A Reputation-Centered Theory of Human Cooperation and Social Organization

Károly Takács*

Institute for Analytical Sociology, Linköping University (Sweden)
CSS-RECENS, Centre for Social Sciences (Hungary)

Abstract

While all species are unique, only humans have been able to develop complex tools and technology, and to place energy and their environment under control. Social learning and extrasomatic storage of information enabled rapid development in recent evolutionary times. Our argument is that human uniqueness lies in human sociality. Namely, large-scale and widespread cooperation, the establishment and maintenance of social order, the use of language as a communication tool, advanced social cognition, and large social complexity built on social norms are characteristics of unique human sociality. Here we claim that reputation is a human invention that could have largely contributed to the development of these characteristics. Reputation-based mechanisms are fundamental to the emergence and maintenance of large-scale cooperation between non-closely related individuals by informing partner selection and conditional actions towards others. Reputation is the basis of informal social hierarchies that provide a guideline to maintain social order. Reputation concerns and gossip about absent others constitute a large part of human communication. This way, and with increased abilities of social cognition, we keep account of a larger set of individuals, and can be directed by norms that guide proper behavior and regulate interactions towards norm violators and their punishers. To provide a nuanced view on how reputation became key to all social features of human uniqueness, we consider its roles and dimensions starting from individual life and going towards interdependencies in dyads, small groups, intergroup relations, and large-scale societies. Throughout this journey from individual to societal life, we speculate that reputation has reached its central importance in small group life and not at a lower or higher level of complexity.

Keywords: Reputation; gossip; cooperation; hierarchy; evolution of language; social organization.

Acknowledgements

---

* ✉ karoly.takacs@liu.se

1   Introduction

1.1   Human uniqueness

Human uniqueness has always been one of the most fascinating and fundamental issues for scientists and philosophers. Behavioral, cultural, and biological accounts of human uniqueness, however, have started to converge only recently (Boyd & Richerson, 2005; Hill et al., 2009). While all species are unique, only humans have been able to control energy and their environment, and to develop complex tools and technology to ease and extend life substantially (Bingham, 1999; Laland & Seed, 2021). Although humans gained large-scale ecological dominance only in recent historical times, an exceptional total biomass, tool use, and social cognition had already been achieved in prehistoric hunter-gatherer societies (Vitousek et al., 1997; Hill et al., 2009).

Humans extensively rely on social learning that results in cumulative adaptive change and extra-somatic storage of information (Hill et al., 2009) that allow for the rapid accumulation of knowledge and skills across generations (Boyd & Richerson, 1985). Tools, technology, social learning, and cumulative culture made our innovations sustainable and resulted in rapid development in the recent evolutionary period (Boyd et al., 2011). But how did humans attain and sustain tools, technology, and cumulative culture? Anthropologists have been speculating about this question for some time (e.g., Schick & Toth, 1994) and are brought back to the fundamental search for key features that made humans uniquely capable to achieve this development.

Following multiple lines of literature that arrive at this position (Richerson & Boyd, 1998; Gintis, 2000; Potts, 2004; Tomasello, 2014, 2020; Levinson & Enfield 2020), we consider that human uniqueness lies in exceptional human *sociality*. The essential features of exceptional human sociality have been and will remain debated. The list of behaviors, cultural and social characteristics that are human universals and are less likely to be found in other species (Brown, 2000, 2004), could be longer or shorter as new findings in studies of animal behavior might eliminate certain elements from this list (e.g., in Høgh-Olesen, 2010).

We identify *cooperation*, a high level of *social order*, *language*, exceptional *social cognition*, and a high level of *social complexity* built on *social norms* as essential characteristics of exceptional human sociality. The first crucial element of unique success of human societies is the ability to solve the problem of cooperation between non-closely related individuals (Bingham, 1999; Fehr & Gächter, 2000; Ostrom, 2000; Okada & Bingham, 2008). Another problem that appears with an increased amount of competitive and other interdependencies in group life is the maintenance of social order, for which humans developed two distinct solutions: formal and informal hierarchies. Furthermore, in line with other perspectives, we acknowledge that the use of language as an advanced form of communication, the acquisition of advanced social cognition, and *social complexity* in the organization of social life that is built on *social norms* that prescribe what is good and bad behavior and how should others be treated are essential parts of human uniqueness. They are, however, partly consequences and partly catalysts of unique human solutions to the problems of coordination, cooperation, and social order.

