what the above series of studies go on to show.

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Chapter 5. Relational Concerns in Fairness Judgements
Moving towards a Relational Theory of Fairness

Across the previous chapters, I have noted an effect of social norms (such as in chapters 1 and 2), others expectations (in chapter 2), and social categories (in chapter 4) in shaping how we decide to distribute resources and labour. I term these as relational aspects—i.e., arising from a preference to attend to various aspects of our social lives. In this chapter, I discuss these relational aspects of fairness judgements in further detail, bringing forward my novel contribution to an understanding of fairness, i.e., how salient social roles and relationships, along with the associated expectations, shape what we judge to be fair. I suggest that, when people make judgments about the fairness of distributions, they do so not just as calculators of costs and benefits, but as socially situated beings who are sensitive to relevant social relationships. They understand that people play particular roles within a larger social fabric that shapes their identities and expectations, and that their self image is affected by appraisals of how well (or not) they perform these roles. This, I believe, is key to understanding fairness not only as it manifests in conditions of equality, but fairness judgements as they manifest in situations of inequality, such as in GDHL; this insight is crucially missing from current psychological accounts of fairness, and is what I aim to put forward with my PhD research. I designate here as *relational concerns* the considerations that arise from these roles and relationships, and study how they affect judgments of fairness. A series of vignette studies is used to explore how relational concerns compare with the impartial principles of equity and equality that fairness is commonly held to entail. I provide evidence that for participants based in the UK and in India, relational concerns are important for judging the fairness of distributions where people coordinate around shared goals, with important differences across cultural communities. This demonstration will provide grounding for a larger *relational theory of fairness,* which I aim to develop in my postdoctoral research. Throughout my PhD, I have insisted on an interdisciplinary study of fairness, which combines anthropological understanding of human societies and knowledge of the cognitive mechanisms which produce fairness judgements. I believe a relational theory of fairness provides the theoretical framework for exactly such interdisciplinary work. The conceptualization of this chapter was heavily collaborative; however the data collection, analysis and writing was done independently by myself and thus, the chapter is written in first-person singular pronouns.

1. Background

People routinely make moral judgements about distributions of costs and benefits. Consider, for instance, two colleagues working together on a task; one might reflect on whether the other has put in enough work. Or a couple in the throes of divorce, deliberating over how best to divide their shared possessions. That same couple might routinely appraise how their household chores are distributed, assessing whether the division is satisfactory and aligns with their expectations. When engaged in such coordination ventures with shared goals, answers to questions like who should bear which burden, or receive which good, are what I refer to here as judgments of fairness. Fairness judgements are then moral appraisals, with normative components, concerning distributions of costs and benefits. Moving away from an abstract experimental paradigm as was used in chapter 4, in this chapter, I focus on how people judge fairness when it comes to well-known, everyday situations, arguing that these judgments are informed by *relational concerns.* Relational concerns arise from considering the relationships of those involved, and the various rights or duties that may be attached to the roles that each individual takes in these relationships. This builds upon the observation from chapter 4, that even minimal social information such as being part of a social category, is relevant information for fairness judgements. Here, *relational roles* refer to the social position of a person, which includes well-known social roles, such as being someone's wife, uncle, work colleague, etc, which specify expectations about patterns of behaviour at the level of cultural communities. It also includes more specific relationships that arise spontaneously out of a history of interactions between individuals, such as specific types of friendships. Relational roles are thus constituted by mutual expectations which, I shall argue, carry moral value and influence fairness judgments. Moreover, people are very often invested in the roles they perform, and favour distributions that enable them to maintain their image as capable occupants of these relational roles. I term this preference *self image*. I argue that relational concerns - which include both considerations about whether people adhere to their relational role and their preference for maintaining their image in this role - inform fairness judgements.

Relational concerns have not figured in experimental research on fairness to date. On the contrary, most such research makes a point of insisting on the anonymity of those involved in a distribution, and on downplaying the relevance of personal relationships. This has led to a

deliberate blindness to relational and contextual elements such as the social roles or statuses of protagonists (e.g. Cullity 2004; Newey 2015), something that we also noted in our anonymous coordination games in chapter 4. Dictator and Ultimatum games, which constitute the leading format for empirical studies of fairness judgements, typically offer little or no information to participants concerning their relative social position (e.g. Nowak et al., 2010; Rand et al., 2013; Schulz et al., 2014; Bolton et al., 1998). Early work in the field justified the anonymity of participants by the need for experimental control; this could be achieved, according to researchers, by eliminating variables connected with interpersonal perceptions, prejudices, and the like (Siegel & Fouraker, 1960). However, these same researchers also acknowledged that anonymity may lead to low external validity, and that interpersonal factors should be studied by systematic manipulation - a concern that has not been heeded in subsequent work. One of the pioneering papers on Ultimatum Games noted that "the group of subjects were [...] informed in advance that their opponent will be chosen by chance out of the other subgroup, so no player knew his opponent for sure", though without articulating why this should be the case (Guth et al., 1982: 370). It is noteworthy that the anonymity conditions of experiments such as these are unlikely to be met in most real-life situations. One-shot interactions with relative strangers, with easily quantifiable payoffs, remain removed from the temporalities of situated moral judgements, that people typically make within unfolding, long-term social relationships.

Another reason for the emphasis on anonymity may be the longstanding assumption that judgements of fairness - and perhaps moral judgements in general - must be impartial if they are to be genuinely moral. Indeed, fairness is sometimes simply conflated with impartiality, as though the two terms were virtually synonymous (e.g. Shaw 2013; Cullity 2004); or strongly tied to impartial principles of proportionality (e.g. Aristotle 1980), equity (e.g André & Baumard, 2011.) or egalitarianism (e.g. Binmore, 2004; 2009). Such accounts appear to privilege what Baier (1954) called "the moral point of view", which presupposes an impartial, independent and objective observer; or as Williams (1974: 198) put it, an assumption that "moral thought requires abstraction from particular circumstances and particular characteristics of the parties, including the agent, except insofar as these can be treated as universal features of any morally similar situation." Normative moral philosophies from Smith's impartial spectator and Kant's categorical imperative through to Rawls's original position have likewise tended to articulate ethical progress as a move away from a preoccupation with relational concerns, towards an ever more abstract and ostensibly

universal perspective. In such normative accounts, the value of personal relationships is downplayed along with other unique features of the specific contexts of moral deliberation (e.g. Blum 1980; Oldenquist 1982). But as Lee and Holyoak (2019) point out, "few of us will ever have to choose whether to redirect a runaway trolley so as to kill one stranger in order to save five others; [though] many of us will have to choose whether to support our own children or donate our income to charity" (see also Bloom 2011). Some voices in feminist philosophy have also stridently critiqued the impartiality bias of justice-based morality, arguing instead for the ethical significance of social relationships of care, responsibility and mutual consideration (e.g. Gilligan 1993; Noddings 1984). Our claim is that while impartiality may be central to the *ideology* of the (English) concept of fairness, and might feature often in evolutionary accounts of fairness (as shown in chapter 1), in practice, it is only one among a range of concerns that people may take into account (see also Niemi et al. 2017).

In economic games, there is already evidence to suggest that removing the condition of anonymity brings about changes in cooperative behaviour. For instance, the introduction of a personal name can increase giving in a Dictator game (Charness & Gneezy, 2008), and lead to higher levels of prosociality (Camerer & Thaler, 1995). Even experimentally-assigned roles matter: when participants were assigned to be primary decision-makers in a charity organisation, for instance, they were much more likely to abide by the goals of the charity in distributing resources (Karuza & Leventhal, 1976). In the experiments conducted in chapter 4 (part B), we saw participants take into account the outside options linked with their social categories. Shared expectations concerning what one ought to do are clearly significant (e.g. Bicchieri & Chavez, 2010; Hoffman et al., 1994). In anonymous Dictator Games, participants were shown to be driven by ideas about what their partners are entitled to expect, given their role in the game (Heintz et al., 2015). Also relevant may be the extent to which people *identify* with their own roles and derive satisfaction from performing them well. Consider, for instance, the abundant evidence suggesting that women - virtually everywhere - do a disproportionately higher share of everyday household chores than men, and yet often purport to find this fair (Braun et al., 2008; Lennon & Rosenfield, 1994; Nakamura & Akiyoshi, 2015). This, as we extensively showed in chapter 1, cannot be explained by theories of fairness which focus simply on principles of equity and equality. Instead, conventional gender roles shape shared expectations about how chores can and should be distributed within the household, and those endorsing such roles may be more likely to judge such unequal

distributions as fair. Moreover, there is a personal satisfaction to be derived from the successful performance of one's role as a wife or homemaker. The social psychological literature has shown that the successful performance of roles facilitates positive social relationships and helps people feel connected to others, especially if they are well suited to the role (e.g. McCall & Simmons, 1978, Sarbin & Allen, 1969). People are motivated to meet role-related expectations because doing so facilitates rewarding social interactions and mutual exchanges of support (e.g. Stryker 1987), and allows them to meet various psychological needs, including deriving feelings of competence, authentic self-expression, and wellbeing (Bettencourt and Sheldon 2001).

Our hypothesis, then, is that fairness judgements will be significantly influenced by the expectations generated by *relational roles*; and by the associated desire to derive recognition and/or self-esteem through the successful performance of these roles, thereby strengthening *self image.* Taken together, these comprise what I refer to as *relational concerns*, and I predict that these will complement, offset, or counterbalance considerations of *equity* (i.e. that rewards or benefits should be proportional to peoples' respective contributions, or labour inputs) and *equality* (that people receive the same benefits or incur the same costs). To test this, I devised a series of hypothetical scenarios in which participants were asked to rate the importance of each of these four factors. Each scenario described protagonists in a familiar social relationship, involved in relatable, everyday coordination activities. I predicted that participants would endorse the relevance of relational concerns (i.e. relational roles and self image) to a similar or greater degree than equity or equality for constituting the overall fairness of the arrangement.

Whereas the vast majority of empirical studies of fairness to date have concentrated on distributions of windfall benefits, such as money (e.g. Carlsson et al., 2013), or the outcomes of cooperative endeavours (e.g. Baumard et al., 2012), our focus here is on questions of fairness in relation to distributions of labour inputs. Relational concerns are especially relevant here insofar as many culturally stable roles are closely linked to the division of labour from the outset; this is precisely the coordination problem they evolved in part to solve (O'Connor, 2019). The delegation of tasks between males and females has been a central principle of social organisation for most of human history (Sanday, 1981); while the challenges of efficient coordination in large-scale economies demand an ever more advanced division of labour. I suggest that scenarios in which people assess who does what within an overarching division of labour are exceedingly common in everyday life; and may well have

greater ecological validity than scenarios involving allocations of material resources which, despite their resonance with the economist's interest in distributions of wealth across populations, are further removed from most people's routine concerns.

Studies 1a and 1b assessed the importance of relational concerns for fairness judgments, with three sets of participants drawn from Prolific UK. These participants demonstrated a high and consistent endorsement of self image, and a significant, but more variable, endorsement of relational roles. For Study 2, I devised a new set of vignettes, with relational roles more closely tailored to a specific cultural context. I recruited participants in-person from two distinct socioeconomic classes in Pune, India, and sought to explore whether - and how - these communities differed in their endorsement of relational concerns. Here, too, I found persuasive evidence for the importance of self image in particular. Moreover, I found that these distinct socioeconomic communities, even within the same city, can vary significantly in their judgments of fairness as a result of divergent attitudes towards relational roles.

2. Study 1a

2.1. Methods and Materials

Study 1a tested the importance of relational roles and self image relative to equity and equality in fairness judgments concerning cooperative arrangements (the social condition). In order to ascertain a baseline for relevance, I used control vignettes in which all social information had been removed (the asocial condition).

2.1.1. Condition: Social

I, along with Harry Walker, designed a set of 10 vignettes in which two named protagonists, with a clear relationship to one another (e.g. as siblings, work colleagues, spouses, etc.), are working towards a shared goal (e.g. a dinner party, paperwork, olive picking, etc.) from which both benefit, though they are described as providing unequal inputs (in terms of labour). See example vignette below (Fig 1), full set of vignettes can be found in the preregistration document: https://osf.io/n89fp and in the SI. Participants were shown 4 vignettes in turn, randomly selected from the set of 10. A comprehension question was used to ensure each vignette had been read carefully. Participants were then asked: 'How relevant are each of the following, for ensuring a fair outcome?' They were provided with four

options, presented in randomised order, whose relevance they were asked to assess on a 5-point Likert scale (from 1, 'not relevant at all', to 5, 'extremely relevant'). A verbal Likert performed better than a numerical Likert in our pilot studies, so we retained that for the following studies. Moreover, since we hypothesised that relational roles and self image might be considered to be similarly relevant as equity and equality concerns, it was important that participants be able to rank each option on its individual merit, (for instance, score 3 'somewhat relevant' for multiple options), thus a likert rating of each individual option was preferred over other methods, such as rank ordering. This has then been applied uniformly across all studies. The four options in each vignette were formulated along the following lines (see Fig 1 for an example):

Relational Roles

Alignment with shared expectations regarding duties or behaviour patterns arising from a protagonist's position within a recognizable relationship (e.g. as a wife, work colleague, neighbour, etc.) or specific history of interpersonal interaction.

Self Image

A representation of the protagonist - as held by them or by others - as a competent occupant of the relevant relational role is maintained or strengthened.

Equity

The protagonists achieve a proportional balance of costs and benefits, e.g. insofar as a) one protagonist receives greater rewards for their greater effort; b) one protagonist is more skilled or experienced, requiring lesser time spent on a given task for a similar outcome; or c) a more burdensome task is performed for a shorter duration.

Equality

The protagonists equalise the overall time or effort they invest in shared projects.

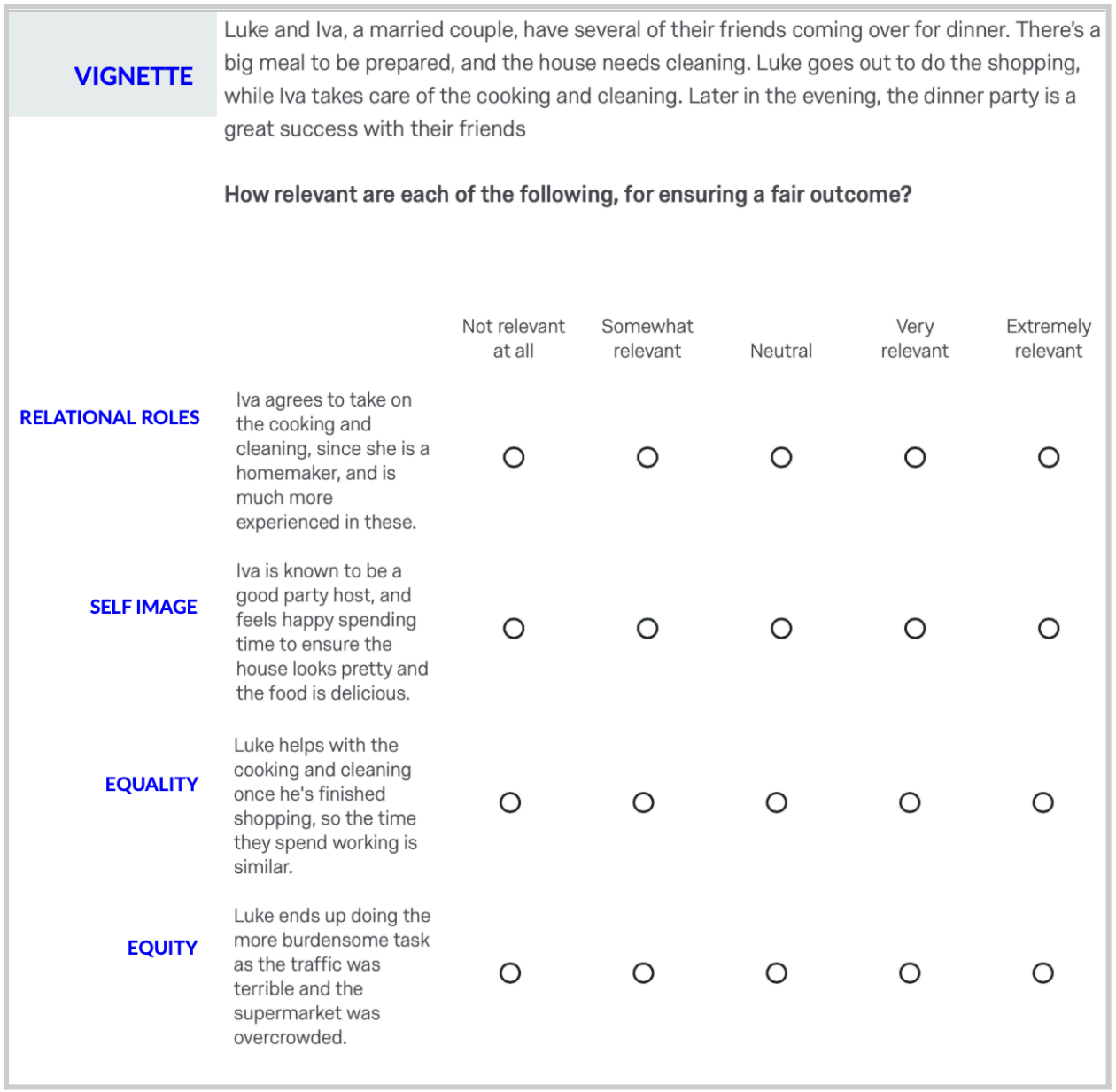

Fig 1. A sample vignette for study 1a (condition: social), in the layout as was presented to participants. The labels in blue were not shown to participants and are added here for clarity.

2.1.2. Condition: Asocial

In order to determine whether a null average (1 or 'not relevant at all' on the Likert scale) or random average (3 or 'neutral' on the Likert scale) represented the baseline for relevance of an option, I used a series of asocial vignettes. These followed an identical format as before but with persons replaced by asocial objects (e.g. computers, power plants, water taps) that are coordinating towards a joint goal (e.g. computing a dataset, delivering electricity, filling a vat) though providing unequal inputs. Full vignettes can be found in the preregistration

document: https://osf.io/atswk and in the SI. I also sought to confirm, via this control, that participants were able reliably to comprehend and calculate proportionality in the context of wordy experimental stimuli.

