Parochial altruism: What it is and why it varies

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ABSTRACT

Parochial altruism (PA), or ingroup favoritism paired with outgroup hostility, is sometimes treated as a synonym for human intergroup relations. However, empirical data suggest that PA is highly variable—across individuals, across situations, and across groups. Here, we review theory and data on PA to explore the candidate sources for this variability. Along the way, we unpack assumptions (e.g., what constitutes a group?), identify precursors to PA behavior (e.g., context and internal states), and review evidence for the pairing of ingroup favoritism with outgroup hostility. We discuss phenomena with measurable impact on downstream behavior, including resource access and cultural institutions, but also flag how researcher expectations and methodological design impact reported variability in PA. We close by making recommendations for how researchers can reduce noise in the study of PA by checking assumptions and being deliberate in research design; this is key, as the PA literature is part of sensitive public discourse.

1. Introduction

Parochial altruism (PA), or ingroup favoritism paired with outgroup hostility (Choi & Bowles, 2007), is assumed to be a central feature of human behavior—and is sometimes even treated as a synonym for human intergroup relations (see Böhm, Rusch, & Baron, 2020, for discussion). However, empirical evidence for PA has been mixed (Rusch, 2014). What might explain this variability? On the one hand, we should expect the magnitude of PA to vary, sometimes substantially, as a function of the net benefits of ingroup versus outgroup cooperation (Aaldering & Böhm, 2020; Pisor & Surbeck, 2019). These net benefits can be modulated by everything from resource competition between groups (Bell & Moya, 2021; De Dreu, Gross, Fariña, et al., 2020; Ross & Pisor, 2021), to cultural institutions that encourage (Fearon & Laitin, 1996) or hinder (Phelan & Hunt, 1998) social relationships with outgroup members, to an individual's *perceptions* of the relevant costs and benefits of intergroup cooperation (Barth, 1998; Brewer, 2010; Riek, Mania, & Gaertner, 2006). Such variability is consistent with a universal cognitive architecture that—at minimum—is prepared for group living and tracks the potential advantages of within and between group interactions (Brewer & Caporael, 2006; De Dreu et al., 2020; Tooby, Cosmides, & Price, 2006).

On the other hand, some variation in PA may not reflect varied outputs of human cognition at all. Instead, some of this variation may be noise—e.g., generated by researcher assumptions about intergroup relationships, or by the subtleties of variation in methodological design. For example, by assuming that PA structures human social relationships, researchers may fail to examine: (i) the extent to which group membership actually constrains social relationships (Pisor & Ross, 2022; Pisor & Surbeck, 2019), (ii) whether what looks like ingroup favoritism might be kin favoritism (Pievani, 2011; Rusch, 2014) or group defense (De Dreu et al., 2020; Delton & Krasnow, 2017), or (iii) what even constitutes a 'group' in the context of the PA hypothesis (Yamagishi & Mifune, 2016). Further, subtle differences in methodological design can have large impacts on empirical findings (Lightner, Barclay, & Hagen, 2017), and many studies of PA do not incorporate measures of outgroup hostility—which is half of the PA hypothesis (Rusch, 2014; Yamagishi & Mifune, 2016). In short, our understanding of PA as a feature of human sociality may benefit from "looking more carefully at the scope of human phenomena we seek to understand" (Barrett, 2020).

Here, we conduct an interdisciplinary review of the empirics of PA. We begin by reviewing the history of the concept and candidate explanations for the evolutionary history and developmental trajectory of PA in humans. We then unpack some of the considerations that we believe underlie the study of PA, including debates about what constitutes a group, the role of different precursors of PA behavior (like context and individual characteristics), and the assumption that ingroup cooperation and between-group conflict are tightly linked. We first discuss how

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variation in precursors to PA behavior—including variation in resource access and cultural institutions—may produce variability in PA, and then turn to the role that variation in researcher expectations and methodological design may play in driving purported variation in PA. Key here is consideration of factors like sample selection, the relevance of particular economic games to measurement of PA, and the triangulation of findings across different data sources. We close by making recommendations for how researchers can reduce noise in the study of PA by checking their assumptions and being deliberate in their research design. Reducing noise, and thus improving our understanding of this feature of human sociality, is especially pressing given the influence of the PA hypothesis and related ideas—like the costs and benefits of diversity (Alesina & La Ferrara, 2005)—in the policy sphere and public discourse.

2. The what and why of parochial altruism

Intergroup conflict in humans has long been a focus of research in the social sciences (e.g., Sumner, 1906). However, authors disagree as to its nature and origins, and even its definition. In psychology alone, for example, some hold that ingroup favoritism and outgroup hostility are inseparable, while others argue that even in the presence of ingroup favoritism, the ways in which individuals think about outgroup members can vary from negative to positive (Buttelmann & Böhm, 2014; Levine & Campbell, 1971; Sherif, 1966; Turner & John, 2004; Yamagishi & Mifune, 2016). In anthropology, debate about the origins of outgroup hostility is often couched in larger conversations about warfare (Zefferman & Mathew, 2015); scholars continue to debate whether outgroup hostility was present in our last common ancestor with chimpanzees and bonobos, or whether it appeared more recently—perhaps as a product of sedentism or cultural transmission (Fry, 2018; Glowacki, 2022; Lemoine, Samuni, Crockford, et al., 2022; Otterbein, 1999; Wrangham & Glowacki, 2012). Across these disciplines, definitions of PA can differ too. For example, while some authors specifically refer to ingroup cooperation—or the generation of benefits for ingroup members at a cost to the self—others refer only to ingroup favoritism (e.g., Rusch, 2014), which may include situations in which ingroup benefits are generated without personal cost (Bernhard, Fischbacher, & Fehr, 2006). Given our goal of understanding variance in PA, we wish to be inclusive of the larger literature, and we thus refer to PA as ingroup favoritism paired with outgroup hostility—which can include aggression, competition, conflict, devaluation, ostracism, punishment, and xenophobia (Bernhard et al., 2006; Bowles & Gintis, 2004; Hruschka & Henrich, 2013; Yamagishi & Mifune, 2016).