During this theoretical speculation, we take it as granted that new insights for human uniqueness can only be gained if human social life is scrutinized in a comparative perspective with non-human social life (Hill et al., 2009; Tomasello, 2009).

1.2   Reputation is key to explaining exceptional human sociality

Human uniqueness is certainly a complex question and various attempts have tried to attribute its origins to a single social characteristic. *Cumulative culture* has been proposed as an explanation (e.g., by Boyd & Richerson, 1985; and Henrich & McElreath, 2003). Culture is information, tools, material goods, and regulations of behavior, that is transmitted socially (Hill et al. 2009). Although culture is present in several animal species as they transmit behavioral patterns, including tool use, food extraction and storage techniques, and social behaviors (Whiten et al., 1999; Vale et al., 2017), humans have an extraordinary capacity for cumulative culture and imitation (Boyd & Richerson, 1996; Mesoudi & Thornton, 2018). The unique accumulation and development of human culture has largely been catalyzed by new institutions of *inheritance* (Cavalli-Sforza & Feldman, 1973; Boyd & Richerson, 1985; Henrich & McElreath, 2003).

Coalitional enforcement has been suggested as another candidate that has enabled cooperative social adaptations and sustained social order (Bingham, 1999). Coalitional enforcement is present in chimpanzees that spend a significant amount of time with coalition formation, management, and policing, and use joint enforcement (de Waal, 1998). Such behavior has also been observed in other primates, dolphins, social carnivores, and elephants (Bissonnette et al., 2015; Redhead & von Rueden, 2021). Human groups and societies coordinate on severe punishment of their members, including ostracism, and the death penalty, although some might have moral objections against these (de Waal, 1996, 2006; Wrangham, 2019).

In the current paper, we argue that *reputation* is a central organizer of our social life and is a device for unique human sociality (Conte & Paolucci, 2002; Garfield et al., 2021) as it is fundamental for the emergence of cooperation, social order, language, social cognition, and social complexity. This claim implies that reputation could have been one of the key avenues through which human uniqueness has developed.

Our perspective finds support in reputation being a *human universal*. Anthropological accounts have identified that striving for reputation is part of human nature (Buss, 2001). From a social science perspective, reputation has been considered as one of the ultimate individual goals that indicates social integration and approval (e.g., Smith, 1976). Individuals strive for and are concerned about their reputation as it brings them social benefits in the form of social comfort, feelings of acceptance, and popularity in partner selection, and direct material benefits such as possession of and access to resources (Lindenberg, 1996; Smith & Bliege Bird, 2005; Romano et al., 2021, 2022; Nieper et al., 2022).

Our perspective is supported also by the multidimensional character and multi-method construction of reputation in humans. Other species evaluate each other as well, because this is essential, for instance, for partner choice. Evaluation could take place also based on interactions that do not directly involve the observer (Subiaul et al., 2008; Herrmann et al., 2013). This happens, for instance, when fights for dominance are observed by bystanders. Reputation in humans as a complex evaluation device has its origins probably in these more elementary forms of evaluations.

Next, we will discuss what is meant by reputation, how it is linked with individual actions and behavior, and how it is constructed. This scrutiny is necessary to differentiate reputation from evaluation of other individuals that is present also in other species. This discussion is organized to illustrate the role of reputation in the struggle for individual survival, in partner choice, in experiencing more complex forms of interdependencies in group life, and in large-scale societies.

1.3   What is reputation?

Reputation is an evaluation of other individuals based on their skills and past actions (Számadó et al., 2021). Reputations also include the beliefs and perceptions we form about others (Wu et al., 2016a; Romano et al., 2021). The collective aspect of reputations is often emphasized in definitions indicating that evaluations of other individuals are discussed, shared, and collectively formed (Giardini & Wittek, 2019b). In our complex social world, reputation provides guidance, helps partner selection, and assists to condition our actions towards others. The universal currency that helps to inform group members about good and bad actions of others is the reputation (Milinski, 2016) that is shared and debated in private and public discussions.