After successfully answering a comprehension question, participants were asked how relevant each of the four options were to make the inputs (of the given objects) proportional to the output (of those objects). Each option corresponded to one of the four factors discussed above, and participants were asked to provide Likert-scale ratings from 1 (not relevant at all) to 5 (extremely relevant) for each. Importantly, only option 3 fulfilled the proportionality criterion specified in the question. Each participant was shown all 3 vignettes from the set, in random order, with the order of each option also randomised. They were operationalized as follows:

> Option 1 (similar to relational roles): Valuation in terms of brand and price
> Option 2 (similar to self image): Considerations of advertising, reputation and quality
> Option 3 (similar to equity, and the only correct answer to the question): Costs are proportional to benefits (e.g. because the two machines perform differently; or are rewarded differently).
> Option 4 (similar to equality): Costs or benefits are equalised (i.e. when engagement in another task is taken into consideration).

I collected data (via Prolific) from 178 participants for the social and 176 for the asocial condition, both gender-balanced, based on a pre-registered power analysis. Each participant provided relevance ratings for four options (relational roles, self image, equity and equality in the social condition; or options 1, 2, 3 and 4 in the asocial condition) per vignette. Relevance scores were averaged out over vignettes such that each participant received single scores for relational roles, self image, equity and equality in the social condition (or for options 1, 2, 3 and 4 in the asocial condition). An average, resulting in a continuous distribution, was chosen over other central measures to give the most accurate representation of an individual's overall preference for any specific factor in fairness. Other measures would provide unrepresentative preferences (such as mode, where a participant who rated 'self image' to be 'extremely relevant' (likert scale 4) in 3 vignettes and as 'somewhat relevant' (likert scale 3) for 2 vignettes, would be shown to have rated 'self image' as extremely relevant for the entire set of vignettes; an unrealistic representation of underlying preferences). Similar approaches of

converting ordinal responses to a continuous scale have previously been used before (Krupka & Weber, 2013). This continuous measure of relevance ratings was then analysed using repeated-measures ANOVA to test for statistically significant differences between relevance ratings of the four factors. A vignette-by-vignette analysis was not included, since an exploratory mixed model analysis (with fixed effects of 'option' + random effect of 'vignette') showed no significant variation across vignettes (results in SI). This was moreover the decision, since our theoretical aim was to understand the importance of relational concerns *across* various domains of social life, and find multiple domains where such concerns might be similarly relevant. In the social condition, I conducted pairwise contrasts to test whether relational roles, specifically, differed from equity and equality, repeating this for self image. In the asocial condition, I ran pairwise contrasts for option 3 with the other three options. I further compared relevance ratings across conditions to check whether relational roles and self image were significantly above the ratings given to irrelevant options (1, 2 and 4) in the asocial condition.

Ethical approval for all studies presented below was obtained from the Psychological Research Ethics Board at Central European University on 24. 05. 2022.

2.2. Results

Descriptive statistics can be found in the SI. In the social condition, I found that the rated importance of self image aligned with our predictions, as not being significantly different from equality ($t = -0.535$, $p = 0.593$) and significantly more relevant than equity ($t = 3.567$, $p < 0.001$). Relational roles, however, were significantly less important than both equity ($t = -7.558$, $p < 0.001$) and equality ($t = -11.660$, $p < 0.001$; Fig 2 - left). Descriptive statistics can be found in Supplementary materials. To understand participants' relevance ratings, I compared the social with the asocial condition (Fig 2, right). Self image was significantly more relevant than all the irrelevant options, while relational roles were significantly higher than one (option 1) but only slightly higher than two other irrelevant factors (options 2 and 4). This led to two significantly different baseline numbers for what would count as irrelevant options. To find a more reliable baseline, I implemented another control in study 1b.

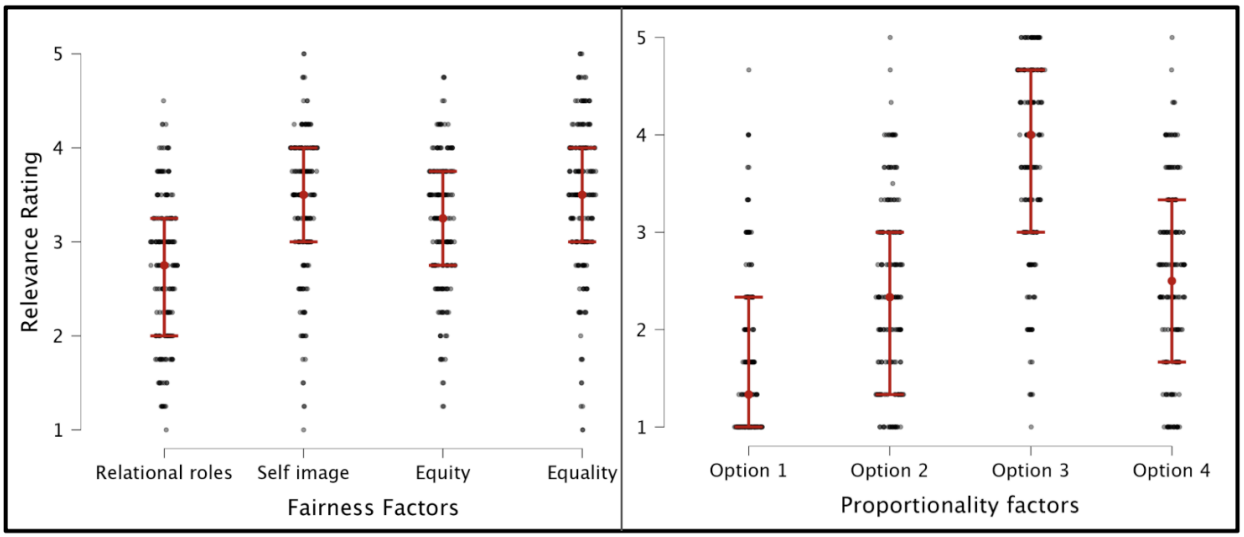

Fig 2: (Left) Beeswarm plot showing average relevance of relational roles, self image, equity and equality; the numbers translate to the points of the Likert scale, with 1 noting 'not relevant at all' to 5 noting 'extremely relevant'; (Right) Beeswarm plot of average relevance of options 1, 2, 4 (irrelevant factors, providing baseline for judgement) and option 3 (relevant factor). Red bars denote quartiles of data distribution

3. Study 1b

3.1. Methods and Materials

This study was carried out to incorporate an alternative experimental control: an irrelevant option given in the social vignette itself. This option provided information with no relevance to the question of fairness in a joint task, such as the protagonist's physical attributes, vacation preferences and the like, and was introduced to obtain the baseline ratings for irrelevance. I also narrowed down the set of vignettes to be studied. Qualitative and quantitative responses from Study 1a suggested that there were specific social scenarios where relational considerations were more relevant for our given demographic of UK Prolific participants; based on which I narrowed down our total set of vignettes to 5 (full vignettes in supplementary materials and in preregistration https://osf.io/d8ckf). After reading each vignette, participants were asked the same question, 'How relevant are each of the following, for ensuring a fair outcome?' A 4-point Likert-scale was chosen for getting relevance ratings, removing the 'neutral' option. Each participant was shown all 5 vignettes in a randomised order, asked a comprehension question, asked to judge relevance for fairness and then shown the five options in a randomised order.

I collected data from 155 participants via Prolific, with the same demographic distribution as study 1a and 1b. The relevance score for each factor was averaged for every participant, as before. I then ran pairwise contrasts for relational roles with equity, equality and irrelevant, repeating for self image.

3.2. Results

Descriptive statistics are provided in supplementary materials. Pairwise contrasts show us that while relational roles was still significantly lower than equality ($t = -4.319$, $p < 0.001$), it was now not significantly different from equity ($t = 0.163$, $p = 0.871$), partially aligning with our predictions, and significantly higher than irrelevant options ($t = 28.279$, $p < 0.001$; Fig 3). Self image align with our predictions fully, by being similar in relevance rating to equality ($t = -0.364$, $p = 0.714$), significantly higher in relevance ratings than equity ($t = 4.116$, $p < 0.001$), and significantly higher than irrelevant ($t = 32.232$, $p < 0.001$). This study sets the baseline for irrelevant options at 1 i.e., 'not relevant at all' on the Likert scale.

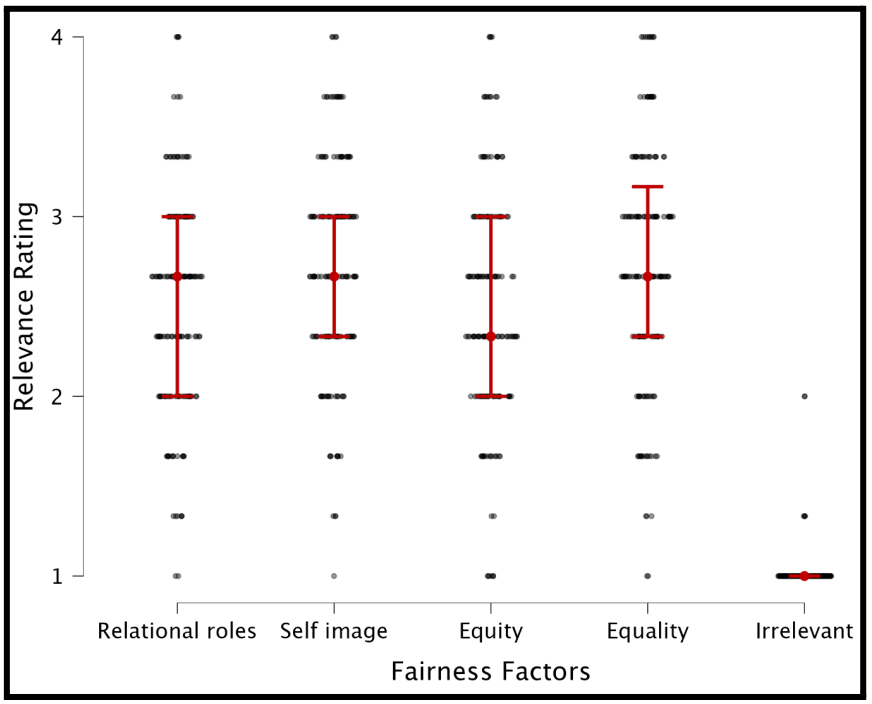

Fig 3: Beeswarm plot showing average relevance of relational roles, self image, equity, equality and irrelevant options; the numbers scale translate to the points of the Likert scale, with 1 noting 'not relevant at all' to 4 noting 'extremely relevant. Red bars denote quartiles of data distribution

3.3. Interim Discussion (1a and 1b):

Studies 1a and 1b demonstrate an overall significance of relational concerns in judgments of fairness. Self image, in particular, was endorsed very strongly; more so even than equality in some cases. These results were replicated with two different sets of participants, making the findings robust. The consistently high rating demonstrates that it matters very much to people whether they are perceived as being adequate—even proficient—in the role that they occupy; and being able to fulfil this preference is highly relevant in their moral judgments. Relational roles remained significantly above irrelevance, but showed inconsistency with our predictions (lower than equity and equality in study 1a, but similar to equity in study 1b). This may have been due to the lack of cultural specification of our participant pool in Studies 1a and 1b. As noted earlier, culturally stable social roles—the kinds of roles salient in a given cultural community and the expectations surrounding them - arise from a larger repertoire of culture-specific norms, beliefs and practices. Roles based on gender, family, or hierarchical relationships might be relatively prevalent in the organisation of social life in certain traditional or collectivistic cultural contexts, for instance, whereas roles associated with the workplace could be more salient in modern or urban contexts, where ideals of impartiality or meritocracy may also have greater sway. In other words, given the ways in which relational roles are likely to be culturally specific, our generic Prolific sample may have made it difficult to target the most relevant roles. I therefore conducted a follow-up field study where I could be confident of the cultural background of participants, and used this to further explore how groups may differ in their endorsement of relational concerns.

4. Study 2:

With Study 2, I aimed at providing further evidence that fairness judgments are sensitive to relational roles. I reasoned that fairness judgments should vary across cultural communities when these communities endorse different relational roles; or the same roles to a different degree. For instance, a feminist would not endorse the expectation that women should do the household chores, and would consequently be unlikely to find a distribution based on such conventional gender roles to be fair. By contrast, a social conservative may be more likely to take gender roles into account when judging fairness. I identified two cultural communities in India which I anticipated, on the basis of preliminary ethnographic work, would endorse a set of well-known and widely spread social roles to different degrees. I thus predicted that these groups would differ in their fairness judgments.

I designed a set of vignettes tailored to the cultural context of Pune, India. I recruited participants from two distinct socioeconomic groups, both of whom reside and work in the metropolitan city, often in close spatial proximity, but which differ widely in terms of cultural background and normative expectations. For instance, I knew from experience that a new wife within a lower SE household would commonly be expected to take care of a majority of household chores, like cooking, cleaning and washing; but that this expectation would be weaker, or even absent, in a higher SE household (especially in certain urban areas). Generally speaking, social class in India appears broadly to correlate with exposure to Western value systems and ideas, including individualism (Rao et al., 2013), with higher SE groups often displaying a preference for individualistic values and lower SE groups maintaining a stronger emphasis on the ties of kinship and community. I designed vignettes that made reference to traditional social roles based around gender and family norms and, on this basis, predicted that appeal to these relational roles would be significantly higher among lower SE participants when making fairness judgments.

India was chosen as our site of study for three reasons. Firstly, India has been reported to show high degrees of embeddedness in social ties and family relationships, and a strong sense of duty to others (e.g. Panda & Gupta, 2004; Sinha et al., 1994; Pandya & Bhangaokar, 2024). This makes it a good place to test for relational concerns. Secondly, India hosts a great amount of cultural diversity, which in part correlates with an enormous socioeconomic divide, thus providing scope for exploring cultural contrasts in a relatively controlled way. Thirdly, I am an Indian national who has lived in Pune, and thus had the necessary linguistic and cultural competence to work there effectively.

4.1. Materials and Methods:

I used a set of 5 vignettes which describe everyday life scenarios in India. Participants were classed by sight (details below) into higher and lower SE groups. These were found in the same localities of Pune: lower SE individuals frequently engage in jobs that serve higher SE individuals, who often in turn work for larger national or international companies and institutions. I then confirmed the class membership of participants based on self-reports of education levels, occupation type, income, parents' education and income, and residence. Detailed description of the two groups is given below:

Lower SE Group: This group comprised of individuals working in the lower strata of manual labour or blue-collar jobs and in the informal sector (Naik, 2009), including housemaids, domestic cooks, security guards, cleaning staff, janitorial staff, roadside vendors and auto drivers. Many were illiterate or lacked formal education; most did not speak English. These individuals often lived in slums within the city or commuted from neighbouring villages, but worked in urban areas like malls, marketplaces, universities or corporate hubs. They were generally easy to identify based on the jobs they were doing, how they were dressed, a distinct style of speaking, and other physical cues. Lastly, individuals in this group have parents who are also likely to be uneducated and are/ were engaged in agriculture or other blue-collared professions.

Higher SE Group: This group included individuals from the upper strata of white-collar jobs, and were recruited from locations such as upmarket coffee shops , elite gyms, high-end restaurants, etc.. These participants tended to be fluent in English and were engaged in a wide variety of (high-paying) jobs. The group also included students completing their higher education (BSc, MSc, PhD). They lived in more desirable neighbourhoods in the city and often adopted a Western style of dress. Parents were likely to be well-educated and also engaged in white-collared professions (though many mothers were reported to be housewives).

This study was conducted in person, with participants given the option of completing the study in either English or Hindi, either on the experimenter's device or using pen and paper. Some participants were later asked to participate in a short, open-ended interview, which was recorded and analysed for qualitative data. As the lower SE group comprised mostly illiterate participants, the experimenter read out the study materials so they could answer verbally. The vignettes were accompanied by animated pictures of the two protagonists, to aid understanding. The procedure was otherwise the same as in Study 1b (see example vignette below (fig 4) and full set of vignettes can be found in supplementary materials and in the preregistration https://osf.io/m3utf).

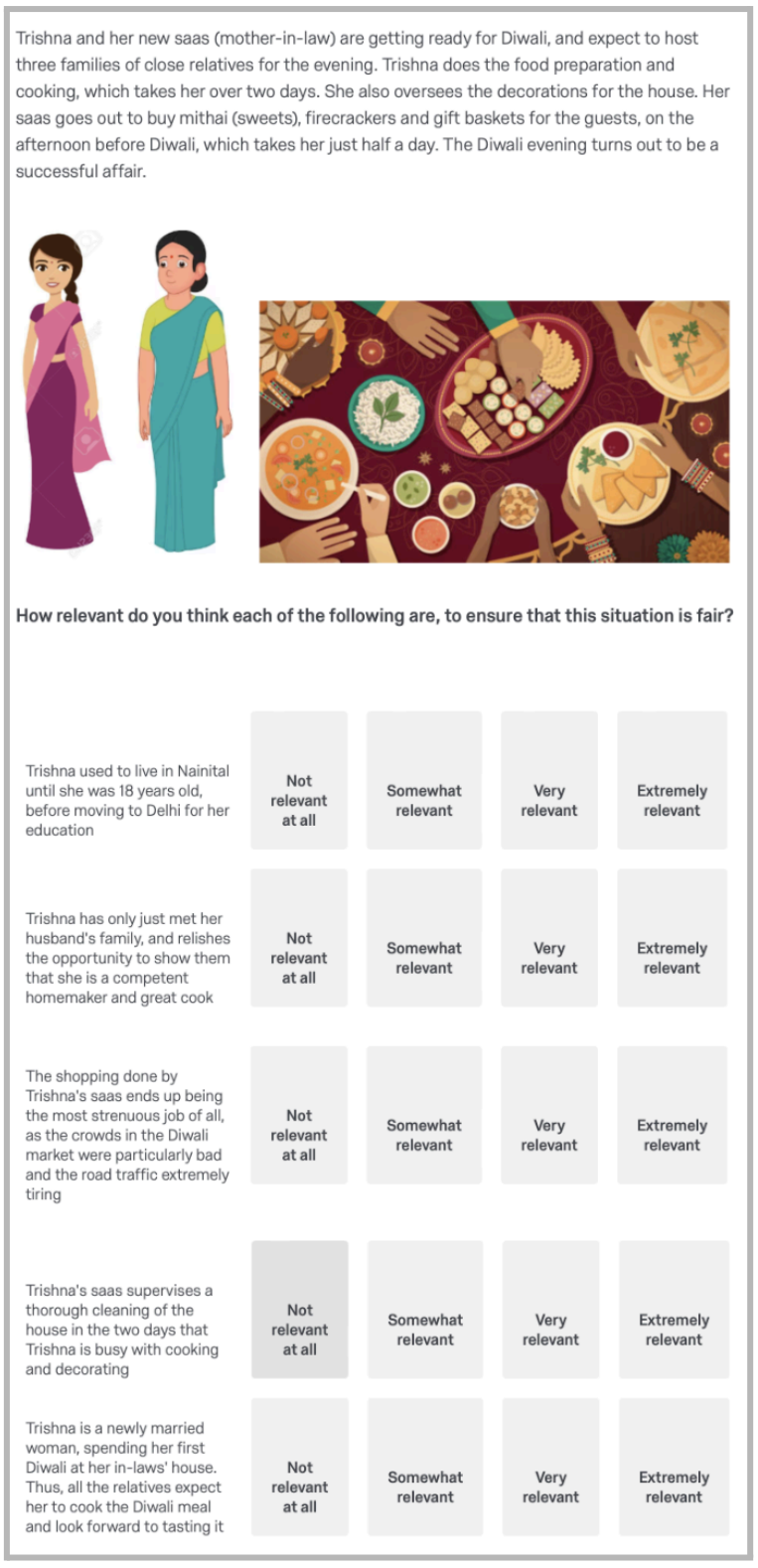

Fig 4. A sample vignette for study 2a, in the layout as was presented to participants. The options denote the following factors (from top to bottom), which were randomized for every participant: irrelevant, self image, equity, equality, social roles.