Within larger conversations about the nature of intergroup relations, a particular hypothesis emerged: that of parochial altruism (see de Dreu, Balliet, & Halevy, 2014; De Dreu, Fariña, Gross, et al., 2022, for useful reviews). Research on PA was propelled in large part by theoretical publications by economist Sam Bowles and colleagues (Bowles & Gintis, 2003, 2004; Choi & Bowles, 2007), which aimed to explain the evolution of wide-spread cooperation among unrelated humans. According to this work, PA likely emerged as a product of group selection: the ancestors of contemporary *Homo sapiens* relied on within-community cooperation—that is, cooperation among individuals who regularly live in proximity to one another (Rodseth, Wrangham, Harrigan, et al., 1991)—to: (i) buffer the risk inherent in food procurement, and (ii) exclude other groups from accessing resources, especially where resources occurred in patches across the landscape (Choi & Bowles, 2007). They argue that although ingroup cooperation may have been costly to inclusive fitness, as it often benefited non-kin, it may have generated group-level benefits—namely, resource access and resource defense—sufficient to offset these costs (Choi & Bowles, 2007). The combination of ingroup cooperation and intergroup competition would have made groups containers for cooperation (see Boyd & Richerson, 1985; Yamagishi & Kiyonari, 2000) and potentially made individuals socially vigilant against outgroup favoritism as it could undermine ingroup

success (Tooby et al., 2006). That said, Choi and Bowles (2007) predict that the degree to which PA is expressed should reflect the local costs and benefits of intergroup connections—a distinction often absent in the citing literature. Bowles and Gintis (2004), for instance, demonstrate that groups can both have adaptations for parochial altruism and rely on intergroup trade relationships.

Today, the PA hypothesis is sometimes treated as a unifying explanation for the prevalence of intergroup conflict in humans. It has influenced a wide range of research on intergroup relations in the last two decades, to the point where some authors treat intergroup relations and PA as synonymous (see Böhm et al., 2020, for discussion). The inclusion of the tenets of PA in popular books (Greene, 2013; Seabright, 2004) and policy recommendations (Choi, Poertner, & Sambanis, 2019; Waring, Kline, Brooks, et al., 2015) has further broadened the scope of their influence. However, many central assumptions of the PA hypothesis are implicit, and important questions remain. For example: is it reasonable to assume that there are psychological predispositions for PA, or is PA an emergent phenomenon, resulting from learning, enculturation, and other processes that highlight certain group identities? Which groups count as groups for the purposes of PA—families, kin groups, ethnic groups, religious groups, political groups, sport groups? When should we expect intergroup hostility versus intergroup tolerance versus intergroup cooperation? If people are members of multiple groups, how are joint allegiances managed?

2.1. The evolutionary history of parochial altruism

To address these questions, it helps to consider the phylogenetic context and potential evolutionary history of PA. In many non-human primate species, kin-selected behavior undergirds outgroup hostility (Kitchen & Beehner, 2007). However, evidence suggests PA involving non-kin and distant relatives in chimpanzees (Kitchen & Beehner, 2007). Assuming that chimpanzees and bonobos offer an analogy for the last common ancestor shared by humans and the genus *Pan*—chimpanzees and bonobos—the presence of PA in chimpanzees and (to a lesser degree) in bonobos may suggest that PA has been part of the hominin lineage since its beginnings (Lemoine et al., 2022, though cf. Wrangham & Glowacki, 2012). As in humans, however, the intensity of PA in chimpanzees and bonobos appears to be flexible, reflecting variation in the costs and benefits of intergroup aggression—for example, reduced resource competition may lead to less PA when resources are less patchy (Glowacki, Wilson, & Wrangham, 2020) and population density is lower (Lemoine et al., 2022).

For humans, dense living became more common at the end of the Pleistocene, perhaps as early as 130,000 years ago, and was often centered around patchy resources (Singh & Glowacki, 2021; Sterelny, 2016a). On the one hand, this may have increased the opportunity for intergroup conflict over resource access, perhaps increasing selection pressures favoring PA (Choi & Bowles, 2007; Singh & Glowacki, 2021). On the other hand, dense living likely created more opportunities for economies of scale in trade and production, simultaneously raising the costs of miscoordination between people with different norms (Singh & Glowacki, 2021; see also Boyd & Richerson, 2022; Glowacki, 2022). In other words, tradeoffs between resource competition, gains to trade, and the cost of conflict may have modulated the intensity of PA, then as now (Barth, 1998; Bell & Moya, 2021; Choi & Bowles, 2007; Pisor & Surbeck, 2019). Use of ethnic markers may have proliferated in the late Pleistocene (Sterelny, 2016a), supporting economies of scale in trade and production, helping learners identify from whom to learn cultural information, and reducing the costs of coordination (Barth, 1998; Derex & Mesoudi, 2020; Dunbar, 2008; McElreath, Boyd, & Richerson, 2003; Moya, 2022; Smaldino, 2019). The proliferation of ethnic markers may or may not have altered *Homo sapiens*' evolved psychology: if we were already skilled at identifying and reasoning about groups (Pietraszewski, 2022), ethnic markers like linguistic cues and dress may have simply scaffolded our recognition of different groups (Moya,

2022). In short, whether or not late-Pleistocene increases in population density and the abundance of demarcated groups changed selection pressures favoring PA (e.g., Choi & Bowles, 2007) is an open question; flexible PA may have long predated the late Pleistocene (see Glowacki, 2022; Singh & Glowacki, 2021).

2.2. The developmental trajectory of parochial altruism

Limited evidence from educated, industrialized populations (in the sense of Henrich, Heine, & Norenzayan, 2010) suggests that PA may have a developmental trajectory similar to society-specific norms for sharing (e.g., House, Silk, Henrich, et al., 2013). Most of these studies are based on the Dictator Game or similar experiments that measure ingroup favoritism; in these experiments, a decider makes an offer of something valued, like stickers or candy, and the recipient has no choice but to accept the offer. Recipients are identified by their group membership—for example, their classroom, or their minimal group (i.e., an experimental group identified by, for example, a sticker color)—and children can allocate the valued resource to ingroup and/or outgroup recipients. These studies reveal that older children tend to be more ingroup favoring than younger children—that is, if they are given the choice between allocating to ingroup versus outgroup members, older children pick ingroup members at higher rates (Benozio & Diesendruck, 2015; Chiang & Wu, 2015; Fehr, Bernhard, & Rockenbach, 2008; Majolo & Maréchal, 2017). This may indicate convergence on society-specific norms, as adults in some of the societies studied (e.g., the United Kingdom and Taiwan; Chiang & Wu, 2015; Majolo & Maréchal, 2017) also exhibit ingroup favoritism (e.g., toward co-nationals; Romano, Balliet, Yamagishi, et al., 2017). However, whether due to the design of these tasks or to a lack of pronounced ingroup favoritism in young children, the effect sizes are usually small (Fehr et al., 2008). Further, the degree of ingroup favoritism appears sensitive to: (i) cues of intergroup competition (e.g., a tournament), which can amplify PA (Majolo & Maréchal, 2017), (ii) amounts given by other ingroup members to outgroup members (invoking ideas around conformity and reputation management; Chiang & Wu, 2015), (iii) the framing of resources as "yours" versus "ours", and (iv) child gender (Benozio & Diesendruck, 2015).

In short, the limited evidence we have from educated, industrialized populations cannot clearly disambiguate between a universal tendency for children to exhibit more ingroup favoritism with age and a convergence on local adult norms for cooperative behavior. What is clear is that ingroup favoritism is often not pronounced and, when present, is flexible—i.e., sensitive to a variety of inputs.