Individuals are motivated to gain and maintain a good reputation, because with good reputation one can harvest and accumulate private gains, such as sex, food, territory use, resources, and social favors (Næss et al., 2010; Redhead & von Rueden, 2021). Individuals can turn their good reputation into power, influence, control over redistribution, and privileges (Farley, 2019). Once reputation is valued this way and provides such advantages, it becomes an important asset that individuals will strive for. In fact, people very much would like to appear in a favorable light for others (Goffman, 1959).

How can people earn their reputation? Even in the hominid past, reputation has not been determined purely by a single skill, but has been based on a complex assessment of multiple qualities (Henrich & Gil-White, 2001; Garfield et al., 2021). Although hunting-competence has been important (Smith & Wishnie, 2000), prosociality and sharing knowledge about the environment also directly assisted group-beneficial cooperation and hence have likely been valued dimensions. The ability to settle disputes and the capacity of leadership for the group in need have also likely been esteemed dimensions in hominid group life. Also today, reputation can be earned with group-beneficial traits and actions that contribute to solving problems of co-existence, conflict, inequality, and cooperation. It is important to notice that many positively valued traits directly relate to other-regarding behavior, group-beneficial actions, leadership skills, and conflict resolution potential, and indirectly to problems of coordination and cooperation that the group needs to solve (Hoyt, 1994; Romano et al., 2021).

A discussion about what do people evaluate in others can be paralleled with the use and accumulation of reputation. Reputation largely depends on *perceptions* of other individuals and on cognitive simplifications, as objective records of skills and attributes are difficult to obtain.

Although the collective aspect of reputation must be emphasized and our assessment is never independent of that of others, we evaluate others *privately*. We often assign reputations to others based on experience from direct encounters and direct observation. In addition to interactions and observation, the assessment of the target can be based on receiving communication and marketing of qualities directly from the target or from others, collecting information about the target, and gathering information about the evaluations made by others about the target. These imply an arsenal of relevant actions and communications, including neutral observation, bystander involvement, signaling, communication, storytelling, and self-marketing. Although assigned privately, reputations are *shaped in social interactions*. This includes third-party communication, open discussions, public displays, and stereotype-driven processes. Table 1 summarizes some characteristics of different ways of reputation construction, ranging from evaluations after direct private involvement in dyadic interactions till learning from public display.

	direct encounters	bystander observation	display of interactions	gossip	public display (e.g., openly available scoresheets)
complexity of social organization required	none	occasional access, relative proximity	life in a small compact group	life in a society with social network connections	institutions for a connected world
skills and abilities required	learning from direct experience, memory, differentiation	learning from indirect experience, memory, some abstraction	learning from indirect experience, memory, more abstraction	communication skills, trust, high abstraction, learning from indirect experience, memory	institutional trust, abstraction, learning from indirect experience
costs implied	interaction costs (high)	private observation costs	public observation costs	communication costs	attention cost (negligible)
number of private observations of dyadic encounters is required to evaluate others*	N-1	(N-1) / 2	(N-1) / 2	0	0
total number of dyadic interactions required for reputations to be formed*	N (N-1)	N (N-1) / 2	(N-1) / 2	(N-1) / 2	(N-1) / 2
second- or higher order social norms	repeated interaction (experimenting) is necessary and reputation remains speculative	observation in multiple encounters is necessary and reputation remains speculative	observation in multiple encounters is necessary and reputation remains speculative	perspective taking and interpretation of actions (not just forwarding evaluations): practiced and reputations are more precise	detailed tables (not just summary scores): easy to implement and might be objective
impact and precision					

Table 1. The construction of reputations through different ways
* Simplification.

Next, in Section 2 we examine the essential characteristics of exceptional human sociality: large-scale cooperation between unrelated individuals, social order, language, social cognition, and complex social organization built on social norms. We elaborate on the relevance of reputation for these characteristics. In Section 3 we navigate from individual actions through partnerships and group life to large-scale societies to illustrate the central role of reputation for interdependencies that mount up to the development of features of human uniqueness. This approach enables to speculate about at which stage of social organization individual reputation reached its peak importance. Section 4 summarizes the paper and calls for subsequent inquiries of reputation-based human sociality.