4.2. Study 2a

I collected data from a gender-balanced sample of 38 participants (higher SE group - 21, lower SE group - 17), based on a pre-registered power analysis (https://osf.io/m3utf). I conducted a repeated-measures ANOVA. Similar to studies 1a and 1b, the relevance score for each factor was averaged out over the 3 vignettes for each participant, and I tested whether relational roles were rated significantly higher in the lower SE groups than higher SE groups, repeating the same with self image. Further, I repeated our pairwise contrasts from previous studies testing relational roles and self image in comparison with equity and equality concerns within each group.

4.2.1. Results:

Descriptive statistics can be found in the SI. The higher and lower SE groups differed from each other in their average ratings, F (df 4) = 2.812, $p = 0.028$. As predicted, relational roles were deemed more relevant for ensuring fairness by the lower SE than by the higher SE group ($t = -4.226$, $p < 0.001$). Self image was also deemed more relevant by the lower SE group than the higher ($t = -2.076$, $p = 0.04$; Fig 5). Relational concerns (i.e., relational roles and self image) were overall slightly more important than equity and equality for higher SE individuals, though not significantly so ($t = 1.246$, $p = 0.215$). In contrast, relational concerns were significantly more important than equity and equality for the low SE group in their fairness judgments ($t = 2.481$, $p = 0.014$).

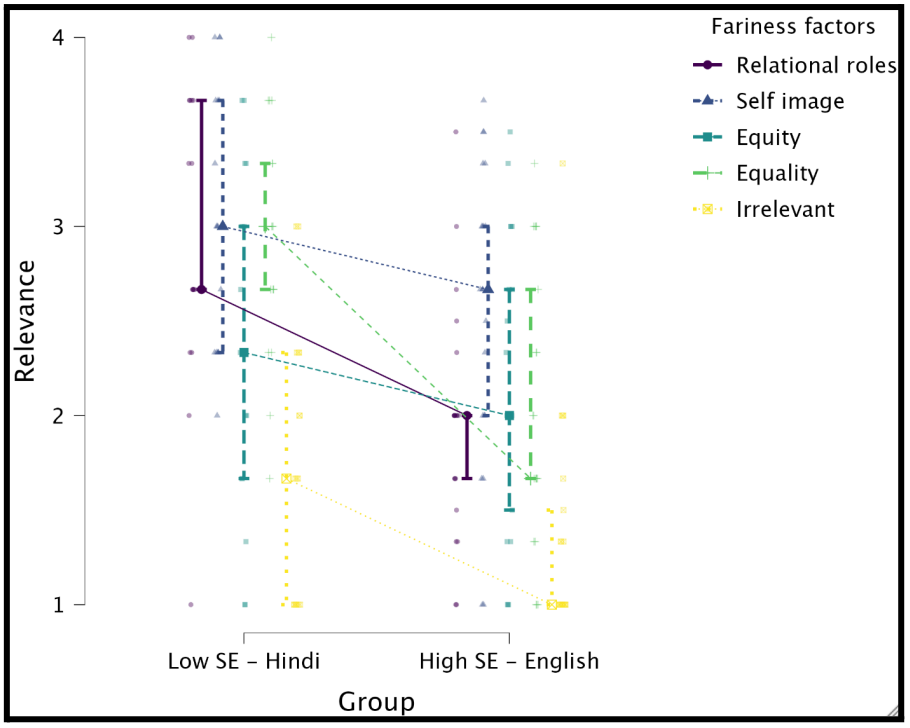

Fig 5: Beeswarm plot showing average relevance of relational roles, self image, equity, equality and irrelevant options in the two groups of participants (lower SE and higher SE); the numbers scale to points of the Likert scale, with 1 denoting 'not relevant at all' and 4 denoting 'extremely relevant'. The bars denote quartiles of data distribution

4.3. Study 2b: Language control

All lower SE participants initially completed Hindi versions of the vignettes and higher SE completed English versions, at their own choosing. However, this differing language of participation potentially confounds the results, not least due to potentially differing connotations of the English word 'fair' and the closest Hindi equivalent (*uchit parinaam*, literally 'right outcome', 'correct outcome'). To control for language I tested higher SE participants in Hindi. I first collected data from Amazon Turk workers who were comfortable in Hindi and were likely to be in higher SE groups (sample location: India; employment status: full time; household income: $25,000 - $49,999 per annum). The study was pre registered at https://osf.io/586wv . However, our sampling yielded half the participants from farming backgrounds, which corresponds more closely to our specification of low SE groups. This had a significant effect on fairness ratings, with individuals from farming backgrounds scoring relational roles more highly than individuals from non-farming backgrounds. Moreover, many participants gave high relevance ratings to the irrelevant option, suggesting

that they may be marking somewhat at random, without reading. Due to this, I could not use our AMTurk data for analysis.

I followed up with another language control using in-person sampling to obtain a demographic similar to the higher SE group of study 2a. This data collection followed the original sampling method and recruited participants from upmarket coffee shops and restaurants. All professed to be comfortable reading and writing in Hindi (pre-registration and all vignettes can be found at https://osf.io/m45be and in the SI). The results obtained (Fig 6) demonstrate that higher SE and lower SE groups still differ significantly when Hindi vignettes are used for all participants. Relational roles were still endorsed more by the lower SE group, as was self image, though to a slightly lesser degree (relational roles: $t = -3.172$, $p = 0.002$; $t = -2.078$, $p = 0.039$). Overall this supported our predictions and demonstrated that the difference between the groups was not due to the language of participation. In fact, doing pairwise contrasts for each option (relational roles, self image, equity, equality, irrelevant) between higher SE individuals who participated in Hindi and higher SE individuals who participated in English yielded no significant differences.

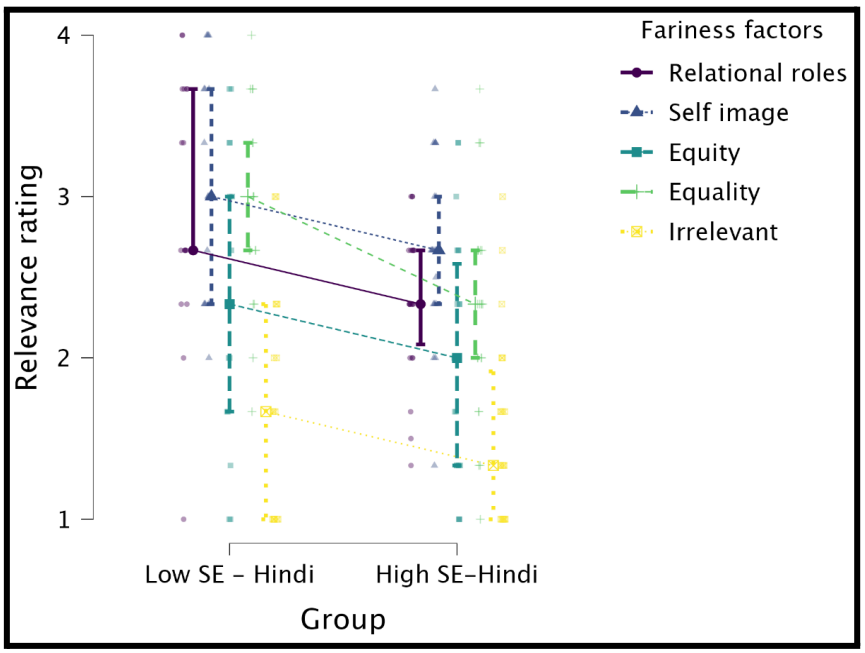

Fig 6: Beeswarm plot showing average relevance of relational roles, self image, equity, equality and irrelevant options in language control, i.e. comparing lower and higher SE group participating exclusively in Hindi./ The numbers correspond to points of the Likert scale, with 1 denoting 'not relevant at all' and 4 denoting 'extremely relevant'. The bars denote quartiles of data distribution

4.4 Qualitative Findings

A short, informal interview with participants following data collection for the vignette study provided some further insight into how participants from these two SE groups were approaching fairness. Consider how the following two quotes differ in their endorsement of relational concerns:

Lower SE participant: *"It's important for everyone to contribute their share so that everyone can stay happy. Men and women obviously have different roles and they should carry out their own tasks as is expected of them. A man would not be able to do a woman's tasks, so it's better that he does his own. However, everyone needs to work hard in order to contribute similarly."*

Higher SE participant: *"Roles are somewhat important, of course, you want to respect your family members; but roles should also be figured out and decided between the two people, in the context of their specific relationship [...] Overall, I do not believe roles should drive much behaviour, there should primarily be a good balance between who does how much."*

While speaking to the lower SE participants, two recurrent themes of justification emerged: a sense of duty (*kartavya*) to others; and the ease *(aasaanee)* brought about by conforming to relational roles. Several participants emphasised the importance of respecting what I are 'supposed' to do (*kya karna chahiye*), and adhering to what others expect from us (*dusre humse kya umeed karte hai).* As one participant put it, "it's the duty of the female to take care of the house and it's only natural that a newly married woman's mother-in-law will ask her to take care of things around the house…this happened to me as well, and that's how it should be." Inhabiting a specific role—as a wife, say, or *Tauji* (elder uncle) –-comes with duties established by social convention and there is a clear sense that bearers of such roles have a moral responsibility to fulfil these duties to the best of their abilities, not least because others are relying on them. As one lady, interviewed outside the public toilet of a marketplace, put it: "I believe that age brings a lot of respect, and it should. At my home, I treat our Tauji with the same respect as I treat our father, if not more. Given his age, Tauji's main job should be to provide wisdom to the younger generation and look after their moral upbringing; but Tauji can also contribute to tasks when possible, such that he can be a good idol for the younger generation." Others emphasised that behaving in line with one's role is not merely an external

imposition, because individuals wish to see themselves as responsible and useful members of their households and communities.

The emphasis placed on the sense of "ease" (*aasaanee*) achieved by dividing labour by well-known roles appears to imply a notion of efficiency. Several participants suggested that social roles have value insofar as they allow individuals to specialise in certain skills and eventually to carry out those tasks better . Indeed, many holding this view maintained that it was important for everybody to contribute, and that having predetermined roles made it easier for everyone to know who does what. None of the participants in this group denied the value of equality and equity; on the contrary, they readily agreed that these were important, but maintained that one's role in the house and in society, and the needs and expectations of others, were fundamental for organising one's actions.

The higher SE participants had more mixed opinions regarding the importance of relational concerns for fairness. As one Masters student in a liberal arts university put it: "What somebody's role is, is really not so important; and neither is the image which they need to have in front of others. Rather it is very important that there should be equality of effort and that costs and benefits are balanced out". Others acknowledged that behaving in accordance with social expectations can be somewhat important—especially when it comes to respecting elders or members of one's family—but that there should, in the end, be a sense of equality or balance when determining who does how much. Self image was explicitly recognised as a potential component of fairness by some, as they suggested it might be a window into the person's wishes: "If somebody feels good after cooking for their family, I don't see why they should not do it. And that automatically makes the situation fair." However, the same participants did not necessarily consider social roles to be so relevant, especially as it implied expectations imposed on one by others—the very sense of constraint making the situation unfair in their view. Interestingly, two participants underscored the relevance of the context of judgement, pointing out that both relational roles and concerns for one's self image can indeed be important when one is dealing with relevant long-term relationships, but less so in more anonymous or short-term contexts, such as interactions with an unknown colleague in the office: "I would not care about coming across as a helpful person or as portraying any specific image of myself to a random person in my office. There, calculations of fairness would be very mathematical. But if you are talking about social relationships which are long-term and have value, it cannot just be mathematical."

4.5. Interim Discussion (study 2a and 2b):

Relational concerns were found significantly to influence fairness judgements among both groups in India. Self image, in particular, was valued highly—more so even than equity or equality. Relational roles were deemed more important than equity and equality in the lower SE group, but not in the higher SE group, though the latter still rated it higher than irrelevant options. Overall, the lower SE group demonstrated a more relational approach to fairness than their higher SE counterparts, providing some support for the predicted effect of class or socioeconomic status on moral judgements (e.g. Haidt et al., 1993; Côté, 2011). This may stem in part from the way SES links to a sense of self: according to Côté (2011: p.54), "lower class group members may be more likely to subscribe to social norms because they are more socially engaged and hence, more attuned to others' positions than their upper class counterparts." For our lower SE participants, relational roles were closely tied to a sense of "duty" (*kartavya*) and "ease" (*aasaanee*) of coordinating with others, and established what people can and should expect from one another. Upper SE participants were more ambivalent about the value of conventional roles—especially insofar as these were viewed as constraints—but did appear to endorse a more processual understanding of roles as emerging from the microhistories of particular relationships. Yet these too were downplayed in relation to equity and equality when speaking about fairness.

I see two possible explanations for the diminished importance of roles among higher SE participants. It is possible that although they reject (to an extent) the moral force of the traditional roles, they would nevertheless endorse a different set of roles which this study did not explore (e.g. those established between friends, or in the workplace, rather than on the basis of kinship or gender; and on the basis of interpersonal interaction rather than fixed social positions). Alternatively, it is possible that relational roles in general are losing their moral relevance as a consequence of modernisation, widely understood as entailing the erosion of traditional institutions and communitarian identities, and the rise of individualised lifestyles (e.g. Giddens 2023; Inglehart & Baker 2000). Such tendencies, including a decline in certain 'traditional' values such as familism and respect for elders, have been observed in urban areas in India, especially among younger generations (e.g. Rao et al., 2013). As the middle class grows more "Westernised", the sense of duty declines and individualistic values rise (Rao et al., 2013; Parihar, 2018).

5. General Discussion:

Across all our studies with different pools of participants, I find a general corroboration of our hypothesis: relational aspects are relevant for judgements of fairness. People do not merely assess whether material costs and benefits are distributed equally (aka fairness-as-equality) or proportionally (aka fairness-as-equity); they also take into account whether distributions align with the expectations generated by relational roles; and whether a protagonist is able to maintain a positive image of his or her self as a competent occupant of these roles. I find these relational concerns to be significantly more relevant than other clearly irrelevant factors, with an important effect size. Further, I find that the relevance of specific relational aspects is culturally variable. Across two communities in India, significantly differing in socioeconomic status, relational concerns associated with traditional social roles tended to diminish in importance as SE status increased. This may reflect a rise in individualism as a consequence of modernisation (which disproportionately affects higher SE groups), or it may reflect a shift of emphasis towards an alternative set of roles not explored here.

The consistently high endorsement of self image could be due to the fact that a positive self image is considered as a kind of payoff in itself, and thus factored into calculations of equity. Alternatively, appreciation of one's self image, as a competent occupant of the relevant relational role, could be evidence that the role itself is endorsed by the protagonist. The first possibility is fully compatible with theories claiming that fairness judgments are ultimately judgments about equity (Debove et al., 2017). It merely enriches the theory by adding an important payoff in the calculation, which does not result from material gains but rather from the *satisfaction* derived from having a good reputation. However, this addition - as important as it is - still leaves the fairness-as-equity theory unable to explain *why* one would derive satisfaction at all from acting according to their role. It also raises a challenge: if the payoffs relevant to fairness judgments are completely subjective, then it arguably becomes fair to give less, say, to a hungry person and more to a satiated one, because the former derives more utility than the latter from the same amount of food. Such a distribution would thus achieve proportionality of subjective utility, but would probably not be considered fair. The way out of this problem is to re-focus on relational concerns: the relevance of self image is especially important because it signifies that a relational role is being endorsed. It is evidence that the

role is not merely imposed upon a protagonist, but truly expresses mutual normative expectations.

Taken together, these results indicate that salient social relationships cannot be ignored in the study of fairness judgements. As such they call for significant revisions to theories of moral cognition that have been largely blind to relational concerns, assuming fairness judgments to be impartial. In fact, while impartiality might well play a role in fairness judgments, I assert that it should be studied as a culturally and historically specific moral attitude rather than an intrinsic feature of our moral cognition. Precisely how relational concerns impact on and shape moral judgements is still in need of explanation.

Towards a Relational theory of Fairness

These results call for a new theory of fairness that accords due recognition to the strong dependence of our moral judgments on our social relations. I propose that concepts of relational roles and self image are useful for taking this into account. An extensive ethnographic literature indicates that across societies, distributions of both goods and labour are strongly shaped by social roles, especially those of kinship and gender. Indeed, a gendered division of household labour is by far the most common way of organising work in subsistence economies (e.g. Leacock 1992), and the social expectations linked to dominant gender ideologies strongly determine what individuals consider to be fair within their households (e.g. Davis & Greenstein, 2009; Nakamura & Akiyoshi, 2015; Hu & Yucel, 2018). Even where there is a certain degree of impartiality at work in distributions of goods (such as food), ethnographers have shown that these tend closely to follow the obligations of local kin ties, and/or calculations of need (e.g. Lewis, 2017).