2.3. What is a group?

In our overview thus far, we have reviewed PA among a variety of groups, including human and non-human primate communities, classrooms, and minimal groups created solely for experimental purposes. What counts as a group under the tenets of PA? In the evolutionary sciences, a "group" is frequently defined as a collection of individuals among whom fitness interests overlap (Pisor & Surbeck, 2019; Tooby et al., 2006) or whose outcomes are otherwise interdependent (Böhm et al., 2020). Pietraszewski (2022) gives an in-depth discussion of the term. Although groups of any size can have overlapping fitness interests (Richerson & Boyd, 2008), ethnic groups are often treated as the default group in the PA literature from anthropology and adjacent fields (e.g., Choi & Bowles, 2007). "Ethnicity" in this context refers to people who identify as members of a group with shared cultural institutions[1] (Barth, 1956, 1998; McElreath et al., 2003; Moya, 2022; Moya & Boyd, 2015)—

i.e., norms, rules, or laws that help individuals coordinate for mutual benefit (Glowacki, 2020; North, 1991). Shared cultural institutions, in turn, can generate or amplify overlapping fitness interests (Richerson, Baldini, Bell, et al., 2016), which can attract more group members (De Dreu et al., 2020). That said, ethnic phenomena, including group markers and shared cultural institutions, are also present in non-ethnic groups (Moya, 2022); the preoccupation with ethnic groups in the literature may reflect an anthropological preoccupation with culture (Rodseth & Wrangham, 2004).

Indeed, focusing too narrowly on how groups like ethnic groups structure ingroup favoritism and outgroup hostility can impact our ability to address broader questions, such as whether groups of all kinds structure PA (Pietraszewski, 2021; Bell & Moya, 2021; Böhm et al., 2020; Brewer & Campbell, 1976; Moya, 2022; Rodseth & Wrangham, 2004). Indeed, PA has been observed among everything from minimal groups (Yamagishi & Mifune, 2016) to world religions (Purzycki, Apicella, Atkinson, et al., 2016) and nation states (Greene, 2013; Romano, Sutter, Liu, et al., 2021). However, not all groups lend themselves to groupish, ingroup-favoring behavior (Moya, 2022). For example, though some authors treat bands as groups among mobile foragers (Bowles & Gintis, 2003; Brewer & Caporael, 2006; Glowacki, 2022), rates of PA in these contexts appear to be low, as tensions are often diffused when individuals move between bands (Knauft, 1991; Layton, O'Hara, & Bilsborough, 2012; Rodseth & Wrangham, 2004). Even in groups that lend themselves to ingroup favoritism, however, group identity alone is typically insufficient to generate PA (e.g., Brewer & Caporael, 2006); other factors—such as incentives for intergroup competition, institutions promoting intergroup hostility, and cycles of retribution—are frequently implicated.

2.4. Internal states or behavior?

When discussing the PA hypothesis, researchers at times fail to separate internal states from behavior, though distinguishing the two can be important—for both theory and policy. Depending on the discipline and intellectual tradition, internal states may be called "motivations," "preferences," "beliefs," "attitudes," "dispositions," or "sentiments;" these terms often appear in the literature on the evolution of cooperation (e.g., "other-regarding preferences", "prosocial preferences", "prosocial motivations;" Kappeler & Silk, 2010). Internal states are generally assumed to guide behavior, as shown in Fig. 1 by the path labeled E (Gervais & Fessler, 2017; Guala, 2019; Strauss, 1992; Tooby et al., 2006). Behavior is not just the direct output of internal states, however, but is also affected directly and indirectly by individual characteristics—such as features of personality or an individual's past experiences—what some authors call "chronic individual differences" (de Dreu, 2010) (see Fig. 1, paths F, C-E, A-D, and A-B-E). Further, context or "structure"

(De Dreu & Gross, 2019)—such as local cultural institutions and features of the local ecology—can impact behavior directly (Fig. 1, path D) or indirectly (Fig. 1, paths B-E, A-C-E, or A-F).

Context, individual characteristics, internal states, and behavior all often appear in discussions of PA, whether explicitly or implicitly. For example, cultural institutions may preclude PA behavior by: (i) removing opportunities for its expression (Fig. 1, D), or (ii) by changing an individual's beliefs about the punishment they will incur if they either engage in PA behavior or, alternatively, do *not* engage in it (Fig. 1, B-E; Fearon & Laitin, 1996; Abbink, Brandts, Herrmann, et al., 2012). Individual characteristics may impact PA behavior directly—e.g., if low income affects an individual's ability to reciprocate generosity or invest in hostility (Fig. 1, F; e.g., Pisor et al., 2020)—or indirectly, by changing individuals' context-dependent beliefs—e.g., about the intentions of outgroup members in contexts of competition (Fig. 1, AB-E; Thielmann, Spadaro, & Balliet, 2020; De Dreu et al., 2020). Importantly, economic experiments, which we will explore below, are usually designed to isolate and measure internal states, though they do so through the proxy

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[1] This definition of ethnicity is limited, of course, not reflecting the usage of the word in other literatures or outside of academia; see Jenkins (1994) for a discussion.
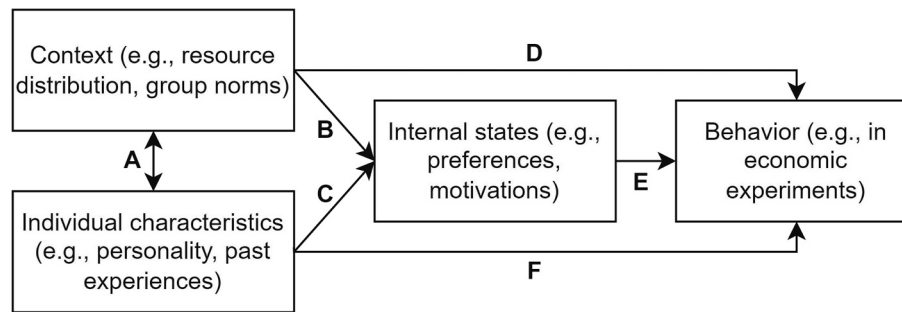
Fig. 1. A simplified model of precursors to PA behavior, per our review of the literature. For other discussions urging distinction between different components of this system, see de Dreu (2010); Pisor, Gervais, Purzycki, et al. (2020). Note that the resemblance between our schematic and the Situation Construal Model (Funder, 2016) is coincidence, though some of the ideas are similar.

of behavior (Guala, 2008; Guala & Mittone, 2010; Thielmann, Böhm, Ott, et al., 2021); likewise, social value orientation and welfare trade-off ratios rely on behavior to infer internal states, as they are the presumed to be the product of individual characteristics and context (Delton, Jaeggi, & Lim, in press; Murphy, Ackermann, & Handgraaf, 2011). On the other hand, to measure behavior in and of itself, observational data are often better measures than economic experiments (Pisor et al., 2020).