2 Key Characteristics of Unique Human Sociality

2.1 Cooperation

The great extent of large-scale cooperation between non-closely related individuals seems to be one key puzzle of human uniqueness. By cooperative action, individuals take substantial cost to themselves in order to provide substantial benefits to strangers or other group members (Henrich, 2004; Rand & Nowak, 2013). Cooperation has already been the likely feature when humans lived in smaller subsistence communities, illustrated by the frequency of cooperation in current small-scale societies (Glowacki & Lew-Levy, 2022). Unlike humans, other species show very limited cooperation between non-kin individuals (Dugatkin, 1997a; Bingham, 1999).

Once group members face cooperation problems repeatedly, *reciprocal help* can develop (Wilkinson, 1984; Kettler et al., 2021). Reciprocity offers a straightforward solution to the problem of cooperation in repeated interactions (Axelrod, 1984). Reciprocal help requires patience for delayed exchange, individual discrimination, and memories concerning past behavior (Clutton-Brock, 2009; Hauser et al., 2009). These are cognitively demanding conditions and are based on subjective evaluation of past behavior of the interaction partner (Stevens & Hauser, 2004).

Indirect reciprocity extends the notion of direct reciprocity (Nowak & Sigmund, 1998, 2005; Panchanathan & Boyd, 2004). Through direct reciprocity, help provided is returned directly by the interaction partner in the future. Through indirect reciprocity, help is reciprocated by someone else, and reputation is the simplifying device that is used to evaluate who is worthy of receiving help and who is not.

Reputation-based mechanisms can provide an answer to widely observed cooperation in small-scale and larger human societies (Nowak, 2006; Wu et al., 2016a, 2016b; Számadó et al., 2021; Romano et al., 2021; Giardini et al., 2022). The relevance of reputation for trust and cooperation has been demonstrated by a wide range of experimental studies (e.g., those of Sommerfeld et al., 2008; Boero et al., 2009; Samu et al., 2020; and Samu & Takács, 2021). Reputation can either be a device to govern the choice of interaction partners or it can instruct how to behave in a given interaction against a specific interaction partner. There are different kinds of theoretical accounts that are built on emphasizing the relevance of reputation-based mechanisms for human cooperation (Roberts et al., 2021).

Costly help to another individual can signal social preferences and care for other group members (Barclay et al., 2021). In general, we would like to be seen as helpful to others and we appreciate generosity of others also if we are not direct beneficiaries (Samu et al., 2020). Hence, reputation is not only earned in direct encounters. Good reputation is attributed to somebody

who has helped others in the past, but it could also be more complexly determined and being ascribed only to those who has helped good partners in the past, depending on the prevalent *social norm* in the society. In addition to informal rules that prescribe what one ought to or ought not to do (Bicchieri, 2005; Andrighetto & Vriens, 2022), social norms prescribe also who is entitled to have good or bad reputation in the society (Ohtsuki & Iwasa, 2004, 2006). Only a limited set of social norms can establish and sustain cooperation (Ohtsuki & Iwasa, 2004, 2006; Okada, 2020; Samu et al., 2020; Podder et al., 2021b). While rewarding good actions and punishing bad behavior seem to be straightforward responses, some guidelines can be controversial or easily misinterpreted. An example is the handling of *justified defection* in which someone is supposed to reward defections against badly reputed others (Yamamoto et al., 2020).

Models of *competitive altruism* emphasize that as reputation has direct benefits for partner selection and can be obtained by helpful behavior, hence individuals are willing to help each other, and costly cooperation escalates (Roberts, 1998; Barclay, 2004; Roberts et al., 2021; Giardini et al., 2021). Once over-commitment can bring reputational benefits to the individual, a solution by equal contributions becomes a shaky equilibrium, because individuals would like to help more than others. Competitive altruism is further enhanced once there are further advantages of high reputation in the society beyond partner choice, such as access to resources or power. Competitive altruism can explain cooperation in human groups and the general appreciation of individuals who make sacrifices for their group (Roberts, 1998; Barclay, 2004; Fehr & Schurtenberger, 2018; Roberts et al., 2021).