Judgements of fairness rest upon the mutual acceptability of a given distribution of costs and benefits, and thus upon whether peoples' normative expectations are satisfied. This is seen also in chapter 2 where we note the role of gender egalitarian norms in shaping household divisions of labour. Such expectations are shaped by a sense of who one is and who should do what. A significant consequence of our relational approach to fairness is that distributions that are unequal or disproportionate in terms of material payoffs may nevertheless be considered fair when they satisfy a need for recognition of one's desired self image or align with normative expectations attached to one's role, producing an explanation for the conundrum raised in chapter 1. Though drawing on a different set of methods, this is

compatible with game theoretical analyses showing that repeated interactions in complementary coordination games can lead to inequitable distributions of labour that are nevertheless stable, provided they still enable coordinated activities that are beneficial for all the agents involved. For such complementary coordination to be possible, however, agents need to identify social roles based on which they decide they predict behaviours (O'Connor, 2019), as we also see in part B of chapter 4. The game theoretical analysis then provides a rational reconstruction of a cultural evolutionary process in which coordination between individuals engenders inequalities, but remains silent about the nature and content of the motivations at work. A relational approach, as I suggest here, can provide the psychological grounding for such evolutionary dynamics, explaining not just which equilibrium is selected, but also which beliefs and motives might drive the choices. In particular, it explains the moral valence that is given to the relational role(s) one has, and to compliance with its associated expectations and tasks. As such, relational concerns are psychological factors that facilitate coordination and, thus, cooperation. A theory of fairness in which relational concerns are foregrounded is thus also compatible with the claim that moral intuitions, including those that drive fairness judgments, evolved for the specific purpose of facilitating cooperation (Curry et al., 2019; Curry, 2016). In fact, I argue, equality and equity, as specific distributions of costs and benefits, should require as much moral legitimization as any other (after all, they are also not able to explain social phenomena such as GDHL). Their privileged moral status may be based on a prior assumption that impartiality has fundamental moral value. Recognising the dependence of fairness judgments upon relational concerns also explains why fairness judgments are culturally diverse (e.g. Henrich et al., 2005) and can evolve in specific directions.

The study contributes to a small but growing literature in moral psychology that seeks to problematize the preoccupation with objective standards of morality that are independent of context. Earp et al. (2021), for instance, show how relational norms specific to different kinds of social relationships strongly shape what we consider moral (see also Lee & Holyoak, 2019). An actor's race, gender and group all influence moral judgements (Boggio et al., 2023; Hester & Gray, 2020; McKee et al., 2024), as does social identity (Hester & Gray, 2020; Boggio et al., 2023). Philosophical and normative accounts of fairness as an equitable state of distribution, approached from a standpoint of impartiality, have a cultural history of their own. They build on a culturally specific (and arguably Western and liberal) ideology of persons as independent, free and morally equal individuals who essentially pre-exist, and can

be thought of as separate from, their social relationships. I, and my collaborators, speculate that the cultural success of impartiality is likely connected to the rise of large-scale institutions such as states, markets and world religions (cf. e.g. Henrich et al. 2010), but that the coordinating value of relational roles of one form or another, and the importance of self image, remain significant everywhere. In other words, we invite readers to consider that impartiality is less a precondition for a judgement to be considered fair than a culturally and historically variable ethical value.

While removing all social identification and eliciting agent-neutral moral judgements may help the experimental cause of retaining tight control, it severely compromises the ecological validity of the resulting findings (Heintz, 2005). In a similar vein, while we might judge allocations of wealth among strangers only rarely, if at all, we have all had cause to consider whether others are pulling their weight in cooperative endeavours. The predilection among researchers for studying fairness in terms of distributions of resources—especially windfall rewards—rather than of labour, may be at odds with the evolutionary dynamics of fairness intuitions, as discussed above. In any case, the convention of implementing anonymity conditions in experimental research on fairness has likely blinded researchers to the significance of relational concerns stemming from the fact that, most of the time, people appraise distributions among known others, with whom they share normative expectations, and with whom they will continue to interact in the foreseeable future. These studies revealed that people do utilize information about social relationships when making fairness judgments, when such information is available to them. In other words, an overreliance on experimental methods that implement anonymity conditions or otherwise encourage participants to ignore socially relevant information, has doubtless contributed to a general disregard of the ways in which fairness is contingent upon mutual expectations that enable efficient coordination. The results point to the need for a *relational theory of fairness* according to which people a) form beliefs about the expectations of others and assess whether these are mutual knowledge; b) assume that relational roles set mutually known expectations and preferences; then c) evaluate distributions on the extent to which these are satisfied.

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Chapter 6: Methodological Reflections
The epistemic value of Interdisciplinary research

In this chapter, I take the opportunity to reflect upon the methodological aspects of my doctoral work, and the epistemological value of interdisciplinarity that I learnt. Before applying for this doctoral position, interested in human behavior as I was, I was mostly exposed to experimental methods of human observation. However, also living my natural social life and observing those around me, I became keenly aware how a sole reliance on experimental methods came with its problems of poor sensitivity to the context of behaviour, being only partially representative of actual behavior, and its limited scope of study. I moved from Zoology to Human Behavioural Ecology as I went from my Bachelors to Masters, and eventually became a part of departments of Anthropology and of Linguistics, completing internships in these fields. This exposure demonstrated to me how the same topics of interest could be approached using distinct methods and data sources, some better-suited for some contexts than others. I experienced the use of methods from both Psychology and Anthropology, wondering whether a combination of these couldn't lead to more holistic explanations of the behavioural phenomena I was interested in. This brought about the determination to approach diverse contexts and use distinct tools, for my own research. A focus on interdisciplinary pluralism, along with an increased attention to the cultural context of behavior, therefore became the primary methodological goals for my PhD.

I believe in these years, I have been able to move in the anticipated direction and acquire the necessary skills in order to continue working on these goals in my future academic career. In the first part of the chapter, I make the argumentative case for how the disciplines of Anthropology and Cognitive Science can help each other; following that, in the second part of the chapter I provide a theoretical demonstration of such multidisciplinary work in the context of understanding inequalities in GDHL.

1. Part A. The Case for Method

Gordon W. Allport, in his Presidential address at the 47th Annual Meeting of the American Psychological Association (1939), discussed the results of a survey they had conducted.[15] It showed an increasingly empirical, mechanistic, quantitative, and analytic focus in the field of psychology. He warned against a "slavish subservience" to such a paradigm, pointing out how as a science, psychology, and its researchers ought to also be rational, qualitative and even non-operational (Allport 1940). Over the years, many researchers have pointed out this narrowness of the experimental methodology, including pioneers in the field such as Solomon Asch, Paul Rozin, Egon Brunswik, Michael Cole, and Ulric Neisser. The father of experimental psychology, Wilhelm Wundt, himself expressed his concerns about the limitations of the methods of experimental testing that motivate complimenting it (Cole n.d.). However, a central part of psychology still remains primarily occupied by the experimental paradigm, dictating a quantitative tradition of collecting and interpreting data (Smith et al. 1995).

A major pitfall of such an experimental paradigm is the fact that it takes the human mind outside of its socio-cultural environment. Jerome Bruner stressed upon the importance of culture in our psychological processes (Mattingly et al. 2008). Culture is intimately and inextricably linked with the way we think, feel, process information, interact, make decisions, and behave. Most psychological processes depend on prior, culturally organized experiences, which differ greatly between societies. However, this relationship gets lost in the current state of psychological methods, which are based on carefully controlled experiments within the laboratory. A collaboration between psychology and anthropology therefore, can be of great value.

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1.1. A Historical Unity

1.1.1. Psychology and Anthropology: An Important Relationship

Psychology and anthropology have seen some good days of conversation and interaction. Researchers from both the disciplines worked closely together for many years and the fields yielded much influence over each other. Psychologists like Wilhelm Wundt had, among his students, eminent future anthropologists like Franz Boas and Bronislaw Malinowski. Works of Sigmund Freud and his disciple Carl G. Jung were used by anthropologist Bronislaw Malinowski who, via ethnographic data, challenged the universality of Freud's formulation of the Oedipus complex (Bock 1988). Margaret Mead was influenced by Freud's ideas and used material from the Manus Islanders to amend his findings. Anthropologist and linguist, Edward Sapir (known for his linguistic relativity hypothesis) led a course on "The Psychology of Culture" at the University of Chicago (Mattingly et al. 2008). Researchers from both fields were also known to engage in substantial collaborations with each other. Psychologist Jerome Bruner worked in intense collaboration with researchers like Clifford Geertz, Claude Levi-Strauss, and Lev Vygotsky, for multiple years. Bruner taught at both departments of psychology and social relations, increasingly attuned to the contributions that anthropological studies were capable of making in psychology. Michael Cole, working on numerical cognition, collaborated with anthropologists to demonstrate the impact of language in symbolization and the importance of culture in cognition (Cole 1967). These collaborations led to an insistence upon a meaning-centered approach in psychology, opposing an experiment-only paradigm. An interpretive framework was stressed upon, which turned to be fundamental in the cognitive revolution of the 1950s (Mattingly et al. 2008).

1.1.2. Cognitive Science

Cognitive science should, in principle, be the prime place for a student interested in the human mind and behavior, to achieve training in interdisciplinary methods. It arose as an interdisciplinary field and one of its great achievements lay in the integration of insights from linguistics, philosophy, anthropology, psychology, neuroscience, and artificial intelligence. This was followed by the emergence of cognitive anthropology in the 1950s, which embraced the idea of culture and understood its implications for mental processes, studying various theories on the representation of meaning and mental models (D'Andrade, 1995). In the beginning, with collaboration between anthropologists and psychologists booming, a variety

of formal and computational methods for analyzing and representing knowledge were also developed (Bender et al. 2010). However, methodological differences between the fields began to become salient, following a division of labor in the research questions: psychologists started studying how people think and anthropologists focused on what they think (D'Andrade 1981). This led to an unprecedented dissociation of the two disciplines, each establishing themselves as unrelated departments. Eventually, the disciplines grew considerably divorced from each other's insights and developed a distaste for each other's methods: anthropologists were turned off by cognitive psychology's focus on studying undergraduates within highly artificial lab situations, using tightly controlled experiments and ignoring social contexts and real-world relevance; cognitive psychologists started to perceive anthropology as a story-telling enterprise, lacking in experimental rigor and making claims without presenting supporting data (Bender et al. 2010). Indeed, by 2019, insights from anthropology and any contributions by anthropologists to the field of cognitive science, are all but gone (Núñez et al., 2019). Having attempted collaborative work with anthropologists myself, I have experienced the repercussions of such disunity: even with the distinct epistemic value of collaborative projects in the study of moral cognition, there is often disinterest from members of the 'core' departments, as well as troubles finding relevant venues for publication.

1.2. A Theoretical Unity

Despite the division of labor, a complete separation of the questions of content (what) and processes (how) of the mind is not possible without losing out on meaningful aspects of human behavior. Given that we grow up, adapt to, and function within a sociocultural world, culture affects not only what people think but how they think. Culture provides a common ground for both research programs, and thus, for both disciplines. However, where many anthropologists are deeply involved in the study of culture, contemporary psychologists tend to bypass the mention of culture at all in their studies.

Our social and cultural lives are crucial contributors in the organization of our cognitive processes, making the study of culture in cognition indispensable (Bender et al. 2010). Developmental processes such as autobiographical memory and theory of mind capacities, due to their dependence on cultural environments, vary considerably between societies (Astuti 2015; Mayer and Träuble 2015); studies in linguistic relativity show that languages

influence thought, mental processes, and behaviors (Boroditsky 2001); cultural constructs of individualism and collectivism have shown well-documented effects on cognitive processes of perception, reasoning, categorization, and attribution (Kim and Markus 1999; Nisbett et al. 2001).

1. 2.1. The Importance of Culture in Cognition

Humans are overwhelmingly submerged in a cultural environment; it stays with us throughout our developmental period right up till we die. No other species is so thoroughly cultural. And indeed, if our brains are organized by experience (including learning), and experience is organized by culture, it naturally follows that culture would be a crucial formative force in the cognitive processes (Bender et al. 2010). A great example of this is the exploration of Theory of Mind capacities in Samoan children

Theory of mind (ToM) is described as an innate cognitive module by which humans attribute mental states – beliefs, intents, desires, emotions, knowledge, etc. – to oneself and others (Butterfill and Apperly 2013). It is understood to be a universal ability in humans, usually arising at the age of 4 (Huemer et al. 2018). Quite contrary to this, some cultures practice a doctrine, stipulating that it is not possible for any individual to know what is inside other people's minds and it is morally wrong to do so. This is called the "opacity of mind" doctrine (Robbins and Rumsey 2008). Mayer and Träuble tested ToM capacities in children from Samoa, a culture practicing the opacity of mind doctrine. Using the popular false-belief task paradigm, they found Samoan children to spectacularly fail in comparison with German children (Mayer and Träuble 2015). The experimental results directly suggested that Samoan children lack ToM capacities or show a developmental delay. However, taking the children's social and cultural contexts into account, much richer inferences can be drawn: (a) Samoan children choose to not ascribe mental states due to the opacity of mind doctrine; (b) "intention" as a concept is irrelevant in Samoa (it is literally impossible to say, "I didn't mean to"), which is what the false-belief task was based on; (c) the children might have been confused by the "easiness" of the task and peculiarity of experimental settings, and indeed one of the children tricked the task itself (Astuti 2015); and (d) receiving instructions from anyone but their parents is unfamiliar to the Samoan children so they stay quiet and thus, fail the task (Mayer and Träuble 2015). Thus, it can be argued that an attention to the cultural

environment can not only help in designing better experiments but also in better understanding the mental processes itself.

Other examples of psychological and cognitive processes where culture has been seen to exert significant influence include, but are not limited to, attribution (the case of fundamental attribution error; Krull et al. 1999), fairness judgments (Henrich et al. 2005), object categorization (Nisbett and Masuda 2003), and even intelligence-quotient testing (Cole n.d.). A complete understanding of human behavior indeed requires an attention to culture and context, along with the study of underlying mechanisms. Geertz called this a "thick description" of a behavior, which takes into account the cultural structures within which behaviors are produced, perceived, and interpreted (Geertz, 1973).

1.3. A Methodological Disunity

Despite a historical and a theoretical unity, there is no question that psychology and anthropology have moved apart considerably as disciplines, with a major decrease in collaborations and interest towards each other's findings. A primary reason for such a dissociation can be said to be the methodological differences between the fields. While anthropology studies human behavior using naturalistic methods like ethnographic fieldwork, participant observation, unstructured and semi-structured interviews, etc. (Bernard 1994); psychology places a major emphasis on quantitative, experimental, and controlled studies in laboratory settings, in order to provide robust predictions (Howitt and Cramer 2007). However, in its urge to be seen as an advanced science, psychology has developed an overreliance on the experimental method, bypassing crucial steps of scientific investigation (Fish 2000). In any natural science study, from physics to biology and even ethology, a general logic of steps is usually followed: systematic observation of phenomena of interest; use of logic and convergent evidence to elaborate that understanding; and choosing investigative methods in accordance with the problem/ object of study (Fish 2000; Rozin 2001). However, this is not reflected in the view of "science" in psychology, which tries to fit restrictive experimental paradigms and statistical analyses to all objects and phenomena of study, rather than the other way round. In this, they also tend to do away with naturalistic observations and push away anything less-experimental to the realm of less-scientific (Rozin 2001).

1.3.1. Shortcomings of Experimental Methods

Lab-based experiments give researchers the desired control to be able to find robust causal relationships—known as internal validity—provide relevant supporting data, and enhance replicability for verification (Roe and Just 2009). Experimental psychology has long built upon this by expanding procedures, devising new designs and evaluations, but without questioning the underlying framework (Brunswik 1956). The designing of experiments, given the constraints of the lab, and an ignorance of the real-life context of behaviors, has led to serious shortcomings.

1.3.2. Context Impoverishment

Behaviors are adapted to specific environments for optimality and derive much of their meaning and function in view of the contexts that they are performed in (cultural environments being one of the main ones). However, as Solomon Asch disapprovingly pointed out, there is a strong tendency in psychology to gain rigor at the expense of context sensitivity (Rozin 2001). Experimental frameworks tend to provide an individual-centered specification of behaviors, stripping away important parts of the context as confounding variables. Despite the experimental control this provides, it leads to a poor understanding of the behavior itself. For example, a wink, when objectively defined, is "the twitching and rapid closing of an eye." It is only within a given context that one can understand the relevance of said wink – a signal from one friend to another before pulling a prank on the teacher or a covert gesture signaling intimacy between two people standing in a group, etc. (Geertz 1973). Thus, context impoverished explanations not only lack real-life relevance but also applicability. Moreover, this makes way for undermining the cross-cultural aspects of behaviors (see criticism on psychology as being heavily ethnocentric; Fish 2000).

1.3.3. Low Ecological Validity

Ecological validity of an experiment determines the extent to which the experimental setting is representative of real-life context and thus the extent to which the findings can be generalized (Roe and Just 2009). Brunswik (1956) was one of the first to point out the lack of ecological validity in psychology experiments, using the case of perception research. He

reproached the psychologist's preoccupation with studying "narrow-spanning problems of artificially isolated proximal or peripheral technicalities of mediation, which are not representative of larger patterns of life" (Brunswik 1956). While designing experiments, it is important to maintain integrity of the real-life situations that one is trying to study, pay attention to the social and cultural contexts of one's participants, and take into account the participants' interpretation of the experimental situation (Neisser 1976). However, most contemporary psychology experiments do not fulfill these requirements of ecological validity. Examples include, playing ultimatum and dictator games with strangers; getting handed a sum of money like windfall, which one then has to divide or put in a common jar; doing a repetitive joint task with a computer; and looking at animated creatures on the screen for judgments of opacity, etc. The concerns extend not only to the experimental contexts but also the nature of tasks, the stimuli, and instructions given to participants (Schmuckler 2001).

1.3.4. Limited Scope

An insistence on studying behaviors in the lab severely limits the range of social and psychological phenomena that can be explored. For example, important social processes like marriage, kinship, friendship, rituals, traditional pedagogical practices, etc. cannot be meaningfully isolated and studied in the lab. This limits the range of processes that psychologists can aim to study and discourages the discovery of new phenomena and creativity. Paul Rozin referred to this as a "phenomenological narrowness" (Rozin, 2001).

1.4.Moving Towards Methodological Pluralism and Interdisciplinarity

1.4.1.Multi-method Approaches

While lab experiments provide greater rigor in identifying causal relationships, doing experiments in the field, with minimal alterations of the context, can provide ecologically valid results. Developing research schemes by combining lab and field experiments can therefore provide both external and internal validity to findings (Roe and Just 2009). List exemplified this approach in his study on gift exchange behavior, where he created one research context in the lab and the other in a sports-card market with only minimal alterations (List 2006). By broadening our methodological scope in this manner, the advantages of a "sterile" lab experiment can be combined with context-relevant field data to provide sharper

and more convincing results. Additionally, other sources of evidence such as surveys, questionnaires, ethnographies, etc. can be used to provide convergent evidence to strengthen one's case (Rozin 2001).