With respect to internal states, researchers often treat PA as the human default, such that tolerance of or even cooperation with outgroup members results only from an override of internal states favoring PA (e. g., Clark, Liu, Winegard, et al., 2019); in other words, researchers often treat internal states as relatively invariant to inputs from context and individual characteristics (Fig. 1). Whether an override is what generates variability in PA, however, is an open question (Levine & Campbell, 1971). The wide range of variability in PA uncovered in archaeological (Sterelny, 2016b), ethnographic (Cashdan, 2001; Pisor & Ross, 2022), genetic (Dyble, 2021), experimental (Columbus, Thielmann, & Zettler, 2023; De Dreu et al., 2020; Yamagishi & Mifune, 2016), and survey data (Brewer & Campbell, 1976) problematizes the concept of a default hostility toward outgroups. Additional research is needed to identify whether internal states favoring PA are a human default; further developmental studies outside of industrialized and educated contexts will be key.

2.5. Strong PA, weak PA, and intergroup tolerance

Though the PA hypothesis suggests that ingroup favoritism and outgroup hostility are likely to occur together, they are often decoupled in empirical contexts. Compelling data indicate that high levels of ingroup favoritism occur even in the absence of outgroup hostility (e.g., Abbink et al., 2012; Balliet, Wu, & De Dreu, 2014; Böhm et al., 2020; Brewer & Caporael, 2006; Cashdan, 2001; Columbus et al., 2023; de Dreu et al., 2014; De Dreu et al., 2020; Hruschka & Henrich, 2013; Purzycki & Lang, 2019; Rusch, 2014; Schaub, 2017; Yamagishi & Mifune, 2016). Indeed, while intergroup competition can certainly stabilize within-group cooperation (Choi & Bowles, 2007), some suggest that the conditions under which these two phenomena become linked may be narrow[2] (Dyble, 2021). This largely reflects the conclusions of those who research coalitional psychology: coalitional identity undergirds within-coalition cooperation in humans (Pietraszewski, 2022; Redhead & von Rueden, 2021; Tooby et al., 2006), but coalitions can

change across circumstances (Pietraszewski, 2021). Between-coalition conflict can strengthen within-coalition cooperation, but when and whether coalitions mobilize against one another is a separate question (Leech & Cronk, 2017; Tooby et al., 2006).

As such, to discuss the when and why of PA, we must distinguish "weak" from "strong" PA—and thus intergroup tolerance from intergroup hostility. When ingroup favoritism occurs in the absence of outgroup hostility, we may refer to it as "weak PA" (Böhm et al., 2020) or not refer to it as PA at all, as ingroup favoritism is so common. "Weak PA" implies intergroup tolerance—for example, when human or non-human primate groups come into contact and effectively ignore each other (Pisor & Surbeck, 2019), or when complementarities in humans (e. g., via trade and markets; Jha, 2013; Schaub, 2017) promote tolerance, and maybe even peace systems (Fearon & Laitin, 1996; Glowacki, 2022). Intergroup tolerance can provide a basis for intergroup relationships in turn, especially if interactions with outgroup members generate net benefits for both parties (Columbus et al., 2023; Pisor & Surbeck, 2019). Unlike "weak PA," "strong PA" involves the explicit coupling of ingroup favoritism and outgroup hostility; the literature reviewed above suggests that strong PA is less common than weak PA (Böhm et al., 2020).

3. What can explain the variability in parochial altruism?

Scholars largely agree that PA varies in humans (Baldassarri & Abascal, 2020; Rusch, 2014) due to variation in the relevant costs and benefits to intergroup hostility across contexts (e.g., Lang, Purzycki, Apicella, et al., 2019; Pisor & Ross, 2022; Romano et al., 2017) and across individuals (e.g., Bogaert, Boone, & Declerck, 2008; Thielmann et al., 2020). However, our literature review suggests that some of the measured variation in PA may be a product of variation in researcher expectations and methodological practices. Here, we expand on how variation in the affordances of PA, researcher expectations, and methodology can each impact our understanding of PA—and, in turn, our characterizations of human sociality more broadly.

3.1. Variation in the affordances of parochial altruism

There are three common explanations for variation in the relative costs and benefits of PA.[3] All of these focus on outgroup hostility, as ingroup favoritism is often present even in the absence of outgroup hostility (see our review above and Böhm et al., 2020). The first two explanations pertain to context and the third to individual characteristics (per Fig. 1):

1. *Variation in incentives for intergroup competition over something limited, like resource access.* As argued by Bowles and colleagues, competition

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[2] Note that in their influential simulation, Choi and Bowles (2007) allowed parochialism and in-group altruism to evolve independently, never suggesting they *had* to be coupled. Rather, they show that specific selective processes can lead to the two becoming linked. They underscore, however, that this linkage should be assessed with empirical data—and it is the empirical data which suggest that in-group favoritism and out-group hostility are often not linked.

[3] Importantly, this list is not exhaustive. For some additional examples, see De Dreu et al. (2022)

over resource access in the human evolutionary past may have selected for internal states that are precursors to PA behavior (Bowles, 2008; Choi & Bowles, 2007). The literatures on intergroup threat and intergroup conflict in psychology likewise find a relationship between defensible, limited resources and intergroup competition (Böhm et al., 2020; Brewer, 2010; Riek et al., 2006). Of course, not all human ecologies feature defensible resources or high demand for limited resources; this means that there should be geographic variation in the affordances of PA (Bell & Moya, 2021). However, when competition over limited resources is in play, a group's size, competitive ability, and power become relevant to its success in competition (Ellemers, Kortekaas, & Ouwerkerk, 1999; Fiske, Dupree, Nicolas, et al., 2016; Richerson et al., 2016). Success changes a group's status relative to other groups, influencing the desirability of group membership (De Dreu et al., 2020; Richerson et al., 2016; Waring, 2012; Waring & Bell, 2013). Groups that attract more members require more resources; this means that even fewer resources will be available to outgroup members, which can stimulate further competition (Bell & Moya, 2021; De Dreu et al., 2020). That said, when the status gap between groups grows, it can impact behavior in unexpected ways; for example, if members of a high-status group do not perceive members of a low-status group to be competitors, they may sometimes be magnanimous toward them (Hewstone, Rubin, & Willis, 2002).