Reputation might be gained also by sacrifices in *intergroup competition* (Handley & Mathew, 2020; De Dreu et al., 2020; Takács et al., 2021). *Bounded generalized reciprocity* theory (Yamagishi et al., 1999; Yamagishi & Kiyonari, 2000; Yamagishi & Mifune, 2009) and *parochial altruism* describe how out-group threat, mobilization for collective resources, and identity formation triggers altruistic actions benefiting the in-group because group-beneficial acts are recognized with good reputation (Rusch, 2014; Balliet et al., 2014; De Dreu et al., 2014, 2022).

2.2 Social order

Orderly living and the management of internal disputes and conflicts is a typical characteristic of small human groups and societies. Humans live a harmonized group life with a limited number of conflicts despite the large number of interdependencies that they face when living and acting closely together. In current human societies, social norms and institutions safeguard and enforce social order, although they are constantly challenged and change (Bicchieri & Mercier, 2014; Bicchieri, 2016), might be local, or support social order only within group boundaries at the expense of being hostile to out-group members (Gambetta, 2011).

Social order in many group-living species is established with the help of *dominance hierarchies*. Dominance is based on the actual capacity to threaten, injure, or kill other group members. In a dominance ranking based on a single dimension of physical strength, the assessment of strength is relatively straightforward. Leadership is determined and occasionally challenged in fights and dominance is disambiguated with signals, cues, and badges. Signals positively correlated with the relevant internal quality, such as body size and advanced weaponry decrease the necessity of aggressive encounters, because they reliably communicate strength to the observer (Spence, 1973, 1974; Bergstrom et al., 2002), but do not eliminate the costs and risks implied by occasional fights needed.

Dominance hierarchies specify the rights of access to mates, food, and territory, but might also imply special responsibilities in exchange for defence, decision-making, representation, and in-group punishment. Dominance hierarchies make individual sacrifices for the group possible through two different mechanisms: coercive enforcement and voluntary competition for dominant positions (Adler & Borys, 1996). Order can be established *by coercion* if dominance is correlated with the actual capacity to employ superior physical strength in a close-range encounter toward other group members (Clutton-Brock & Parker, 1995; Bingham, 1999). At the same time, there is less need to apply coercion because dominance hierarchies disambiguate role stress (Adler & Borys, 1996), while guiding and synchronizing group life for joint movement, physical location, and access to food and reproduction. The maintenance of monitoring, threats, and physical dominance, however, is costly and results occasionally in unwanted injuries.

Humans have advanced the hierarchical solution of in-group social order in two different ways: with the development of *formalized* hierarchies and institutions, and with the use of reputation as the basis of *informal* hierarchies (Buss, 2001; Flanagan, 1989; Grove, 2020). Both formal and informal hierarchies simplify the enforcement of orderly actions and sanction violations of order. Formalized hierarchies and institutions centralize rights and rules for applying coercion (Richerson & Boyd 1999). They enable the fine-tuning of hierarchical asymmetries and their careful consideration for conditional actions and privileges (Borgerhoff Mulder et al., 2009). Formalization and supporting institutions allow that hierarchies could operate also in larger groups. Formalization has been key to scaling up the organization of group life by size and time, because formal ranks have provided unambiguous distinctions also when dyadic monitoring of actions and dyadic enforcement of contribution have not been feasible.

Material signals to earn or communicate reputation were important to disambiguate hierarchical relations in humans. Display of success in a costly and group-beneficial hunt is considered as a signal to earn reputation (Smith & Bliege Bird, 2000, 2005). Success and reputation could be communicated with various signals, including body paint and tattoos (Jacques, 2017), durable material substances such as clothing, beads, necklaces, bracelets, or jewelry (Kuhn, 2014), and giving away possessions (Rappaport, 1979; Bliege Bird & Smith, 2005). Archeological evidence of that warriors and heroes have been buried with their possessions in ancient graves supports this argument (Hansen, 2013). A public display of signals is an efficient way to share and harmonize reputations, which could be used to organize access to resources, coordinate decisions on social integration and exclusion, and motivate members for increased cooperation. A public display largely decreases the costs involved in dyadic interactions. A public display can be arranged easily in small groups that spend their lives together. Accordingly, rituals of inauguration, ostracism, punishment, and apologies are often exercised publicly in order to publicly ascribe, demolish, or repair reputations.