1.4.2. Interdisciplinary Collaborations

Psychologists can participate in collaborations with anthropologists and other social scientists, in order to gather relevant information about the cultural contexts. Knowing about the sociocultural environments of one's study, as well culture-specific behavioral norms relevant to one's population of interest, can allow researchers to design ecologically valid experiments and make appropriate interpretations from the collected data. For instance, in the case of Samoan children, as suggested by Rita Astuti, knowing about the opacity of mind doctrine and cultural norms of obedience can lead to designing better experiments with the appropriate instructions for the participants. Only then can one be certain that they are really studying these children's Theory of Mind capacities (Astuti 2015; Mayer and Träuble, 2015). Anthropologists can have great contributions in psychological studies by providing information on how the cognitive processes of interest are employed in natural environments, and thus, help decide what kinds of hypotheses and design would be relevant to understanding the underlying processes (Bloch 1991). This is precisely what I tried to do in Chapter 2 and 4: the collaborations took effort from both sides, as we were communicating using slightly different languages, and writing using different frameworks. But the outputs—findings based on both quantitative and qualitative data, and ethnographically-informed field studies, as well as being able to reinterpret ethnographic data in statistical models—were much richer than any single method could have provided.

Maurice Bloch rightly said, "the basis of cognitive science is a combination of different disciplines, each with a contribution to make, but with a single aim" (Bloch 1991). Understanding human behavior and human lives is no easy task. And psychology is definitely not the only discipline invested in this pursuit. Trying to solve a problem of such complexity by a singular methodological framework can only lead to an incomplete understanding. The above insights are not to propagate the view that experimental paradigms should be replaced. Instead, newer avenues for data collection must be explored, and the importance of anthropology and other social sciences in the fields of psychology must be restored.

2. Part B. A theoretical demonstration of Interdisciplinarity

One of the crucial projects as part of my two-department PhD fellowship, was an interdisciplinary dialogue to answer one of the key research questions of my thesis: how can gender inequalities in the household division of labour, come to be considered as fair?

Together with Kusimova, T. and Hominis O., we developed a multidisciplinary explanation from three different levels, focusing on the economic, cultural and cognitive processes underlying the perpetuation of inequalities within households. We begin with a broad, economic approach that details the role of outside options and how they impact available decisions across different subsistence communities. We then discuss the role of cultural narratives and norms in shaping internalized structures of inequality. Finally, we unify these perspectives by focusing on the cognitive mechanisms that underpin self-perception and motivated assessments of fairness within households. We end with a brief discussion on the policy significance and avenues of future work.

Background

As was detailed in chapter 1, there is worldwide evidence chronicling the disproportionately high housework load that falls on women in dual-earner households. This has been seen across decades and was recently brought into sharper relief during the COVID-19 pandemic (Carlson et al., 2022; Power, 2020), the implications of which led some to refer to it as the 'gendered pandemic' (Yavorsky, Qian & Sargent, 2021). This imbalance is exacerbated by marriage, as women assume more housework and men tend to assume a smaller share, after they marry and have children (Coltrane, 2000). A critical element in the study of such inequalities is the role of individual perception; and it has been a point of puzzlement why men and women across the world, would often find these inequalities to be fair (Braun et al., 2008; Lennon & Rosenfield, 1994; Nakamura & Akiyoshi, 2015). Under what conditions does this perception of fairness come about? We review three distinct perspectives—the role of outside options; the role of culture; the role of self-concept—that connect macro-level explanations of what generates gender inequalities in a society, to an individual-level understanding of what shapes the perception of such inequalities. This then opens up three distinct research avenues, utilizing diverse methods of empirical investigation.

First, we formulate a broad characterization of households as a coordination problem and discuss how having (or not having) alternatives for welfare outside of one's household can lead individuals to opt for unequal divisions within households, which eventually stabilize into cultural norms.[16] We characterize these alternative sources of welfare as outside options, which are shaped by larger social and economic structures. In the second section, we discuss cultural representations of femininity and masculinity within socio-economic classes, and their possible role in existing inequalities. We discuss how narratives can shape individuals' perceptions of their options and how mobility between socio-economic classes can frame one's understanding of fairness. Within this section, we provide an understanding of how established social structures and representation are thus internalized by such narratives, and come to facilitate individual behaviors. In the final section, we explore the cognitive mechanisms underlying these phenomena. Namely, that the frameworks of motivated cognition and identity protective cognition can explain how individuals can continue to perceive fairness in situations of gross systemic inequalities.

Here, we define households as heterosexual dyads (married or not) since our finding of concern reflects gender-based inequality in cross-sex households and because analysis of outside options and internalized culture focuses on such shared households. Other configurations, such as same-sex marriages, civil partnerships, extended households might have different ramifications for resource distribution and power relations (Yanagisako 1979).

2.1. The Role of Outside Options: a Bargaining Approach

Unequal distributions can often be perceived to be fair when a partner has (or perceives to have) limited options and alternatives outside of the relationship. In this section, we characterize the household as a problem of complementary coordination, where men and women can bargain over division of resources, such as labor inputs. Outside options, which provide individuals alternatives outside of the household, can then provide bargaining power, which can shape divisions of labor. These can be measured by different forms of wealth, and further modulated by gender norms and institutional factors. Outside options therefore

[16] Text taken from publication in *Journal of Cognition and Culture*, *24*(3-4), 373-409. https://doi.org/10.1163/15685373-12340193

provide a pathway for the emergence of gender inequalities and allow power dynamics to thrive.

2.1.1. Household: a Complementary Coordination Problem

Household division of household labor has been commonly described as a complementary coordination problem, characterized by partners adopting strategies distinct from, and complementary to, each other for coordinating towards a common goal (Hadfield, 1999; O'Connor, 2019; Bicchieri, 1996). Complementary coordination can garner higher efficiency in joint tasks which require specialization and is a common characterization of division of labor problems generally. Individuals, sometimes as part of social categories and groups, can specialize in specific tasks and successfully coordinate with others who specialize in a complementary set of tasks. A key question in such complementary divisions then is, who does what? And how do these behavioral strategies become stabilized on a larger scale for easy coordination within a group? The answer to the former considers bargaining dynamics, wherein individuals can expect to select strategies that give them higher payoffs than their outside options i.e., the payoffs one can receive outside of the current cooperative venture (e.g., the household). The answer to the latter looks at cultural behavioral norms shaped by the bargaining dynamics of different groups. Households, with their salient division of labor along the lines of gender, provide an important social unit for understanding coordination problems. Such a modeling of the household has been frequently done by economists (Manser & Brown, 1980; Agarwal, 1997; Ott, 2012), with a move over to cognitive and anthropological domains, to further understand how bargaining power underlies conventional divisions of labor, and how it may vary across societies.

2.1.2. Outside Options and Relative Bargaining Power

As has been described in previous chapters, outside options can play an important role in determining bargaining power. When one has better outside options than their partner, they can leverage it for higher payoffs within the household, such as more daily leisure time. The partner, in turn, would be sensitive to these expectations and fulfill them, as long as participation remains advantageous for themselves (Heintz et al., 2015) in view of their own outside options.This can lead to a perception of lower bargaining power in individuals, and

often an entire social group, due to the lack of economic opportunities. In this way, unequal task distributions become mutually acceptable and, in the long run, culturally stable (O'Connor, 2019).

An economic exchange perspective explains this to be a consequence of exchange between household labor and individuals' opportunities for well-being outside the household (Lennon & Rosenfield, 1994; but see Mandel et al., 2020 who suggest gender norms still play a larger role in determining labor distributions and; Brines, 1993 for a 'quasi-economic' model, integrating economic exchange and gender norms). For instance, when a woman has high employment prospects and individual financial security, she would perceive herself to have high bargaining power, and ask her partner to contribute more in household chores, even if it means getting into an argument. Another woman who has no individual financial assets and cannot afford to disrupt the relationship with her partner, might not behave similarly. A seminal example of the group-level effect of outside options is men's bargaining power in the plough-based economies, as was detailed in chapters 2 and 3; Alesina et al., 2013; Burton & White, 1984). In turn, women, who become dependent on men – and often restricted to household labor – lose bargaining power, and their mobility and decision-making can become severely limited (Djurfeldt, 2021). Outside options have been seen to override allegedly universal preferences for equity (Debove, Baumard & André, 2017), in the popular Ultimatum Game, by modulating evaluations of the same division of resources (Knez & Camerer, 1995; Schmitt, 2004). Lab experiments on the Nash bargaining game demonstrate that players can be sensitive to differences in their own and partners' outside options (Anbarci & Feltovich, 2013; Binmore, Morgan, Snaked, & Sutton, 1991), with outside options often providing the "tiebreaker" (Binmore & Eguia, 2017).

Many studies have pitted outside options and gender norms as alternative—often competing—explanations for household division of labor (Mandel et al., 2020; Brines, 1993). However, availability of economic resources are influenced—and can be restricted (Fuwa, 2004) —by gender norms, which provide men and women different opportunities and access to certain resources. Behavioral norms, in turn, shape the further availability of outside options for men and women, such that unequal opportunities can be accepted as "natural", even appropriate (Sen, 1995). Gender norms also alter one's perceptions of their outside options by shaping prior expectations about how one is supposed to behave. For instance, a man in 1990s India, who does not wish to do a job but to be the homemaker instead, might be

hesitant in proposing this idea to a prospective partner and in-laws for the fear of coming across as 'un-manly'; however the same can be practiced with ease and regularly in the Mbendjele BaYaka hunter-gatherer population from Congo (Hewlett, 1993). An even better example is the 'glass ceiling effect' where women are unable to access certain employment opportunities due to prevailing gender stereotypes (Taparia & Lenka, 2022), thus limiting their potential outside options in a male-dominated economy. Yet which conventions get established needs probing into the relative bargaining relationships, and here one circles back to the relative welfare conditions for each group, which shape their available outside options. In a cultural evolutionary process, outside options-mediated bargaining between men and women, can thus provide a robust account for the emergence of inequalities in household division of labor.

2.1.3. What Constitutes Outside Options

The most robust proxy of outside options are parameters of individual wealth that are considered most important for welfare in any given society, broadly categorized as social, embodied and material wealth (Borgerhoff Mulder et al., 2009).

Since most studies in household division of labor have been conducted in industrialized and post-industrialized societies, material wealth and economic prospects, such as employment prospects (Abraham et al., 2010) have been the most commonly studied measures of outside options. An important measure is the study of employment prospects, which can affect one's decision-making power within the household (Abraham et al., 2010) and determine division of labor (Geist, 2005; Brines, 1993). Relative earning potential and consequent resource dependency matter, with highly dependent women undertaking significantly higher workloads than women who are financially independent (Greenstein, 2000) and having lesser bargaining power (Blundell et al., 2007). A more direct measurement was carried out by Klein & Barham (2018), who looked at partners' earning opportunities, predicting income available from outside options. In a gender-targeted cash transfer program in Mexico, a natural experiment of sorts, income transfers were seen to increase women's bargaining power by roughly 100% (Klein & Barham, 2018). Such differences in outside options, along with modulating bargaining power and expected distribution of payoffs, has also been seen to affect the rate of divorce (Cherchye et al., 2018). Economic prospects are further exacerbated by factors such as education gap between partners (Lundberg & Ward-Batts, 2000; Fengdan

et al., 2016; Ma & Piao, 2019) and ownership of assets such as housing and land (Doss, 2013; Doss, 2006). The latter is specifically important in developing nations which are still significantly dependent on small-scale agriculture. In Malawi for instance, land rights and wage income form an important element of women's outside options and can explain variation in household productivity (Telalagic, 2014). An important, but understudied measure of outside options is social wealth, which can provide individuals social support in the case of a divorce. This would be especially salient in populations, such as immediate-return hunter-gatherers, who have no material storage, but derive fitness benefits from their social networks. We suggested this as a fruitful avenue for future research, and was the theoretical motivation behind chapter 2 in this thesis.

Factors of material wealth and assets are invariably tied to cultural and institutional factors such as inheritance and divorce norms which can heavily modulate the availability of wealth and assets (Voena, 2015), which determine how individuals will fare if they were to dissolve their household. Other factors are policy differences in welfare states (Iversen & Rosenbluth, 2006) and social support for divorced and single individuals (Cooke, 2006), which regulates availability of outside options for individuals who leave their partners.

Further, cultural norms, such as patrilineal transfer of wealth, role of males in religious rituals, dowry system and practices of patrilocality also limit the availability of economic resources to women (Jayachandran, 2015). Anthropologist Michelle Rosaldo put forward this holistic view of looking at gender inequalities decades ago, by stressing that economic factors and cultural factors must go hand in hand to bring about any substantial change in women's position (Rosaldo et al., 1974). Cultural norms not only regulate the effects of outside options but can explain cross-cultural variability in how men and women divide labor amongst themselves. Sanday demonstrates an impressive variability in gendered division of household labor across multiple tribal societies, making a case for the central role of "social stress", such as deployment in war, in stabilizing gender roles and cultural interactions within households (Sanday, 1981). These social environmental differences are reflected in popular cultural narratives that heavily underlie evaluations of fairness. The more conventional an ideology for gender inequality is, the more likely females are in that society to perceive an unequal division of household work as just, and vice-versa (Braun et al., 2008). In fact, culture can even alter one's perception of the self and what one should be expecting from their partners (Sen, 1987). Within some cultures, specific household tasks labeled as

essentially “feminine” activities, leads to acceptance of a much higher workload on the female partner (Demaris & Longmore, 1996) and male’s contribution to these “female-typed” tasks hold higher weight on the perception of fairness (Blair & Johnson, 1992; Lennon & Rosenfield, 1994).

These estimates can be useful, especially in conjunction with structural models of household coordination to make realistic predictions about household bargaining and understand when gender inequalities are likely to arise. When external factors limit one’s access to resources, perceiving fairness in existing inequalities can significantly reduce dissatisfaction with relationships and contribute to mental health (Hu & Yucel, 2018). Culture often reflects the structural differences in one’s environment, and internalization of these narratives allows inequalities to thrive in groups. Especially when the individuals believe they do not have the power to change it. We considered this level of explanation crucial to understand how inequalities are culturally passed on, and how effects of unequal outside options can be seen years after the outside options themselves cease to be relevant. The sociologist in our group accordingly outlined the role of culture in reinforcement of inequalities.

2.2. The Role of Culture in Maintaining Inequalities

Structural differences in outside options are often transmitted through cultural norms, such as institutional arrangements for gendered division of labor, which are then subject to path dependence and change relatively slowly, and vice versa. To understand this side of the explanation, we discuss the role of internalized beliefs, cultural narratives and symbolic boundaries in shaping individual perceptions for what is available and acceptable, and how that can eventually determine what individuals consider to be fair, natural or legitimate in any given society.

2.2.1. How does culture shape perceptions? Notes on internalization

Cultural analysis of various forms of inequalities—racial, gender, socioeconomic, but usually intersectional—remains a growing and undeniably important area of research (Small, Harding and Lamont, 2010; Lamont, Beljean and Clair, 2014; Lareau, 2014; Silva, 2015; Lamont et al., 2017; Valentino and Vaisey, 2022). The cultural realm may be analytically

divided into private and public dimensions (Lizardo, 2017). The latter refers to cultural forms such as public symbols, discourses and institutions which are externalized and exist without individuals (Lizardo, 2017, 2021, p. 1177; Valentino and Vaisey, 2022, p. 111). Elements of public culture that provide us with normative ideas about feminine and masculine behaviors, such as what type of labor—including emotional—women and men should perform within the household, may be found, for instance, in self-help books (Lichterman 1992; Simonds, 1992), teen magazines and TV shows (Joyrich, 1996; Currie, 1999). Discourses that are distributed through educational (Bourdieu and Passeron, 1990) and religious institutions (see, for instance, Hawley (ed.), 1994) also constitute a part of public culture. Personal culture, in turn, is limited to the individual mind and may be divided into declarative forms, i.e. things we may articulate, like metaphors of marriage (Quinn, 1998) or relationship expectations; and nondeclarative forms, i.e. tacit knowledge, that often comes without explicit reflexive processes, like dating strategies and courtship manners in a specific social class (Lizardo, 2017; Valentino and Vaisey, 2022, pp. 121).

How public forms of culture become personal, i.e., how culture gets "into people", is what internalization of culture seeks to explain. Internalization seems to be a developmental process that begins in early childhood[17], involving learning not only through communication but also the acquisition of skills through observation and repetition (Downey, 2010; Wacquant, 2014; Lizardo, 2017, 2021). Culture then functions as a toolkit that contains specific resources that individuals use strategically for explanation, justification, and rationalization of specific actions and patterns of behavior to themselves and to others (Swidler, 1986, 2001; DiMaggio, 1997). Situational and institutional arrangements have the power to define both common patterns and departures from them with rewards or sanctions (Swidler, 1986, 2008).

[17] On internalization of gender norms and differences, see, for instance, works in developmental psychology (Bussey and Bandura, 1999; Martin, Ruble and Szkrybalo, 2002; McHale, Crouter and Whiteman, 2003). Ethnographic research provides us with a more nuanced account of acquisition of basic gender categories, see (Astuti et al.., 2004). On the development of a sense of fairness, merit, and the ability to negotiate in cooperative activities in children, see (Baumard, Mascaro and Chevallier, 2012; Engelmann and Tomasello, 2019; Grueneisen and Tomasello, 2022),, on the differences in children's understandings of fairness and equality in different societies and the influence of cultural norms, see, for instance (Blake et al., 2015; Schäfer, Haun and Tomasello, 2015)

2.2.2. Becoming (un-)equal

Understanding culture as a resource and a toolkit that individuals use for everyday meaning-making gives us two possibilities. First, it allows us to understand the processes behind everyday encounters that lead to the essentialization and normalization of gender inequalities within households. Second, it allows us to trace how people use cultural meanings to contest, negotiate these inequalities, and reinvent notions of "femininity" and "masculinity," both within the context of household labor and regarding broader categories of race and socioeconomic class (e.g., the femininity of white working-class women, the femininity of upper-class black women). The latter is crucial since, for an individual, it is in fact the intersectionality of identities such as race (and/or belonging to a particular ethnic group), class, and gender that shapes both women's and men's perceptions of themselves and the outside options available to them (Browne and Misra, 2003; Cole, 2009; Collins and Bilge, 2020).