2. *Cultural institutions, or their absence.* When individuals share the same norms for proper behavior (e.g., in markets or collective actions), the costs of coordination are reduced (Barth, 1998; Bell & Moya, 2021; Bunce & McElreath, 2018; Ensminger, 1997; McElreath et al., 2003; Moya, 2022; Moya & Boyd, 2015). These norms often emerge endogenously—for example, when between-group mobility is low, a high likelihood of repeated interactions with ingroup members may mean that individuals pay more attention to ingroup generosity, which may make ingroup favoritism normative (Roberts, 2007; Yamagishi & Kiyonari, 2000). Cultural institutions can enforce and spread shared norms (e.g., McElreath et al., 2003), and such institutions may be maintained by the individual-level benefits of improved coordination[4] (Habyarimana, Humphreys, Posner, et al., 2007; Mantilla, Zhou, Wang, et al., 2021). However, if there are net benefits to be gained by avoiding conflict (intergroup tolerance), or even by coordinating across group boundaries (intergroup relationships): (i) institutions may emerge that punish individuals who generate costs for outgroup members (Fearon & Laitin, 1996; Fry, 2018; Pisor & Surbeck, 2019), (ii) individuals might seek competency in the norms of other groups in order to lower the costs of coordination (Bunce, 2020; Ruben, 1989), and (iii) institutions may emerge that support connections across group boundaries, such as through marriage, trade, and ritualized relationships (Bollig, 2010; Jackson, 1983; Jha, 2013).

3. *Positively-valenced exposure to outgroups can expand loyalties; negatively-valenced exposure can enhance parochial altruism.* When individuals are exposed to outgroup members—either directly, through dyadic interactions, or indirectly, via information transmission from others—they may develop additional loyalties and become less willing to favor individuals of their own group. This is assuming, however, that exposure to outgroup members is positively valenced or generates net benefits for the individual (e.g., Paluck, Porat, Clark, et al., 2021). There are various explanations for how positively-valenced exposure translates into expanded loyalties, from identity fusion to the strategic building of social capital (Beck, 2006; Brewer & Campbell, 1976; Buchan, Grimalda, Wilson, et al., 2009; Fukuyama, 2001; Hruschka & Henrich, 2013; Mau, Mewes, &

Zimmermann, 2008; Singer, 1981). These explanations imply that positively-valenced exposure increases the value individuals place on outgroup members, either as beings (Singer, 1981) or, more specifically, as potential social partners (Pisor & Gurven, 2015). On the other hand, when exposure to an outgroup is negatively valenced—for example, when individuals have experienced civil war (Schaub, 2017) or discrimination (Pisor & Gurven, 2018; Waring & Bell, 2013)—individuals may update their beliefs about the potential net benefits of interacting with outgroup members; in other words, a change in their individual characteristics may change their internal state. In the context of negatively-valenced exposure, internal states that promote ingroup favoritism may increase an individual's chance of obtaining net benefits (Yamagishi & Kiyonari, 2000).

These three explanations—competition, institutions, and exposure—are not mutually exclusive. For example, differences in pro-self and pro-social behavior as measured by social value orientation (Messick & McClintock, 1968) may reflect internal states (though cf. de Dreu, 2010), which integrate context, individual characteristics, and their interrelation (Fig. 1). Indeed, a person's social value orientation appears to be a product of gene expression plus past experiences (Bogaert et al., 2008), incentives for competition (e.g., degree of capitalism), and enculturation to local norms (Shahrier, Kotani, & Kakinaka, 2016). Social value orientation is sometimes predictive of favoritism, especially ingroup favoritism, although not outgroup hostility (Columbus et al., 2023; de Dreu, 2010; Romano et al., 2017).

In short, competition, institutions, and exposure all generate variation in the benefits and costs of intergroup competition and intergroup relationships—namely, by affecting whether the expected affordances of within-group interactions are greater than those of between-group interactions. We should expect that the minds of *Homo sapiens* attend to the pros and cons of various social relationships; between-group connections are no exception (Brewer & Campbell, 1976; Pisor & Gurven, 2018; Waring & Bell, 2013). However, few researchers explicitly address whether any of the explanations above are alone sufficient to account for observed variation in PA (for examples of those that do, see: Hruschka & Henrich, 2013; Vardy & Atkinson, 2019; Levine & Campbell, 1971).

3.2. Researcher expectations about parochial altruism

While competition, institutions, and exposure are common explanations for why the intensity of PA may vary, researcher expectations may also impact reported levels of PA. For example, researchers may:

1. *Select study sites in areas where intergroup relations are characterized by conflict.* Fearon and Laitin (1996) note that much of the research on intergroup relations focuses on cases of between-group conflict, essentially selecting on the dependent variable and making such conflict seem ubiquitous: "violence is assumed to follow ethnic tensions as night follows day" [p. 716]. "The salience and extremity of intergroup hostility" to researchers can thus lead to a literature in which "the study of intergroup relations is equivalent to the study of intergroup conflict" (Brewer, 2010, p. 535). Our point here is not that intergroup conflict is rare, but rather that human flexibility is not to be understated. At very least, while there are many instances of intergroup contact in humans, the fraction of these instances where conflict actually *occurs* is much smaller (Fearon & Laitin, 1996). As such, we cannot gain an unbiased understanding of how and why PA varies in humans if the literature focuses only on a highly selective subset of humanity (Barrett, 2020; Pisor & Surbeck, 2019; Sherif, 1966).

2. *Conflate generalized cooperation with cooperation targeted toward ingroup members.* Silva and Mace (2014) argue that unless we assess which groups matter the most to participants, we may mean to measure ingroup favoritism but instead capture a willingness to

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[4] Note that researchers disagree over whether norms and institutions appear, persist, and spread because they generate individuallevel or group-level benefits, or both (see Purzycki, 2020, for discussion).

cooperate with most others—a "generalized" preference for cooperation sometimes associated with the concept of generalized trust (Nannestad, 2008; Yamagishi, 2011). As such, collecting social network data that include the group identities of each person, as well as their favoritism and hostility toward each other, can improve our understanding of how group identities structure cooperation (e.g., Moya, 2022).

3. *Conflate PA with motivations to protect valued social partners, who are often ingroup members*. According to this argument, because most social relationships are with members of the same group, "what may look on the surface like the selfless defense of in-group interests, may instead be the message 'don't tread on me and mine'" (Delton & Krasnow, 2017, p. 741).

4. *Accidentally label variation in some other feature of human sociality as variation in PA*. For example, both PA and nepotism entail favoritism toward certain individuals—ingroup members or kin (Pievani, 2011; Rusch, 2014). If there are enough kin in one's ingroup, then behaviors that benefit kin—like not closely monitoring who did what for whom (Sahlins, 1972)—could benefit ingroup members as a byproduct (Rusch, 2014). Or, taking another example from our own work (Pisor & Ross, 2022), if different groups live in different ecological areas, then preferences for long-distance relationships that span ecozones could look like preferences for intergroup relationships—even if the fact that such relationships span group boundaries is causally immaterial (e.g., Barth, 1956; Pisor & Ross, 2022).

Of course, not all work on PA is affected by the researcher expectations outlined above—these are merely generalized critiques voiced by researchers of intergroup relations. That said, expectations can certainly guide what research questions are asked and how researchers interpret their data (Barrett, 2020). If we expect PA to be a defining feature of human sociality, we may interpret a variety of data as evidence for or against PA, rather than considering other, sometimes more parsimonious, explanations.