Signals of earned reputation, in any case, must be credited by group members. This is difficult because reputation signals could potentially be faked, meaning that they might not be perfectly correlated with actual group-beneficial contributions. The establishment of credible formalized public signaling conventions of reputation is therefore challenging.

Even in the absence of formalized public reputation systems and supporting institutions, in our diverse contexts of social life, we develop and rely on informal rankings based on reputation — when this does not seem to be necessary (Boehm, 1999, 2019; Érdi, 2019). In our social life in various group contexts, reputation is the central organizer of action. A good reputation can be acquired by contributing to in-group social order and behaving in a manner that is in line with in-group norms and expectations. In addition, reputation can also be earned by prosocial

protection of group order. Prosocial guardians might voluntarily punish free riders and take initiations for humiliation or social exclusion of norm violators and free riders. For instance, adolescents imposing sanctions on those who stand out of the group attain higher informal status (Adler & Adler, 1995; Eder, 1985).

Bad reputation is a sanction for those who disturb the in-group order and violate group norms. These norms, however, can be local and support costly actions against out-groups or against the larger society. In such cases, reputations are also considered within the group only and internal social order can be linked with external disorder (Gambetta, 2011; Meier et al., 2016). In return, reputation is the device to signal and prescribe in-group privileges. Consequently, reputation rewards and sanctions are largely responsible for the spontaneous maintenance of *emergent* order within the group (Conte & Paolucci, 2002).

Informal reputations, the emergence of formalized hierarchies, and the emergence of formalized hierarchies and the development of supporting and regulating institutions could have *reinforced* each other. The increasing complexity of group life, however, could have resulted also in the *decoupling* of informal reputations from formal hierarchies. Given the multiplexity of relevant dimensions, informal and formal hierarchies could refer to *different* skills and traits. Prestige earned by having specialist skills and knowledge, for instance, is a distinct dimension of gaining influence over others than dominance gained by threat and fear (Brand & Mesoudi, 2019). Informal reputation could also be a *correction* mechanism that arises because of the rigidity of formal hierarchies and the compensation opportunities inherent in informal reputation attributions. Noble men and kings could have bad reputations, and low-ranked servicemen could enjoy high social esteem. In any of these cases, informal reputations remain to guide behavior. In an organization, for instance, the allocation of tasks and responsibilities are linked with the formal hierarchy, and personal favors are compensated with informal reputation. Most benefits accrue to the formal hierarchy, but some benefits are aligned with informal reputation.

There is also transferability between formal and informal hierarchical positions. On the one hand, individuals at the top of formal rankings might try to turn their formal position and visibility into good reputation by investment in charity, public image making, and conspicuous consumption (Veblen, 1899). On the other hand, good informal reputation can be turned into political gain and success in formal selection processes. Status differentiation of this kind is a fundamental socio-relational process. Social status is formed through informal and formal interactions and exchanges, and through alliance formation dynamics and conflicts (Emerson, 1962; Blau, 1964; Frank, 1985).

2.3   Language and gossip

Communication is a tool to solve problems of interdependence. Language is a uniquely human way of communication that enables navigation in our societies (Tomasello, 2008). Language is a human universal; it exists in all known human cultures and there is an innate capacity of humans to learn any language (Brown, 2000). Hence, language is part of the puzzle of human uniqueness, but it is a tool or a solution rather than a problem itself. In humans, language has enabled the accumulation of knowledge and culture, and largely assisted the negotiated division of labor and the establishment of large-scale cooperation (Gärdenfors, 2004; Számadó & Szathmáry, 2006). In turn, the development of complex language has likely been helped by the need of solving the puzzle of cooperation. Language can be used to talk somebody into cooperation and share who has made sacrifices for the group.

How and why we have attained this master tool of communication is an open and complex question. Given the amazing power and uniqueness of human language, there is a wide range of theories that speculate about early language evolution (Számadó & Szathmáry, 2006). Dunbar (1996, 1998a, 2021) finds an answer in *how* we talk. Most of our informal conversations are intimate and mutually enjoyed. Such activities create or maintain social bonds between the partners involved in the communication. Informal conversations are less demanding and more time-efficient than physical grooming, and hence "grooming" conversations could have replaced physical grooming in the hominid lineage.