Everyday interactions reinforce inequalities in two ways. As mentioned above, routine encounters within a family or larger social group lie at the core of the process of internalization of culture from an early age. Family remains an important site from which children internalize their understandings of inequality, gender roles and relationships, as well as expectations (Lareau, 2002; Streib, 2011; Berk, 1985). Additionally, gender differences and expectations get naturalized and essentialized through what scholars call *doing gender* (West and Zimmerman, 1987, 2009) in complicity with culture-specific gender ideologies (Davis and Greenstein, 2009). For instance, household management, caregiving and emotional labor is something traditionally associated with femininity and being a good mother, which can lead to women remaining confined as the primary caregiver in the house, even when she has a full-time job (Blair-Loy 2003; Blair-Loy et al., 2015; Collins, 2019; Daminger 2019). Moreover, motherhood remains a central category for working-class women despite the limited time for child rearing and parental involvement (Gillies, 2006a, 2006b; Edin and Kefalas, 2011). Although there are cases where men assume the identity of primary caregiver, the majority remain minimally involved in caretaking responsibilities (Lamb, 2000; McLanahan and Percheski, 2008)

Another avenue for cultural experiences to seep into behaviors which ultimately reproduce inequality is avoidant behaviors. Traumatic experiences of being an outsider in a particular social environment (e.g., being a woman of color in predominantly white male social group), like educational institutions (Horvat and Antonio, 1999; Morris, 2005; Lehmann, 2007; Thomas and Stevenson, 2009; Gillborn et al., 2012; Hsin, 2018; Alvarez, 2020) or workplace (Reskin, 1988; Acker, 2006) can shape an individual's behaviors through avoiding negative experiences. There can be several possible strategies of responding to traumatic experiences – from coping and emotional regulation (i.e., disengagement, not responding, working harder) to open confrontation (Jacob et al., 2022) or long-term strategies of negotiating one's identity and shaping it to become a respectable member of society (Skeggs, 1997; Lamont et al., 2016). Avoidant behaviors can specifically include actions such as dropping out of college, leaving one's job, changing career orientations, which, in the end, shapes and significantly limits one's outside options (Sennett and Cobb, 1973; Silva, 2015; Jacob et al., 2021). Such instances exemplify the fact that it is not just the availability of outside options (as discussed in previous section), but its interaction with cultural factors and its effects on individual perceptions, that lead to the visible outcomes of social inequality. Such an interactive web of causes makes a multidisciplinary approach like ours to be critical in the academic discourse of power and social inequalities. Ultimately, inequality and its reproduction are inextricably linked to what people perceive as valuable - whether it is certain personality traits or forms of work, e.g., professional paid work vs. domestic unpaid work that is not perceived as labor at all (Lamont, 2012). Empowerment and social mobility, thus, means navigating and strategically constructing one's identity within these given categories (Bettie, 2002; Streib, 2017).

2.2.3. Cultural narratives, perceptions of femininity and labor

Inequality is a relative category – people tend to notice it through social comparisons, be they between gender, class, race, or generational groups. The important role of reference groups combined with growing socio-economic inequality, contributes to what Lamont and Molnár (2002) call the symbolic boundaries (Lamont and Molnár, 2002, p. 168). The division between "time for housekeeping," "leisure time" and "working hours" can then itself be seen a form of symbolic boundary, and the (im-)balances between these temporalities come to depend upon what we put into the concepts of femininity and masculinity (Epstein, 2007).

Collins (1992) demonstrates how notions of gender roles and reference groups interact with the socioeconomic status of the household: for the working class, the role of the full-time housewife, who devotes all her time to childcare and household duties, was considered desirable; among middle-class (and upper-middle-class) women, the role of the full-time housewife was seen as "restrictive," "unacceptable," and contrary to the trend toward women's empowerment in the context of which paid employment was crucial (Collins, 1992). Thus, childcare and household responsibilities do not lose their importance in a straightforward manner, as would be expected if individuals were guided only by outside options or bargaining power theory (Arrighi and Mauma, 2000; Zuo and Bian, 2001, p. 1123). Hochschild (1997, 2012) captures the cultural rise of the supermom figure – a white, middle-class woman that is building a successful career and remains an involved parent and housekeeper at home. The concept of involved parenting, as promoted by contemporary parenting literature, falls within the cultural repertoire of the middle and upper classes because it requires sufficient resources (including time) in the household (Lareau, 2014). Meanwhile, working-class parents who must combine hard work and childcare cannot conform to these ideals, and often face resentment and stigmatization (Gillies, 2006a).

A crucial step for understanding these changes in perceptions, lies in exploring the underlying cognitive processes of the individual, a perspective which the cognitive scientist can bring in. The next section deals with how individuals come to form their identity within these larger structures, and what motivates specific behaviors that continue to perpetuate gender inequalities.

2.3. Self-concept and the perpetuation of gender inequality

Considering the joint role that motivated cognition and self-affirmation play in the perpetuation of gender inequalities opens a unique avenue of research. The domestic household provides a useful case study for investigating the motivations underpinning the perpetuation of inequalities in systems. In relationships, such as those between a married couple, both individuals are motivated to interpret information in a way that is self-affirming. This is in turn, contingent on the conceptions they each maintain of themselves. Moreover, because challenges to their status quo might generate uncertainty, both will be motivated to believe that existing distributions of labor are fair. The output of such motivated cognition

closely resembles Becker's 'unitary' formulation of the household, where all members are purported to have exactly the same joint interests of the family in the forefront of their interests, and which they all strive to maximise in a rational and systematic manner (Becker, 1993). While a woman in a traditional marriage might be motivated to avoid unpredictability about their standing in the community or her financial status, their husband might be motivated to both avoid accepting that they unfairly benefit from their marriage and that their contributions to the household are outweighed by their wife's. Both therefore, will accept the current status quo as 'natural' and acceptable, and by such self-justification, continue to act in ways that maintain this. Further, their cultural contexts will generate circumstances within which each is motivated to deny information that threatens the idea that they have a marriage that is sustainable and fair.

In short, a motivated cognition view explains fairness assessments on two fronts: a) people want to maintain a positive self-concept and b) they want to avoid the uncertainties of a change in one's social and material environment. The first point relates back to the importance of self-image in fairness judgements, which was empirically demonstrated in chapter 5 (Relational Concerns in Fairness Judgements). The second point strengthens the finding that predictability is crucial in coordination scenarios, as they form the point of salience where people can successfully (chapter 4: When do inequalities emerge?)

2.3.1 Motivated assessments of fairness

Voluntary participation in unequal systems allows us to focus on the cognitive mechanisms which both groups rely on in their motivated assessments of fairness. A crucial starting point is denial. Being faced with information that one is either the advantaged or disadvantaged party in an unequal system seems to trigger a denial response (Phillips & Lowery, 2020; Solomona et al., 2005). As explored in the previous section, this may be because the potential strategies available to an individual upon recognizing their role in an unequal system are limited, and therefore the individual's only immediate recourse is to reject the information. The advantaged group can move to relinquish their advantaged position, but this would require admission that they had been advantaged. Research suggests this is less appealing than the denialist strategy of self-affirmation (Newman, 1999; McQueen & Klein, 2006). In contrast, the disadvantaged group can move to rebel against the existing structure of the

household, potentially resulting in an increase in burdens. This, again, may be less appealing than merely denying the credibility of information one is faced with. These strategies fall firmly within the scope of motivated reasoning, which argues individuals will interpret social interactions and outcomes in a manner that is consistent with maintaining a positive self-concept (Carpenter, 2019; Shepperd et al., 2008).

Moreover, the advantaged party often doesn't realize their positions of relative privilege, instead merely placing increased value on their contributions to a household. Literature on racial privilege suggests that even when faced with evidence regarding the inequality, privileged groups will either deny it (Knowles & Lowery, 2012; Phillips & Lowery, 2020; Solomona et al., 2005) or engage in what Smith and Pettigrew (2015) refer to as relative gratification. This is likely due to a particular type of motivated reasoning called defensive self-affirmation (Sherman & Cohen, 2006), which is the process of bolstering one's self-concept in response to information that threatens it.

For the disadvantaged party the option to leave the dyad exists, but it carries uncertainty in terms of possible repercussions. One needs to perceive that their circumstance has exceeded one of two thresholds: either their self-concept is positive enough to mitigate their uncertainty regarding leaving the dyad, or the status quo is negative enough to outweigh their uncertainty. Exposure to such high levels of uncertainty has been linked to multiple detrimental outcomes from the inability to act or think clearly to a range of negative affective states such as distress, depression, and anxiety (Abbott 2005; Carleton et al., 2016; Flores et al., 2018).

2.3.2. Uncertainty avoidance and within-household inequality

The avoidance of uncertainty and the maintenance of a positive self concept are interdependent with regard to social and material outcomes (Gerber et al., 2018). Multiple research programs have worked to establish the link between uncertainty and one's conception of themselves, some referring to it as self-concept and others as self-esteem (Cichocka et al., 2016; Hogg, 2021). This manifests differently depending on one's position in a dyad. For women it might present as a potential aversion to greater uncertainty regarding both one's place in society and their overall workload. Whereas for men it might present as an aversion to both a relative loss of control, as well as the proposition that their contribution is not as valuable as they believe it to be.

Additionally, individual motivations to believe one is contributing as much to a situation as their partner impact their perceptions of their social exchange (Cropanzano et al., 2017). In a motivated view of the perception of social exchange, one might overvalue or undervalue their own contributions and fail to acknowledge an imbalance. Social systems, such as the household, offer stability by improving predictability of outcomes and a degree of social status, among other things. This allows for the perceived benefits of the status quo, that is being in a stable relationship, to outweigh the perceived uncertainties of any potential alternatives. This view suggests that perpetuation of an unequal system may be because both sides have something to gain with regard to their conceptions of themselves. This may seem counterintuitive for the disadvantaged party, but the critical element is that the individual perceives the status quo itself - having a partner - to be a net gain from the alternatives they perceive to be possible.

Future empirical work might therefore test whether uncertainty avoidance is a significant enough motivator to incentivize blindness to one's complacency in an unjust system, regardless of whether they are the benefactors or the victims of it. Lauria et al. (2016) demonstrated that individuals prefer the short-term payoff of pacifying their uncertainty with self-deception, even if it has negative payoffs in the long term. This claim is supported with evidence demonstrating that as one's uncertainty regarding an outcome increases and their potential ability to cope with those outcomes decreases, one becomes more likely to engage in self-deception as a coping mechanism (Knowles & Lowery, 2012; Lauria et. al., 2016).

2.3.3. Protecting one's self-concept

We suggest that individuals seem to be incentivised to maintain a favorable model of themselves and project that model when engaging in social comparison (Cacioppo & Cacioppo, 2016; Williams, 2007; Williams & Zadro, 2005). This is likely because it mitigates their uncertainties regarding both their general desirability and their standing in society relative to others (i.e. social comparison). Ultimately, this allows individuals to avoid any threats to their social identities (De Hoog, 2013; Hogg, 2014). This has been referred to respectively as Social Identity Protection (Derks et al., 2007) or Identity-Protective Cognition (Kahan, 2017). Thus, identity research, particularly the findings that demonstrate triggering identity protection engages individuals' motivated reasoning, are critical to understanding

assessments of fairness, and opens up avenue for experimental work where the causality of these mechanisms can be tested.

The testing of identity models typically involves observing the effects of manipulating one's perception of their own standing in their social environment, called identity threat, and is focused primarily on the negative consequences of those manipulations (Chen et al., 2015; Choi & Hogg, 2020; Hameiri et al., 2018). Experiments largely consist of generating feelings of ostracism and diminished self-concept, by either attempting to lower the participant's perceived standing in their own group, or by lowering the perceived standings of participants' affiliated groups. The overarching trend in the literature demonstrates that individuals are motivated to protect their conceptions of themselves (Chen et al., 2015; Derks et al., 2007; Kurzban, 2011; Williams, 2021) and the groups they affiliate with (Carmines et al, 2016; Claassen & Ensley, 2017; Kahan, 2012). In this case, maintaining stability of the household by accepting traditional divisions of labor, might be an extension of self-affirming behavior in that individuals incorporate their conception of a group into their own identities (Goldman & Hogg, 2016; Hogg & Adelman, 2013; Mason & Wronski, 2018). This leads us to three questions that can be addressed empirically: Are both genders equally likely to engage in identity protective cognition (and the parallel phenomena of defensive self-affirmation and motivated reasoning)? Does this change when they are evaluating the terms associated with fairness if those terms include concepts they associate with themselves and their social environments? Is providing validation of one's position and value within a dyad, sufficient to open them to genuine dialogue?

2. 4. Social and policy significance

The above overview was conducted not just with academic goals in mind, but with the purpose of identifying the most pertinent questions that must be asked to build better societal interventions. Taking a multidisciplinary approach is crucial for developing well-suited policies which complement existing economic and cultural structures of a society, as well as pre-empting individual responses to changes.

A subjective sense of fairness and welfare is, in many ways, an individual's adaptation to the available systems, most relevant to them. Amartya Sen (1987) urged this decades ago, noting "there is much evidence in history that acute inequalities often survive, precisely by making allies out of the deprived". A sense of fairness can be a reflection of an unquestioning acceptance of traditional and normative priorities. Individuals might not be in the position to evaluate, or even be aware of the possibility of evaluating, their possibilities outside their immediate social environment. Social change, therefore, might lie in providing individuals the opportunity to face these important, evaluative questions. As has been seen from worldwide feminist movements, politicization of the topic of gender imbalance can bring about sharp changes in these perceptions. Further, structural economic changes for better employability, thus increasing women's outside options often, have a lower tolerance for inequalities as compared to more patriarchal communities (Greenstein, 2009).

Cutting desires in line with perceived availability is often a protective system to save one from frustration and disappointment and can save relationships and marriages. In a patriarchal world, when a woman sees her husband do the dishes on the day, she is sick, this might fill her with disproportionate amounts of happiness, even gratitude, though the same sense of disproportionality would not have been roused as she does the same two times a day, for years. Women in many countries are habituated to inequalities, unaware of possibilities of social change and relatively hopeless about upliftment beyond a certain point. This brings about an acceptance of established order but should not be confused for a lack of need for change.

We presented our work as a starting point for future conversations between disciplines and exploration of the problem of the household using mixed research methods (e.g. Astuti & Bloch, 2012; Pugh, 2013, 2014; Swidler, 2008; Vaisey, 2014). The problem of gendered divisions of labor is complex, and we intend to assert this very point. Underscoring this point is the recent COVID-19 pandemic, which uncovered the additional layers of complexity underlying division of labor within households (Nishimura, 2022), exposing the volatility of men and women's positions within these systems (Shafer, Scheibling and Milkie, 2020). This multidisciplinary review can be a resource for individuals seeking to conduct future work and an invitation for a broader, more encompassing multidisciplinary effort to address the systemic issues which continue to haunt generations of individuals. The work both draws on, and has implications for, our understanding of inequality more broadly and we hope this

serves as a means of unifying the efforts at progress without diminishing the unique struggles of each group of individuals.

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Beyond Equity and Equality:
A Relational lens to Fairness

In this thesis, I have explored the socio-cognitive mechanisms underlying fairness judgments and their role in shaping social inequalities, particularly in gendered divisions of labor within households. By taking an interdisciplinary approach, I have attempted to integrate perspectives from anthropology, psychology, and economics to understand how fairness—understood here as acceptability of distributions—is perceived, how inequalities emerge, and how they are stabilized through cultural norms and cognitive adaptations. A key aspect of my work has also been to understand how the perceptions of these inequalities vary across cultural communities, and how they might depend on the domain of distribution, such as division of household labour v/s division of economic resources in an experiment.

I began by reviewing evolutionary theories of fairness, questioning their ability to explain the persistence of gendered inequalities in household labor, across industrialized societies. Many of these theories assume an egalitarian bias in human cognition, yet real-world patterns of household labor contradict this assumption (chapter 1). I then examined whether such inequalities can also emerge in immediate return hunter-gatherer households, testing the role of outside options and the bargaining power it provides. I found that contrary to industrialized societies, hunter-gatherers show remarkable equality in labor distribution within households; a key interpretation of the results pointing to the role of social norms of egalitarianism in shaping these bargaining processes (chapter 2). Illustrating the prevalence of such egalitarianism in hunter-gatherers further, I critiqued an influential theory of fairness that suggests that norms of equity and equality primarily emerged in large-scale societies with market integration and big institutions. Instead, I argued that principles of egalitarian sharing were already present in pre-market societies, challenging assumptions about the origins of fairness (chapter 3). I went on to then investigate the micro-level conditions under which inequalities *do* emerge, with the help of coordination games; finding that while equality can be a default preference while coordinating with an unknown other without guarantee of one's future position, social categories and guarantee of stable outside options can create persistent inequalities (chapter 4). Assimilating these insights I introduced *relational concerns* as a central component of fairness judgements, in what I believe to be the novel contribution of this thesis. Following a series of vignette studies conducted online and in India, I argued that

fairness is not simply about equity or equality but is deeply tied to fulfilling socially expected roles, and maintaining one's image within these roles—explaining why inequalities persist in household labor divisions, and also explaining that when equality is normatively expected, equality is more commonly seen. This paves the way for an integrative *relational theory of fairness* (chapter 5). Finally, I reflected on the methodological challenges of studying fairness and inequality, and the immense epistemic value that I derived from doing collaborative work on these topics. I argue for the necessity of methodological pluralism and more interdisciplinary collaborations, particularly collaborations between anthropologists and cognitive scientists, in order to generate robust understandings of similar complex social phenomena (chapter 6).

I expect the thesis to contribute an interdisciplinary perspective to the existing academic literature, integrating cognitive science and anthropology to explain how fairness judgments operate in real-world contexts, and drawing causal relations between micro-level cognitive processes and macro-level social norms and structures. It challenges universalist assumptions in evolutionary theories, showing that fairness perceptions are not static but are dynamically shaped by social networks, the cultural norms that guide behaviours within these structures, and the cognitive motivation to attend to such relational concerns. Building on this, amongst my future research goals is to specify a *relational theory of fairness*, which can incorporate factors of social roles and relationships into judgements of fairness—primarily considered to be evaluations of costs and benefits—thus underscoring how the intricacies of our social lives influence our moral judgements. Something that we believe will be a valuable addition to the psychological literature on fairness.

A crucial consequence of this work is, by revealing that people often justify and reproduce inequalities when they align with social expectations, it underscores the role of our socio-cognitive mechanisms in maintaining systemic disparities. I suggest that there is a need to integrate such insights from fairness perception studies into legal, economic, and social policy frameworks. Addressing inequality requires much more than just economic redistributions; while structural reforms are essential, they will be less effective if they do not also challenge the cognitive and cultural narratives that sustain inequality at an individual level. Gender disparities, in particular, are not just institutional issues but are deeply embedded in how individuals perceive themselves in their social contexts, and based on that, what expectations they form for their own lives. These perceptions are shaped by one's

upbringing, social norms that one sees mothers and grandmothers abide by, media representations of masculine and feminine roles, and interactions with peers and community, making them difficult to shift through policy changes alone. In addition to this, it is absolutely crucial for individuals to be able to rely upon the predictability of their social life and structures, and be able to effectively coordinate with those around them, at home and outside. Thus, a combination of these factors—attending to one's relational concerns, maintaining predictability of social life, and successfully coordinating with others—should be key considerations while formulating laws and policy interventions, and should guide leaders who wish to create robust communities and countries.