3.3. Measuring parochial altruism

Depending on a given researcher's inferential objectives, PA may be measured in a variety of ways. In some cases, researchers use self-report data, experimental economic games, social discounting tasks, and social network data to measure PA. In other cases, researchers infer PA from patterns in aggregate, ecological-level data. As mentioned before with respect to researcher expectations, variation in methodological design can have noteworthy impacts on inferences about PA and related phenomena.

3.3.1. Economic games

Experimental economic games are perhaps the most commonly used tool for assessing PA, and researchers usually consider such games to be a measure of internal states (e.g., Guala, 2008; Guala & Mittone, 2010; Thielmann et al., 2021). In economic games, participants make decisions that affect the amount of currency received by other individuals—referred to variously as alters or recipients, and who are usually anonymous. For example, in a classic game called the Dictator Game, the decider makes an offer and the alter has no choice but to accept it, while in the Prisoner's Dilemma, a decider and an alter each have to independently choose whether to cooperate or defect, and their decisions jointly determine the payouts they each receive. Although classic games like the Dictator Game and Prisoner's Dilemma have been frequently used to study PA, unless their designs are substantially modified, they do not allow researchers to measure the coupling of ingroup favoritism and outgroup hostility as predicted by strong PA (Rusch, 2014; Yamagishi & Mifune, 2016). As discussed in Section 2.2, they more readily measure ingroup or outgroup favoritism; without an option for participants to engage in outgroup hostility, it is unclear whether ingroup favoritism in

the Dictator Game and Prisoner's Dilemma reflects weak PA or strong PA (Aaldering & Böhm, 2020). We review these classic games, and other methods that do not measure outgroup hostility, in the first six rows of Table 1.

Game designs that either compare ingroup favoritism with outgroup hostility, or make it such that ingroup favoritism generates outgroup hostility as a byproduct, are better suited to measure strong PA. One important game in the literature is the intergroup prisoner's dilemma–maximizing difference (IPD-MD) game (e.g., Böhm, Halevy, & Kugler, 2022; Columbus et al., 2023; de Dreu, 2010; Halevy, Bornstein, & Sagiv, 2008). The IPD-MD allows weak PA to be decoupled from strong PA, such that participants can favor ingroup members with or without expressing hostility toward outgroup members. The intergroup parochial and universal cooperation (IPUC) game is a nested dilemma that extends the IPD-MD, allowing individuals to engage in ingroup favoritism (weak PA), ingroup favoritism paired with outgroup hostility (strong PA), or favoritism toward both ingroup and outgroup (universal cooperation) (Aaldering & Böhm, 2020; De Dreu et al., 2020), addressing concerns that what looks like ingroup favoritism may be universal cooperation in some cases (Silva & Mace, 2014).

A particular strength of economic games is that they can offer high internal validly and allow for experimental manipulations (Pisor et al., 2020). A researcher can, for example, manipulate relevant group identities by changing the composition of an experimental group (e.g., Silva & Mace, 2014) or by changing or obscuring the group identity of a potential recipient (e.g., Romano et al., 2017). This allows researchers to test for differences in favoritism or hostility as a function of the manipulated variable. However, the external and ecological validity of experimental games has been called into question, with experimental behavior in games often having little association with relevant behavior in the "real world" (e.g., Galizzi & Navarro-Martinez, 2019; Gurven & Winking, 2008; Naar, 2020; Winking & Mizer, 2013). Similarly, test-retest reliability in games is often low (Chuang & Schechter, 2015); varied results across games that supposedly tap similar constructs (Lönnqvist, Verkasalo, Walkowitz, et al., 2015; Naar, 2020) may reflect differences in framing (Lightner et al., 2017; Yamagishi, Mifune, Li, et al., 2013) or differences in researcher expectations 3.2; and respondents, especially non-numerate ones, might be confused by peculiar or complicated game rules (Cook, 2015; Dave, Eckel, Johnson, et al., 2010). Taken together, these observations underscore the sensitivity of experimental findings to minute features of design (Hagen & Hammerstein, 2006). Moreover, by generally focusing on the effect of only a single variable (e.g., the group identity of a potential recipient), experimental approaches often fail to account for how people—in real-world scenarios—weight behavior in light of a plethora of competing heuristics, some of which are highlighted in Fig. 1 (e.g., Gurven & Winking, 2008; Naar, 2020; Winking & Mizer, 2013). For example, an individual's internal state might motivate them to favor both ingroup individuals and individuals who are most in need (e.g., Hewstone et al., 2002). The latter consideration might overwhelm the former in some contexts, and so—if outgroup members happen to be more in-need—economic game play might suggest internal states consistent with PA, while real-world behavior (in the same set of individuals) might suggest no PA, or even elevated cooperation directed to outgroup members (Pisor et al., 2020).

3.3.2. Aggregate-level studies

If PA has appreciable effects on real-world behavior, the consequences of PA should be detectable in aggregate-level (e.g., county-level) indices of ingroup favoritism (i.e., in rates of public goods provisioning) and outgroup hostility (e.g., in rates of inter-ethnic violence). Thus, in an effort to test if laboratory findings generalize more widely, researchers have studied aggregate-level outcomes to infer the presence, causes, and consequences of PA (see Table 1, second section). Many of these studies focus on the role of context, especially on variation in incentives for intergroup competition over limited resources—often exacerbated when group size is increasing and groups see one another as

Table 1

A summary of tools used to study parochial altruism and its causes and consequences. The first section of the table focuses on approaches in which researchers can select the group identity of the alter(s). The second section focuses on tools that measure the relationship between context and PA behavior outside of the laboratory. The third section focuses on network-based tools that attempt to bridge the gap between the control of the laboratory and the ecological validity of studies of real-world behavior. For other helpful summaries of existing economic experiments, see Thielmann et al. (2021) for a general overview, and Böhm et al. (2020) for one specific to intergroup relations.