Gossip, talk about third parties who are not present (Dores Cruz et al., 2021b), is an informal conversation (Dunbar, 1996); it is often intimate, mutually enjoyed, and creates or maintains social bonds between the communication partners. Hence, it can indeed be a form of social grooming (Torres, 2019). Gossip constitutes a major part of our informal conversations (Emler, 1992, 1994; Dunbar et al., 1997; Dunbar, 2004; Pápay et al., 2022). Gossip is uniquely human (Bloom, 2004). Talking about others in an evaluative way implies that the *reputation* of others is discussed, questioned, and influenced in gossip. This is how we can construct reputations in any human social context (Dores Cruz et al., 2021a; Giardini et al., 2022). Hence, gossip is more than social grooming and the important role of who is targeted by gossip should not be underestimated. The focus on the absent target brings complexity into the communication. Gossip is certainly the most important tool for building reputations socially. As a precondition of gossip, identification of third-party individuals who are not present is necessary, which imposes a complex cognitive requirement.

But why is it so necessary to talk about third parties who are not present, especially if it requires high cognitive effort? Social bonding and trust between the sender and the receiver do not necessitate the cognitive investment because social grooming can also be obtained by chit-chat talk, touching, and smiling (Dunbar, 2021). There is also little need of exchanging information about targets if the group lives a compact life and individual actions are to a large extent observed by everyone. Once the group life includes a temporary absence or separation of its members, division of labor, or a larger size in which direct observation of all actions is not feasible, gossip becomes an important tool to share relevant information that is used to update reputations of *known* third parties. The value of talking about absent third parties is therefore primarily associated with in-group relations. In a small group, the need for third-party information occurs, for instance, if activities are done separately (for instance, due to the development of division of labor). If group members separate temporarily, then direct control, for instance of partners, becomes inaccessible. This is typical of the hunter-gatherer lifestyle. Efforts and contributions in hunt can only be assessed by those who are present, and hence they might be asked to share this information.

Unlike condemnation in front of a large public, the privacy of the gossip situation offers a safer place to be *critical* about a third party. This is an important distinction because many scholars question the honesty of gossip, while critical gossip can actually be more honest than the public sharing of personal information that is constrained by social desirability and a risk of conflict and retaliation (Giardini, 2012). Emotions related to reputational dynamics can be expressed in this private setting easier than publicly. Unlike public communication, gossip can undoubtedly be related to coalitions, alliance formation, and power dynamics; it can be about social relationships, enemies, or the exclusion and integration of others. Furthermore, while condemnation in the public could ruin the sender's relationship with the target, negative gossip does not directly have such consequences.

Voluntary disclosure of private and sensitive information in gossip implies indebting the

communication partner with the promise of returning important information in the future. Gossip is also the tool to improve perceptions about the perspectives of others, including their motivations, beliefs, and expectations. Accordingly, the language of gossip is highly complex and contains much more than just adjectives describing the skills and past actions of the target (Vincze et al., 2021).

2.4 Social cognition

Humans have distinctive cognition, and their cognitive uniqueness contains several elements, including memory of the past and imagining the future, the design of complex tools and technology, exceptional exploration and problem-solving capacities, and complex social cognition. Social cognition in particular is central to human cognitive uniqueness (Laland & Seed, 2021). A large number of interdependent situations continuously require remembering, learning from, and conditionally adjusting behavior. Furthermore, carrying out action conditional on the interaction partner requires the use of social information and advanced social cognition. Information that concerns whom to trust, whom to follow, and whom to punish has to be accessed, analyzed, and utilized to make appropriate decisions in interactions with others. Reputation is a shortcut developed exactly for such a purpose.

In turn, the communication of reputations and its interpretation requires advanced social cognition. We continuously attempt to impress others with our own qualities, our prosocial intentions, and care for others (Barclay & Barker, 2020). Skills, qualities, and behavior that are relevant to reputation are *signaled* intentionally. Evidence of helping behavior, for instance, is displayed or told in stories. Knowledge, wisdom, humor, and management skills are showcased in conversations.