Amartya Sen astutely noted, "if a typical Indian rural woman were asked about her personal 'welfare', she would find the question unintelligible, and if she is able to reply, she may answer the question in terms of her reading of the welfare of her family. The idea of personal welfare may itself be unviable in such a context" (Sen, 1987). These words encapsulate the deep social embedding, and the relationships-based construal of our moral lives and perceptions of fairness. Understanding this social anchoring is crucial and has been missing from economic and evolutionary studies of inequality, or even academic discourses on fairness. Individuals don't quite exist behind a *veil of ignorance*, so to say, and their decisions are not generally made without social information or wholly removed from their social biases. Social structures in fact provide us with identities and positions, and our individuality co-exists within a variety of such identities. These then shape our interests, judgements, obligations, objectives, behavior and well-being. Even in the most individualist countries, for instance the U.S.A, social structures of family, romantic partnership, friendships, work relationships, and other relations based on human interactions drive people's daily lives; and it would be strange if they didn't also drive our behavior and moral judgments. Goals of equality are absolutely important, especially when it comes to equal representation, autonomy, or basic rights of certain groups that have been historically disadvantaged. Like gender groups. However, it is possible to have both equality and relational concerns under one framework; with relational concerns paving the way for diversity of relationships and individuals, while ensuring a baseline of equality for all.

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Supplementary Materials

Chapter 5: Relational Concerns in Fairness Judgements

1. Experimental Material

1.1. Study 1a: Social Vignettes

1.1.1. **[Vignette 1]**
Luke and Iva, a married couple, have several of their friends coming over for dinner. There's a big meal to be prepared, and the house needs cleaning. Luke goes out to do the shopping, while Iva takes care of the cooking and cleaning. Later in the evening, the dinner party is a great success with their friends.

Comprehension: Who does the cleaning for the dinner party

O Iva

O Luke

O Both clean together

How relevant are each of the following, for ensuring a fair outcome?

Not relevant at all – Somewhat Relevant – Neutral - Very Relevant – Extremely Relevant

[Relational roles]
Iva agrees to take on the cooking and cleaning, since she is a homemaker, and is much more experienced in these.

[Self image]
Iva is known to be a good party host, and feels happy spending time to ensure the house looks pretty and the food is delicious.

[Equity]
Luke ends up doing the more burdensome task as the traffic was terrible and the supermarket was overcrowded.

[Equality]
Luke helps with the cooking and cleaning once he's finished shopping, so the time they spend working is similar.

1.1.2. [Vignette 2]
Ivan and Marko have been asked by their boss to work on a new project. Overall, Ivan spends around 30 hours on it, while Marko spends around 15. Their boss is delighted with the outcome and praises them both profusely.

Comprehension: Who is the boss delighted with?

O Marko

O Ivan

O Both

How relevant are each of the following, for ensuring a fair outcome?

Not relevant at all – Somewhat Relevant – Neutral - Very Relevant – Extremely Relevant

[Relational roles]
Ivan has a junior role in the company, and as such is expected to work more

[Self image]
Ivan thinks of himself as a highly skilled programmer and feels satisfied contributing this expertise to the project

[Equity]
Ivan gets a bonus for the extra work he’s put in

[Equality]
Marko puts in 15 more hours than Ivan on another project

1.1.3. [Vignette 3]
Filip and Josip have been grouped together to build a model for a school science project. They decide that Josip will present it to the class. He spends around 5 hours preparing the presentation. Filip builds the model, which takes him around 8 hours.

Comprehension: Josip spends more hours than Filip on the project

O False

O True

O Not given in the description

How relevant are each of the following, for ensuring a fair outcome?

Not relevant at all – Somewhat Relevant - Neutral - Very Relevant – Extremely Relevant

[Relational roles]
In this course, presenters usually leave model-building to others

[Self image]
Filip always tells others that he is a technical whiz, so relishes the opportunity to show off his model-building skills to his classmates

[Equity]
Filip, by being the presenter, has actually taken on a more stressful job that nobody likes doing

[Equality]
Josip oversees the model-building after school, and in the end spends as much time as Filip

1.1.4. [Vignette 4]

The Jurić family are harvesting their olives to make oil. Ana and Mario, brother and sister, help to pick the olives. Ana spends two days in the fields, while Mario spends three days. Their parents are very happy with them both.

Comprehension: Who spends more time in the field?

O Ana's Father

O Mario

O Ana

How relevant are each of the following, for ensuring a fair outcome?

Not relevant at all – Somewhat Relevant – Neutral - Very Relevant – Extremely Relevant

[Relational roles]
Mario agrees that, as a boy, he should contribute more substantially, when it comes to agricultural labour

[Self image]
Mario thinks of himself as hardworking, and wants to be seen as such by his family.

[Equity]
Ana is more experienced at picking olives, and works faster

[Equality]
Ana spends an extra day pressing the oil after harvesting

1.1.5. [Vignette 5]
Sanja and Kristina, two neighbors, are members of the body corporate of their apartment building. They have to apply for government funds for building repairs. Sanja collects the necessary paperwork, which takes her nearly the entire week. Kristina agrees to stand in line in the various municipal offices, and gets her job done in two days.

Comprehension ques: What are Sanja and Kristina doing together?

O Applying for government funds for building repairs

O Attending a meeting

O Making repairs to their building

How relevant are each of the following, for ensuring a fair outcome?

Not relevant at all – Somewhat Relevant – Neutral - Very Relevant – Extremely Relevant

[Relational roles]
Kristina is the younger of the two, so it is expected of her, that she should take on the more physically demanding work

[Self image]
Sanja considers herself a practical person, with excellent attention to detail. Getting this kind of paperwork sorted makes her feel valuable and productive.

[Equity]
Kristina has to walk around the city a lot for her tasks, in the hot summer sun, while Sanja does her tasks from her home

[Equality]
Sanja was the one to stand in lines the last time the building needed repairs

1.1.6. [Vignette 6]

Miguel and Esther recently became parents, and are struggling with the demands of caring for a newborn baby. Both are working professionals. Miguel is a junior employee in a bank, while Esther is a CEO of a large company. They decide that Miguel should take care of the baby at night, and that daytime caring will be shared between them, based on their work schedules.

Comprehension: Who takes care of the baby's daytime responsibilities?

O Esther

O Miguel

O Both, based on schedules

How relevant are each of the following, for ensuring a fair outcome?

Not relevant at all – Somewhat Relevant – Neutral - Very Relevant – Extremely Relevant

[Relational roles]
As the most senior person in her company, who has to meet multiple professional demands, they both agree that Esther should work less when at home

[Self image]
Miguel likes to be seen as a devoted father, and does not mind caring for the child more than his wife

[Equity]
Esther earns more, and takes greater responsibility for the child's financial needs

[Equality]
On the weekends, Esther makes up for her absence during the week by giving the house a thorough cleaning.

1.1.7. [Vignette 7]

Anna and Claudio are graduate students who rent rooms in a house with a shared kitchen and living room. Claudio takes out the rubbish twice a week, spending a total of 20 minutes, while Anna cleans the kitchen and living room every Sunday, spending more than an hour.

Comprehension: How often does Anna clean the kitchen and living room?

O Everyday

O Twice a week

O Every Sunday

How relevant are each of the following, for ensuring a fair outcome?

Not relevant at all – Somewhat Relevant – Neutral - Very Relevant – Extremely Relevant

[Relational roles]
As a boy growing up in a traditional household, Claudio usually left the kitchen chores to his sister,

and found other ways to make himself useful. Thus, he is no good at cleaning.

[Self image]
Anna is known as an organized person, so she wants to make sure the kitchen is in the best possible shape, for when her friends come over

[Equity]
Taking out the rubbish is actually more demanding than cleaning, as the heavy bags need to be carried down several flights of stairs

[Equality]
Claudio also takes care of other common chores, like paying the bills and carrying out minor repairs

1.1.8. [Vignette 8]

Sam and his nephew Arthur go fishing together at the nearby harbour each weekend. Arthur usually carries all the fishing equipment back and forth, tiring himself out, while Sam mostly does the work of selecting the right bait to use.

Comprehension: Who is the nephew?

- O Sam
- O Arthur
- O Not mentioned in the description

How relevant are each of the following, for ensuring a fair outcome?

Not relevant at all – Somewhat Relevant – Neutral - Very Relevant – Extremely Relevant

[Relational roles]
Being Arthur's older uncle, Sam is expected to leave the strenuous jobs to Arthur

[Self image]
Arthur sees himself as a physically strong and hardworking person, and carrying the extra loads helps him to demonstrate that

[Equity]
Sam has a lot of experience in fishing, and is teaching many important skills to Arthur

[Equality]
Whenever they take out the boat to fish, Sam does the heavy work of dealing with the sails and equipment

1.1.9. [Vignette 9]
Dave and Jim are committee members for their local football club. Jim is appointed as treasurer, responsible for sorting the finances and collecting membership dues. Dave is appointed as the president, and has to arrange the league matches for the club. Dave's job requires a lot more time than Jim's, and involves both personal networking and football skills

Comprehension: What does Dave do?

O He is the treasurer

O He arranges league matches for the club

O He is the goalkeeper

How relevant are each of the following, for ensuring a fair outcome?

Not relevant at all – Somewhat Relevant – Very Relevant – Extremely Relevant

[Relational roles]
Dave's role is much more prestigious and important, and he is expected to put in more time

[Self image]
Dave sees himself as a natural leader and puts in the extra time with great enthusiasm

[Equity]
Thanks to his post, Dave benefits from building a strong social network in the football world

[Equality]
Dave is paid a monthly honorarium, as reward for his longer hours, which Jim doesn't ge

1.1.10. [Vignette 10]

Paul and Meg want to publish the results of their research into a new medical procedure. Meg does most of the work of writing up, while Paul makes some edits and other suggestions. The paper is accepted by a leading academic journal and is well-received by the academic community.

Comprehension: Who makes the edits in the paper?

- O Meg
- O Paul
- O Paul's assistant

How relevant are each of the following, for ensuring a fair outcome?

Not relevant at all – Somewhat Relevant – Neutral - Very Relevant – Extremely Relevant

[Relational roles]
Paul is Meg's supervisor, and it is customary for supervisors to leave the writing to students

[Self image]
The process is an excellent learning experience for Meg, who gains confidence as a junior scholar

[Equity]
Meg's name appears first on the paper, in the prestigious position of lead author

[Equality]
Paul invested more time when they were collecting the experimental data

1.2. Study 1a: Asocial Vignettes

1.2.1. [Vignette 1]

Two power plants Doosee and Trianum, operating as independent companies, are supplying electricity for a nearby town's annual Christmas market, which lasts three days. Doosee provides electricity for two of the three days, whereas Trianum provides electricity for one day only. The town council pays the two companies for their services.

Comprehension: How many days does Doosee provide electricity for?

O Two days

O All three days

O One day

How relevant are the following, for ensuring that the money each power plant receives from the town council is proportional to its electricity contribution?
Not relevant at all – Somewhat Relevant – Neutral - Very Relevant – Extremely Relevant

[Option 1]
Doosee has higher share prices than Trianum

[Option 2]
Trianum advertised its brand on a banner displayed in the market

[Option 3]
Doosee receives twice the amount of money that Trianum receives

[Option 4]
Trianum has won another contract with the town's council

1.2.2. [Vignette 2]

Two computers, known as Razr and Fyre, are processing a large dataset in a university Physics lab. Altogether the computation takes 45 hours, with Razr having processed data for 30 hours and Fyre for 15 hours. The scientists are happy with the performance of both computers

Comprehension: Which lab are the computers processing the dataset for?

O Physics

O Chemistry

O Biology

How relevant are the following, for ensuring that the computers processed the same amount of data for this dataset?
Not relevant at all – Somewhat Relevant – Neutral - Very Relevant – Extremely Relevant

[Option 1]
Fyre is manufactured by a luxury brand

[Option 2]
Fyre has a better reputation in the market, as a more powerful machine

[Option 3]
Razr is a slower machine and takes longer to compute the same amount of data as Fyre

[Option 4]
For the next project, in the Biology lab, Fyre will do 15 more hours of computing than Razr

1.2.3. [Vignette 3]

A large vat that holds 10000 litres of water is being filled by two different taps. It takes about 15 hours to be filled completely. Tap A fills the vat for 9 hours and then stops, while tap B fills it for the entire 15 hours. The water is then delivered successfully to a nearby housing estate, which suffered from a broken pipeline

Comprehension: Which tap fills the vat for the entire 15 hours

O Tap B

O Tap A

O Both taps

How relevant are the following, for ensuring that the two taps fill the large vat with an equal amount of water?

[Option 1]
Tap A is made of platinum, and is more expensive than tap B

[Option 2]
Tap B is old and rusted, whereas tap A is brand new

[Option 3]
Tap B fills the vat at a slower speed, so it needs to deliver water for longer than tap A

[Option 4]
Tap A is also being used to fill up other containers, in the time that tap B continues to fill the large vat

1.3. Study 1b

1.3.1. [Vignette 1]
Luke and Iva, a married couple, have several of their friends coming over for dinner. There's a big meal to be prepared, and the house needs cleaning. Luke goes out to do the shopping, while Iva takes care of the cooking and cleaning. Later in the evening, the dinner party is a great success with their friends.

Comprehension: Who does the cleaning for the dinner party

O Iva

O Luke

O Both clean together

How important are each of the following, for ensuring a fair outcome?

Not relevant at all – Somewhat Relevant – Very Relevant – Extremely Relevant

[Relational roles]
Iva agrees to take on the cooking and cleaning, since she is a homemaker, and is much more experienced in these.

[Self image]
Iva is known to be a good party host, and feels happy spending time to ensure the house looks pretty and the food is delicious.

[Equity]
Luke ends up doing the more burdensome task as the traffic was terrible and the supermarket was overcrowded.

[Equality]
Luke helps with the cooking and cleaning once he's finished shopping, so the time they spend working is similar.

[Irrelevant]
Iva is better at playing tennis than Luke.

1.3.2. [Vignette 3]

Filip and Josip have been grouped together to build a model for a school science project. They decide that Josip will present it to the class. He spends around 5 hours preparing the presentation. Filip builds the model, which takes him around 8 hours.

Comprehension: Josip spends more hours than Filip on the project

- O False
- O True
- O Not given in the description

How relevant are each of the following, for ensuring a fair outcome?

Not relevant at all – Somewhat Relevant – Very Relevant – Extremely Relevant

[Relational roles]
In this course, presenters usually leave model-building to others

[Self image]
Filip always tells others that he is a technical whiz, so relishes the opportunity to show off his model-building skills to his classmates

[Equity]
Filip, by being the presenter, has actually taken on a more stressful job that nobody likes doing

[Equality]
Josip oversees the model-building after school, and in the end spends as much time as Filip

[Irrelevant]
Filip has an acoustic guitar that he received from an old friend.

1.3.3. [Vignette 6]

Miguel and Esther recently became parents, and are struggling with the demands of caring for a newborn baby. Both are working professionals. Miguel is a junior employee in a bank, while Esther is a CEO of a large company. They decide that Miguel should take care of the baby at night, and that daytime caring will be shared between them, based on their work schedules.

Comprehension: Who takes care of the baby's daytime responsibilities?

O Esther

O Miguel

O Both, based on schedules

How relevant are each of the following, for ensuring a fair outcome?

Not relevant at all – Somewhat Relevant – Very Relevant – Extremely Relevant

[Relational roles]
As the most senior person in her company, who has to meet multiple professional demands, they both agree that Esther should work less when at home

[Self image]
Miguel likes to be seen as a devoted father, and does not mind caring for the child more than his wife

[Equity]
Esther earns more, and takes greater responsibility for the child's financial needs

[Equality]
On the weekends, Esther makes up for her absence during the week by giving the house a thorough cleaning.

[Irrelevant]
Esther has long brown hair, while Miguel's hair is black

1.3.4. [Vignette 9]
Dave and Jim are committee members for their local football club. Jim is appointed as treasurer, responsible for sorting the finances and collecting membership dues. Dave is appointed as the president, and has to arrange the league matches for the club. Dave's job requires a lot more time than Jim's, and involves both personal networking and football skills

Comprehension: What does Dave do?

O He is the treasurer

O He arranges league matches for the club

O He is the goalkeeper

How relevant are each of the following, for ensuring a fair outcome?

Not relevant at all – Somewhat Relevant – Very Relevant – Extremely Relevant

[Relational roles]
Dave's role is much more prestigious and important, and he is expected to put in more time

[Self image]
Dave sees himself as a natural leader and puts in the extra time with great enthusiasm

[Equity]
Thanks to his post, Dave benefits from building a strong social network in the football world

[Equality]
Dave is paid a monthly honorarium, as reward for his longer hours, which Jim doesn't get

[Irrelevant]
Jim is taller than Dave and weighs 6 kilos more.

1.3.5. [Vignette 10]

Paul and Meg want to publish the results of their research into a new medical procedure. Meg does most of the work of writing up, while Paul makes some edits and other suggestions. The paper is accepted by a leading academic journal and is well-received by the academic community.

Comprehension: Who makes the edits in the paper?

O Meg

O Paul

O Paul's assistant

How relevant are each of the following, for ensuring a fair outcome?

Not relevant at all – Somewhat Relevant – Very Relevant – Extremely Relevant

[Relational roles]
Paul is Meg's supervisor, and it is customary for supervisors to leave the writing to students

[Self image]
The process is an excellent learning experience for Meg, who gains confidence as a junior scholar

[Equity]
Meg’s name appears first on the paper, in the prestigious position of lead author

[Equality]
Paul invested more time when they were collecting the experimental data

[Irrelevant]
Meg's favorite hobby is sketching landscapes

1.4. Study 2 (English version)

1.4.1 [Vignette 1]:

Shreya and Amit are a married couple living in an apartment in Old Delhi. Both are professionals and their offices are far from home. They like having dinner together, so Shreya cooks for them both every night. Amit only helps Shreya with the cooking every Sunday, when they invite their relatives around for lunch.

How relevant are each of the following, for ensuring a fair outcome?