Method	Design	Pros	Cons	Example Citation
Dictator Game (DG)	Of endowment X, decider chooses to offer Y to alter; alter cannot respond	Potential proxy for favoritism toward a single target, whether ingroup or outgroup	Does not measure hostility (i.e., cannot measure strong PA); may better measure fairness than favoritism	(Guala & Mittone, 2010)
Ultimatum Game (UG)	Of endowment X, decider chooses to offer Y to alter; alter can accept, with decider getting X-Y and alter getting Y, or reject with both getting nothing	Potential proxy for favoritism toward a single target, whether ingroup or outgroup	Does not measure hostility; does not distinguish between preferences and strategy (i.e., internal states and context)	(Gil-White, 2004)
Prisoner's Dilemma (PD)	Two parties simultaneously decide whether to cooperate or defect, with payouts DC > CC > DD > CD	Potential proxy for favoritism toward a single target, whether ingroup or outgroup	Does not measure hostility; does not distinguish between preferences and strategy (i.e., internal states and context)	(Romano et al., 2021)
Public Goods Game (PGG)	In experimental groups of 3+ participants, deciders decide how much to contribute to a common pool, which is multiplied and redistributed; when used to study PA, experimental group composition is typically manipulated	Potential proxy for favoritism toward ingroup and/or outgroup targets	Does not measure hostility; does not distinguish between preferences and strategy (i.e., internal states and context)	(Schaub, 2017)
Social Value Orientation (SVO) Slider Measure	Decider makes decisions about how much money they would like for self and anonymous other (ingroup, outgroup, or unspecified); decisions triangulate decider's social orientation type	Can measure prosocial orientation toward both ingroup and outgroup alters	Does not measure hostility	(Murphy et al., 2011)
Resource Allocation Game (RAG)	Decider makes series of die rolls and, given how die lands, is to put coins in cups for the self or an ingroup or outgroup recipient; deviations from fair divisions at population level are interpreted as favoritism	Measures deciders' willingness to be fair and avoid ingroup favoritism and/or selfishness	Does not measure hostility; difficult to make individual-level inferences about internal states	(Lang et al., 2019)
Intergroup Prisoner's Dilemma—Maximizing Difference (IPD-MD)	Decider can give to one of two pools—ingroup benefitting and ingroup benefitting at outgroup cost—and/or keep money	Differentiates ingroup favoritism from ingroup favoritism paired with outgroup hostility (that is, weak PA from strong PA)	Does not measure outgroup favoritism	(Halevy et al., 2008)
Intergroup Parochial and Universal Cooperation Game (IPUC)	Decider can contribute to three pools—ingroup benefitting, ingroup benefitting at outgroup cost, and ingroup and outgroup benefitting—and/or keep money	Differentiates ingroup favoritism, from ingroup favoritism paired with outgroup hostility, from "universal cooperation"	The ecological validity of this method, like all experimental measures above, is questionable	(Aaldering & Böhm, 2020)
Ethnolinguistic Fractionalization (ELF)	Measures the extent of ethnic (or other type of group identity) diversity at a specific level of resolution (e.g., county) and associates it with other aggregate variables, like rates of public goods contributions or rates of between-group violence	Measures ecologically valid behavior outside of an experimental context and links it to diversity in group composition at some aggregate level of resolution	Does not reveal much about individual-level internal states; lacks experimental control; analyses are sensitive to confounding and the ecological regression fallacy	(Alesina, Devleeschauwer, Easterly, et al., 2003)
Indices of Ethnic Competition (ECI) and Demographic Disadvantage (DDI)	Measures the extent of scope for ethnic (or other type of group identity) competition at a specific level of resolution (e.g., county) and associates it with other aggregate variables, like rates of public goods contributions or rates of between group violence	Measures ecologically valid behavior outside of an experimental context and links its to demographic indices that are purported precursors of PA	Does not reveal much about individual-level, internal states; lacks experimental control; analyses are sensitive to confounding and the ecological regression fallacy	(Slack & Doyon, 2001)
Social Network Analysis (SNA)	Uses measured characteristics of individuals combined with reports of positive or negative ties to analyze how individual, dyadic, and network characteristics predict behavior	Measures reported or observed behavior outside of the experimental context	Time-consuming to collect; may or may not reveal internal states; sensitive to typical biases affecting any self-reported data	(Pisor et al., 2020)
Recipient Identity-Conditioned Games (RICH)	Respondents are presented with photos of known alters and complete three tasks: allocating coins to alters, removing coins from alters, and paying to punish alters	Proxies internal states given context and individual characteristics of decider and alter	Does not involve experimental manipulation of group identity variables, so the causal effect of group identity can only be recovered if appropriate controls are included	(Gervais, 2017)

competitors (e.g., De Dreu et al., 2020; Hewstone et al., 2002). Alesina, Baqir, and Easterly (1999), for example, used aggregate demographic data to show that, at a community level, white Americans appeared to decrease investment in public programs on average as ethnic diversity increased. Similarly, Slack and Doyon (2001) applied event history analysis to war crimes data from the former Yugoslavia (1990–1993) and found that civilian-involved acts of violence—mostly Bosnian Serbs harming Bosniak Muslims—were more likely to occur in areas with higher "indices of ethnic competition"—that is, in areas where Serbs and Muslims had similar population sizes—and in areas where the Muslim population was experiencing higher growth relative to the Serb population. Using similar methods, other empirical work has since explored the effects of inequality across ethnic groups on outcomes potentially indicative of ingroup favoritism and outgroup hostility, such as public goods provisioning, economic performance, and conflict rates (e.g., Alesina, Michalopoulos, & Papaioannou, 2016).

A strength of these empirical studies is that they explore the potential real-world consequences of PA, testing both whether group identity structures behavior and how the intensity of ingroup cooperation and outgroup hostility vary as a function of differences in context. However, a weakness of these aggregate-level methods is that they lack experimental control and are thus highly sensitive to both confounding variables and the ecological regression fallacy. For example, they may assume ethnic groups are the most relevant and salient to intergroup relations (Section 2.3); focus on areas with recent conflict, selecting on the dependent variable (Section 3.2); and aggregate across higher-order units, like villages, regions, or nations, such that the associations that are observed *across* units may not reflect causal relationships that occur *within* units (see Freedman, 1999).

3.3.3. Integrative, network-based methods

All methods come with trade-offs between internal and external validity. Economic games applied to the topic of PA are thought to afford high internal validity by permitting experimental manipulation of group membership (Espín, Brañas-Garza, Gamella, et al., 2022; Silva & Mace, 2014; Waring & Bell, 2013; Yamagishi & Kiyonari, 2000; Yamagishi & Mifune, 2016), while observational studies of PA behavior are thought to afford high external validity by permitting researchers to study if and when laboratory findings generalize to behavioral patterns in the real world (McElreath, Bell, Efferson, et al., 2008). As reviewed above, each approach has its limitations. Accordingly, the generalizability and reliability of research on PA may be improved by triangulating results using multiple methods, and replication—using consistent protocols across variable contexts. We advocate consideration of methods that: (i) capture between-individual variability in PA as a function of context and individual characteristics, including characteristics of the alter and the dyad of which the individual and alter are a part; and (ii) can be deployed with multiple samples, including outside of educated, industrialized contexts, to improve comparability. One approach that we find particularly promising is the joint deployment of social network analysis paired with Recipient Identity-Conditioned Heuristic (RICH) economic games (Gervais, 2017). In Ross and Pisor (2023), we provide a detailed analysis of social network and RICH data from two multi-ethnic communities on the Pacific coast of Colombia; the data illustrate important between-individual, between-dyad, and between-site differences in PA. Here, we outline the potential of such a networks-based approach to address some of the limitations of other methods.

Social network questionnaires can be designed to measure both positive ties (e.g., nominations of friendships or food/money transfers) and negative ties (e.g., nominations of alters who people fear, shun, or have conflicts with) and study patterns in such ties as a function of group identity. Importantly, social network data can measure real-world behavior concerning both ingroup favoritism and outgroup hostility, while avoiding the ecological inference fallacy that problematizes interpretation of aggregate-level empirical data.

RICH economic games involve tasks in which deciders have a chance

to: (i) allocate money to, (ii) take money from, and (iii) at a cost to themselves, reduce the payouts of a set of known alters. In these games, a photograph roster is used to allow each decider to make economic decisions with respect to each other person in the study (see Ross & Redhead, 2021, for details and software tools). These games thus: (i) measure generosity, exploitation, and hostility toward ingroup and outgroup alters that each participant knows, and (ii) permit researchers to study how group membership affects internal states (e.g., sentiments toward alters) while statistically controlling for potential confounds using standard tools from social network analysis (e.g., using the social relations model, or its generalizations; Kenny & La Voie, 1984; Koster & Leckie, 2014). In contrast to other economic games not played on networks, RICH games permit researchers to study how game decisions are influenced by multiple individual-level and dyad-level variables, and thus possibly competing heuristics—e.g., the relative effects of group identity and economic need can be studied via network-based multiple regression (Pisor et al., 2020).

4. Conclusions and future directions

In a recent paper provocatively titled "Tribalism is human nature," Clark et al. (2019) write that ingroup favoritism is "natural" and "nearly ineradicable." Such characterizations can have wide-reaching effects on how researchers and policymakers think about intergroup relations. Although parochial altruism (PA), or ingroup favoritism paired with outgroup hostility, is commonly treated as the default for human intergroup relations (Böhm et al., 2020; Brewer, 2010; Fearon & Laitin, 1996), empirically measured levels of PA actually vary substantially across individuals, across contexts, and across groups (Rusch, 2014)—it is far from "nearly ineradicable," but treating it as such can create a self-fulfilling prophecy (Böhm et al., 2022). As we have outlined here, variability in measured PA can reflect variation in what is measured (e.g., internal states versus behavior; Fig. 1) and how context varies (e.g., due to changes in the net benefits of intergroup competition). However, researchers' expectations and methods matter too. There is evidence that researchers' expectations have influenced where PA is studied, how PA is studied, and how results are interpreted (Fearon & Laitin, 1996). If we expect to see a social world shaped by a given phenomenon, we may mischaracterize human sociality (Barrett, 2020). Such mischaracterizations have policy implications—including, for example, how we expect individuals to respond to conflicts (cf. Schaub, 2017).

In our review of the PA literature, we have highlighted areas of PA research that we believe would be well-served by more researcher reflection and caution—and these critiques apply with equal force to research on intergroup relations and group psychology more broadly. Areas that could be well-served by more reflection and caution include:

1. *Examining assumptions about PA in humans.* The PA hypothesis refers to just a subset of intergroup relations in which ingroup favoritism and outgroup hostility are directly related—perhaps due to selection linking the two (Choi & Bowles, 2007). Intergroup relations take many more forms (Böhm et al., 2020; Brewer, 2010) and range from hostile to peaceful (Glowacki, 2022). If our expectation is that human intergroup relations are defined by PA, we may design studies that reflect this assumption (Pisor & Ross, 2022) and/or preferentially conduct research in locations where levels of outgroup hostility are atypically high (Fearon & Laitin, 1996; Pisor & Surbeck, 2019). The flexibility of human sociality is not to be underestimated.

2. *Differentiating weak from strong PA.* As reviewed above, many studies aiming to investigate PA focus instead on just favoritism—ingroup favoritism by itself, or ingroup versus outgroup favoritism. This is true, for example, in much of the literature on PA in children. The IPUC, IPD-MD, and RICH games offer methods for measuring both ingroup favoritism and outgroup hostility—with the IPUC and IPD-MD designed with internal states in mind, and RICH games designed to measure behavior given context, individual

characteristics, and internal states (Aaldering & Böhm, 2020; Gervais, 2017; Halevy et al., 2008).

3. *Engaging in specific study of different components of PA.* Indeed, the precursors to PA behavior (Fig. 1)—which appear both implicitly and explicitly in the PA literature—can each be studied, allowing us to better understand how upstream changes create variability in internal states and behavior across individuals, across situations, and across groups (e.g., Thielmann et al., 2021). Work by Thielmann et al. (2020), de Dreu (2010), Columbus et al. (2023), and others has begun to unpack how structural vs "chronic individual differences" (de Dreu, 2010) contribute to internal states and behavior pertinent to PA.

4. *Designing methods that match research questions.* Whether studying PA or another aspect of human sociality, we suggest that researchers ensure that the methods they choose match the questions they wish to answer (Barrett, 2020). We have had issues with this ourselves (Pisor & Ross, 2022) and, in Pisor et al. (2020), offer pointers for how to improve the match between hypotheses and design of economic games.

5. *Considering both internal and external validity, especially before generalizing.* Experimental, laboratory-based studies of PA are popular, partially because they serve as proxies for internal states with experimental controls (Thielmann, Böhm, Ott, et al., 2021). There is a tendency for authors to generalize from these findings to humanity more broadly. However, concerns have been raised about the internal, external, and ecological validity of economic games (Chuang and Schechter, 2015; Galizzi and Navarro-Martinez, 2019; Naar, 2020). For claims of generalizability to be defensible, the phenomenon under study should appear consistently across studies, samples, and methods (Tiokhin, Hackman, Munira, et al., 2019). Thus, we need to triangulate findings across methods, and consider deploying methods with high ecological validity (such as network-based games) across diverse contexts, to complement and cross-validate findings derived from laboratory methods with tighter experimental control, but possibly less relevance to real-world behavior. For example, learning that there is a small effect of group identity on inter-personal behavior in online Prisoner's Dilemmas might not tell us much about how we should expect PA behavior to respond to change in group composition in real populations.

6. *Drawing on existing data to formulate explicit hypotheses.* It can be difficult to elicit intergroup hostility. Modeling and experimental data do offer suggestions about when and why it might emerge, however: surprisingly, not in all situations of high resource density, but instead, perhaps when population pressure is high or groups are caught in cycles of retribution (Bell & Moya, 2021; Columbus et al., 2023). These findings offer testable predictions that can be studied further; we especially recommend examining different precursors to PA behavior (Fig. 1) in naturalistic settings through triangulation (e. g., combining ethnography, social network data, and field experiments; Pisor et al., 2020).

Barrett (2020) also provides detailed discussion and recommendations pertinent to each of the above points. In sum, one of the most characteristic features of humans is our flexibility (Potts, 2012)—and flexibility in our social worlds is no exception (Pisor & Surbeck, 2019). Being deliberate about how we study intergroup relations may not only improve our characterizations of human sociality, but may change our expectations for how intergroup relations play out in the real world, affecting our approach to policy and interventions in turn.

Declaration of Competing Interest

None.

Data availability

Not applicable.

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