Not relevant at all – Somewhat Relevant – Very Relevant – Extremely Relevant

[Relational roles]
Shreya being the wife, is much more experienced at cooking, and it's expected that she cooks most of the time

[Self image]

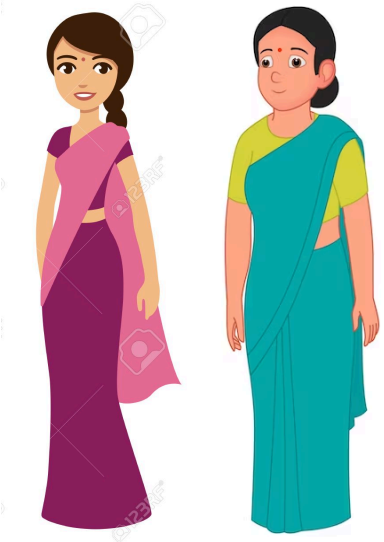
Shreya is good at balancing the needs of her job and her household, and enjoys being seen as a good daughter-in-law by Amit's family

[Equity]
Shreya commutes from work in her company's AC cab, coming back home more relaxed than Amit, who has to drive through Delhi traffic every day on a motorbike. As such, she has more energy in the evenings

[Equality]
While Shreya cooks each evening, Amit does other household chores, like dusting the furniture and doing the laundry

[Irrelevant]
Shreya loves traveling in Himachal, while Amit prefers the Goan seaside

1.4.2. [Vignette 2]



Trishna and her new *saas* (mother-in-law) are getting ready for Diwali, and expect to host three families of close relatives for the evening. Trishna does the food preparation and cooking, which takes her over two days. She also oversees the decorations for the house. Her *saas* goes out to buy *mithai* (sweets), firecrackers and gift baskets for the guests, on the afternoon before Diwali, which takes her just half a day. The Diwali evening turns out to be a successful affair.

How relevant are each of the following, for ensuring a fair outcome?

Not relevant at all – Somewhat Relevant – Very Relevant – Extremely Relevant

[Relational roles]
Trishna is a newly married woman, spending her first Diwali at her in-laws' house. Thus, all the relatives expect her to cook the Diwali meal and look forward to tasting it

[Self image]
Trishna has only just met her husband's family, and relishes the opportunity to show them how she is a competent homemaker and great cook

[Equity]
The shopping done by Trishna's *saas* ends up being the most strenuous job of all, as the crowds in the Diwali market were particularly bad, and the road traffic extremely tiring

[Equality]
Trishna's *saas* supervises a thorough cleaning of the house in the two days that Trishna is busy with cooking and decorating

[Irrelevant]
Trishna used to live in Nainital until she was 18 years old, before moving to Delhi for her education

1.4.3. [Vignette 3]

Jay has come to live with his tau-ji (elder uncle) Vinay during his summer holidays. They decide to make regular trips to a nearby ashram, to help out and to donate food and clothes. Jay does a lot of the hardest work, including packing and carrying the bags each day, and scrubbing dishes at the ashram. His tau-ji mostly supervises his conduct.

How relevant are each of the following, for ensuring a fair outcome?

Not relevant at all – Somewhat Relevant – Very Relevant – Extremely Relevant

[Relational roles]
Being the elder of the family, it is expected that tau-ji should take care of Jay's social conduct and moral education, and leave the heavier physical tasks to Jay

[Self image]
Jay really looks up to his tau-ji, and feels good to be able to portray himself as a strong and helpful young man

[Equity]
Tau-ji uses his social connections to find the donations of food and clothes that they take to the ashram, which takes up a lot of his time

[Equality]:
Jay's tau-ji cleans and manages the house to ensure that Jay is comfortable during his stay. This is quite hard work.

[Irrelevant]
Vinay, Jay's tau-ji, is a veteran of Hindustani classical music.

1.4.4. [Vignette 4]

Dev and his sister Shalini have recently finished their studies and are now back living in their parents' home. Their father has just passed away and, being MBA graduates, they have each offered to handle their father's business, which produces handicrafts and clothing.
Shalini takes charge of the factory workers, as manager, and works many hours each day, from Monday to Friday. Meanwhile, Dev steps in as the head of finance. He works with the distributors every Monday, for around 5 hours.

How relevant are each of the following, for ensuring a fair outcome?

Not relevant at all – Somewhat Relevant – Very Relevant – Extremely Relevant

[Relational roles]
Being the only male of the household,, Dev is expected to be the one to manage the finances of the company

[Self image]
Shalini, though an expert in finance, feels happy at being seen as the approachable member of the family that all workers can best communicate with.

[Equity]
Shalini gets to take longer vacations than Dev.

[Equality]
Dev, aside from being the head of finance, also manages the advertising. For this, he works multiple hours on the remaining days of the week

[Irrelevant]
Shalini is a great connoisseur of French food

1.4.5. [Vignette 5]

Deeksha and her full-time housemaid, Sreemati, have decided to tend to the house garden together, as the gardener fell sick. Winter is approaching and they need to lay down new flower beds for winter plants, as well as rearrange some of the existing plants. Sreemati, the housemaid, does the weeding

and manuring of the soil, which takes her the whole day. Meanwhile, Deeksha rearranges the older plants onto the peripheries of the garden, working for just 3 hours.

How relevant are each of the following, for ensuring a fair outcome?

Not relevant at all – Somewhat Relevant – Very Relevant – Extremely Relevant

[Relational roles]
Sreemati knows that, being a housemaid, taking care of tasks like handling manure is expected of her

[Self image]
Sreemati likes to maintain her image as a particularly reliable and helpful housemaid whenever she can. Contributing to such extra tasks allows her to do that.

[Equity]
Sreemati gets paid extra money for her day's work

[Equality]
Deeksha does the dusting of the house, which is usually Sreemati's duty, while she spends the day manuring the garden

[Irrelevant]
Deeksha likes to play the violin on Sundays

1.5. Study 2 (Hindi version)

1.5.1 [Vignette 1]

श्रेया और अमित एक विवाहित जोड़ा हैं जो पुरानी दिल्ली के एक अपार्टमेंट में रहते हैं। दोनों नौकरी करते है और दोनों के ऑफिस उनके घर से दूर हैं।
उन्हें एक साथ डिनर करना पसंद है, इसलिए श्रेया हर रात दोनों के लिए खाना बनाती है। अमित सिर्फ हर रविवार को खाना पकाने में श्रेया की मदद करता है, जब वे अपने रिश्तेदारों को दोपहर के भोजन के लिए घर बुलाते हैं।

इस कहानी में उचित परिणाम के लिए निचे लिखे हुए प्रत्येक विकल्प कितने महत्वपूर्ण है?

[Relational roles]
श्रेया पत्नी हैं और खाना बनाने में ज्यादा अनुभवी हैं। इसलिए, यह उम्मीद की जाती है कि नियमित रूप से खाना वोही बनाये।

[Self image]
श्रेया अपनी नौकरी और घर की ज़रूरतों के बीच संतुलन बनाने में अच्छी है, और अमित के परिवार द्वारा उसे एक अच्छी बहू के रूप में देखे जाने से आनंद मिलता है।

[Equity]

श्रेया अपनी कंपनी की एसी कैब में काम से आती-जाती है और अमित की तुलना में अधिक आराम से घर वापस आती है। अमित को हर दिन मोटरसाइकिल पर दिल्ली के ट्रैफिक से गुजरना पड़ता है। ऐसे में, शाम को श्रेया में ज़्यादा ताकत होती है

[Equality]
जब श्रेया हर शाम खाना बनाती है, अमित घर के अन्य काम करता है, जैसे फर्नीचर साफ़ करना और कपड़े धोना

[Irrelevant]
श्रेया को हिमाचल में घूमना पसंद है, जबकि अमित को गोवा का समुद्र तट पसंद है

1.5.2. [Vignette 2]

तृष्णा और उसकी नई सास दिवाली के लिए तैयार हो रही हैं। उनके घर रिश्तेदारों के तीन परिवार आएंगे। तृष्णा भोजन पकाने का काम करती है, जिसमें उसे दो दिन से अधिक का समय लगता है। वह घर की साज-सज्जा की भी देखरेख करती हैं। उसकी सास दिवाली से एक दिन पहले मेहमानों के लिए मिठाई, पटाखे और उपहार की टोकरियाँ खरीदने के लिए बाहर जाती है, जिसमें उनको सिर्फ आधा दिन लगता है। दिवाली के शाम सबको बहुत मज़ा आता है।

इस कहानी में उचित परिणाम के लिए निचे लिखे हुए प्रत्येक विकल्प कितने महत्वपूर्ण है?

[Relational roles]
तृष्णा एक नवविवाहित महिला है, जो अपनी पहली दिवाली अपने ससुराल में मना रही है। इस वजह से , सभी रिश्तेदार उससे दिवाली का खाना पकाने की उम्मीद करते हैं और उसे चखने के लिए उत्सुक रहते हैं

[Self image]
तृष्णा हाल ही में अपने पति के परिवार से मिली है और उन्हें ये दिखने में प्रसन्नित होती है की वह एक सक्षम गृहिणी है और बेहतरीन खाना बनाती है।

[Equity]

तृष्णा की सास द्वारा की गई खरीदारी सबसे कठिन काम बन गई, क्योंकि दिवाली बाजार में भीड़ विशेष रूप से खराब थी और सड़क यातायात बेहद थका देने वाला था।

[Equality]
जिन दो दिनों में तृष्णा खाना पकाने और सजावट में व्यस्त है, तृष्णा के सास घर की पूरी तरह से साफ़ सफाई करवाती है।

[Irrelevant]
अपनी शिक्षा के लिए दिल्ली जाने से पहले तृष्णा 18 साल की होने तक नैनीताल में रहती थीं

1.5.3. [Vignette 3]

जय गर्मियों की छुट्टियों के दौरान एक सप्ताह के लिए अपने ताऊ-जी (बड़े चाचा) विनय के साथ रहने आया है। उसके ताऊ जी जय में समाज सेवा के संस्कार डालना चाहते हैं और भोजन और कपड़े दान करने के लिए उसके साथ रोजाना पास के अनाथालय जाते हैं।

जय प्रतिदिन भोजन और कपड़ों के बैग पैक करता है, उन्हें घर से कार तक और कार से आश्रम तक ले जाता है। उसके ताऊ जी अनाथालय में पैकिंग और जय के आचरण की देखरेख करते हैं।

इस कहानी में उचित परिणाम के लिए निचे लिखे हुए प्रत्येक विकल्प कितने महत्वपूर्ण है?

[Relational roles]
परिवार के बड़े होने के नाते, यह अपेक्षा की जाती है कि ताऊ-जी को जय के सामाजिक आचरण और नैतिक शिक्षा में मदद करनी चाहिए, और भारी कार्यों को जय पर छोड़ देना चाहिए।

[Self image]
जय ताऊ-जी का आदर करता है, और खुद को एक मजबूत और मददगारी युवा चित्रित करने में अच्छा महसूस करता है

[Equity]
ताऊजी अपने सम्पर्को के उपयोग से आश्रम में ले जाने वाले भोजन और कपड़ो जुगाड़ करते है । इसमें उनका काफी समय चला जाता है।

[Equality]
जय के ताऊ-जी पूरे दिन घर के कामकाज देखते हैं, ताकि यह सुनिश्चित किया जा सके कि जय का रहना आरामदायक हो। यह काफी म्हणत वाला काम है।

[Irrelevant]
विनय, जय के ताऊ जी, हिंदुस्तानी शास्त्रीय संगीत के अनुभवी हैं

1.5.4. [Vignette 4]

देव और उसकी बहन शालिनी ने हाल ही में अपनी पढ़ाई पूरी की है और अब वापस अपने माता-पिता के घर में रह रहे हैं। उनके पिता का हाल ही में निधन हो गया है और एमबीए स्नातक होने के नाते, दोनों ने अपने पिता के हस्तशिल्प और कपड़े

का व्यवसाय को संभालने की पेशकश की है। शालिनी मैनेजर के रूप में फ़ैक्टरी श्रमिकों का कार्यभार संभालती है, और सोमवार से शुक्रवार तक प्रत्येक दिन कई घंटे काम करती है। देव वित्त प्रमुख के रूप में कदम रखता है। वह हर सोमवार को वितरकों के साथ लगभग 5 घंटे काम करते हैं।

इस कहानी में उचित परिणाम के लिए निचे लिखे हुए प्रत्येक विकल्प कितने महत्वपूर्ण है?

[Relational roles]
अपने पिता के बाद घर में एकमात्र पुरुष होने के नाते, देव से उम्मीद की जाती है कि वह कंपनी के वित्त का देखरेख करेगा

[Self image]
हालांकि, शालिनी वित्त में विशेषज्ञ हैं, लेकिन परिवार के एक ऐसे स्वीकार्य सदस्य के रूप में देखे जाने पर खुशी महसूस करती हैं, जिसके साथ सभी कर्मचारी सबसे अच्छे तरीके से संवाद कर सकते हैं।

[Equity]
शालिनी को देव की तुलना में लंबी छुट्टियाँ लेने को मिलती है

[Equality]
देव, वित्त प्रमुख होने के अलावा, कंपनी का विज्ञापन भी संभालता ह। इसके लिए उसको हफ्ते के बाकी दिनों में कई घंटे काम करना पड़ता ह।

[Irrelevant]
शालिनी फ्रेंच खाने की बहुत शौक़ीन है।

1.5.5. [Vignette 5]

दीक्षा और उसकी पूर्णकालिक नौकरानी श्रीमती ने घर के बगीचे की देखभाल एक साथ करने का फैसला किया है, क्योंकि माली बीमार पड़ गया था। सर्दियाँ आ रही हैं और उन्हें सर्दियों के पौधों के लिए नयी जगह बनानी है, साथ ही कुछ पुराने पौधों को नई जगह पे लगाना है। श्रीमती, घरेलू नौकरानी, मिट्टी की निराई और खाद का काम करती है, जिसमें उसे पूरा दिन लग जाता है। इस बीच, दीक्षा 3 घंटे काम करके पुराने पौधों को बगीचे की परिधि पर लगाती है

इस कहानी में उचित परिणाम के लिए निचे लिखे हुए प्रत्येक विकल्प कितने महत्वपूर्ण है*?*

[Relational roles]
श्रीमती जानती हैं कि, घर की नौकरानी होने के नाते, खाद संभालने जैसे कार्यों की देखभाल करना उनसे अपेक्षित है

[Self image]
श्रीमती जब भी संभव हो एक विश्वसनीय और मददगार गृहिणी के रूप में अपनी छवि बनाए रखना पसंद करती हैं। ऐसे अतिरिक्त कार्यों में योगदान देने से उसे ऐसा करने का मौका मिलता है। ।

[Equity]
श्रीमती को उनके दिन के काम के लिए अतिरिक्त पैसे मिलते हैं

[Equality]
दीक्षा घर की सफाई करती है, जो आमतौर पर श्रीमती का कर्तव्य है, जब श्रीमती बगीचे में खाद डालने में दिन बिताती है

[Irrelevant]
दीक्षा को रविवार को वायलिन बजाना पसंद है

2. Descriptive Statistics

Condition	Factor	Average Rating (out of 5)	Standard Deviation
Social	Relational roles	2.713	0.791
	Self image	3.414	0.769
	Equity	3.190	0.728
	Equality	3.448	0.822
Asocial	Option 1 (Irrelevant)	1.682	0.839
	Option 2 (Irrelevant)	2.359	0.963
	Option 3 (Irrelevant)	3.727	1.030
	Option 4 (Relevant)	2.511	0.961

Table S1: Descriptive Statistics for Social and Asocial conditions in Study 1a

Factor	Average Rating (out of 4)	Standard Deviation
Relational roles	2.514	0.619
Self image	2.723	0.615
Equity	2.505	0.665
Equality	2.742	0.677
Irrelevant	1.022	0.124

Table S2: Descriptive statistics for study 1b

Group	Factor	Average Rating (out of 4)	Standard Deviation
Low SE	Relational roles	2.961	1.076
	Self image	3.039	0.999
	Equity	2.373	1.199
	Equality	2.922	0.977
	Irrelevant	1.706	0.965
High SE (English)	Relational roles	1.948	0.867
	Self image	2.569	0.881
	Equity	2.138	0.981
	Equality	2.000	0.838
	Irrelevant	1.362	0.810
Language Control High SE (Hindi)	Relational roles	2.351	0.883
	Self image	2.622	0.806
	Equity	2.014	0.944
	Equality	2.284	0.820
	Irrelevant	1.527	0.864

Table S3: Descriptive statistics of low and high SE groups in study 2, including language control participants

3. Mixed Model Analysis with Vignette as Random Effects

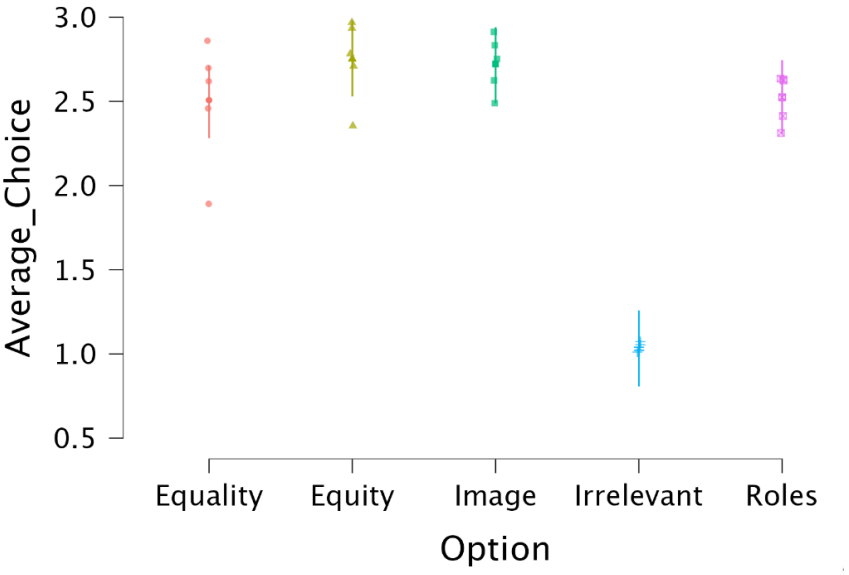


Fig S1: Mixed Effects model for Average choice with Option (Roles, Image, Irrelevant, Equity, Equality) as fixed effects and vignettes as random effects. Vignettes shown here were those used in study 1a and 1b. Vignettes can be seen as background jitter data.

Random Effect Estimates

Vignette: Random Effect Estimates

Vignette	(Intercept)
Nine	0.000
One	0.000
Six	0.000
Ten	0.000
Three	0.000

Fig S2: Estimates of the random effects for the Mixed Effects model