Direct interaction experience or visual inspection of an interaction might be sufficient to draw conclusions about the qualities of an individual. Direct experience can be of various kinds, including aggressive fights, mutually beneficial encounters, and neutral meetings. Interaction can include information sharing, threats, and could be self-marketing, storytelling, or motivated by social bonding. It could include signals of abilities, capacities, dominance, submission, and future actions, but also of current need.

Bystander observations are also the sources to evaluate others. The presence of observers implies the use of complex signals targeting the outside observers with the action. As bystander observations are used to learn important social information, the presence of bystanders modifies the actions of interaction partners (Bateson et al., 2006; Manesi et al., 2016).

Most interaction situations lack the incentives to lie, especially to trusted interaction partners or to the public. This is because communication of reputations is cheap, benefits to the receiver are substantial, and the receiver could immediately reciprocate with other information, social acknowledgment, social bonding, or other rewards. Still, given the competition for reputation, reputational signals are not necessarily honest. Strategic investments in reputation construction and deconstruction are beneficial individually. So, it is a fundamental question what are the mechanisms that can ensure the credibility of reputations and reduce problems with imperfect of incorrect information (Giardini et al., 2022).

Strategic intentions behind some of these signals drive receivers to devote efforts to figure out the true intentions and motives of their senders, which is labelled as *epistemic vigilance* (Kraus & Fussell, 1991; Mascaro & Sperber, 2009; Sperber et al., 2010). Attention of receivers to the intentions of senders increases the risk of disseminating dishonest information and hence decreases the expected gain from lying (Sperber et al., 2010). Clarification of the intentions of

others and disambiguation of their reputations takes place in communication about others (Estévez et al., 2022). The huge amount of time we spend in gossip (Emler, 1992, 1994; Dunbar et al., 1997; Foster, 2004; Besnier, 2009; Pápay et al., 2022) is not just an exchange of reputation assessments. Gossip contains communication about the *perspectives* of others to anticipate their behavior in interdependent situations correctly (Righi & Takács 2022). Humans are exceptional in their ability to represent the mental states of oneself and others, including beliefs, desires, and intentions, which is also summarized as the theory of mind (Premack & Woodruff, 1978; Laland & Seed, 2021).

Language and the management of cooperation and of hierarchical relations are all related to the emergence of advanced cognitive skills, increased brain and neocortex size. The *social brain hypothesis* (Dunbar 1998b, 2021) could also be referenced here, as with increasing social complexity we need to use more of our brain to carry out, interpret, and influence actions. At the same time, our increased brain and neocortex size enables us to deal with problems of coordination, cooperation, and social order. Although advanced social cognition and our complex brain are somewhat costly solutions, they could still be considered as efficient tools that help solve fundamental problems of our life.

2.5 Social complexity, social norms, and the interrelation of characteristic features of unique human sociality and reputation

We argue that the essential features of human uniqueness are interrelated, and a perspective centered on reputation helps the explanation of their development. These features are present in every human culture, as all human societies exhibit large-scale cooperation, social order, have spoken language, gossip, and advanced social cognition.

Social complexity could be added to this list of unique human sociality. A complex organization of group life, however, is featured also in some other species. For instance, eusocial species live in large and complex societies with extensive cooperation and division of labor. These species have developed advanced forms of communication (such as communication with dance in honeybees or with pheromones in ants), but as cooperation is kinship-based, there is no need for reputations and gossip. Social complexity in humans involves methods and rules for the transmission of knowledge and social information, ways of interpreting the intentions and actions of others, management of action in increasing and volatile groups, ways to keep records and memory of past actions, imagination and plans for the collective future, the practical organization of the division of labor, exploration and joint problem solving, and the creation of the social self and social identity (Laland & Seed, 2021).

Social complexity in humans is largely governed by socially learned and transmitted *social norms*. Social norms provide guidance about who is entitled to have a good reputation. Moreover, social norms could also provide guidelines for reputation misinterpretation and repair. They are so complex that their transmission requires the use of language and active teaching (Tomasello, 2009). Social norms are often internalized and become implicit social prescriptions (Conte & Paolucci, 2002). Internal representations of rules, and beliefs about their general acceptance, provide the basis for social control. These norm-based systems generate complexity in social cognition, social interactions, and in the social organization of life.

Social complexity and the social network organization of human groups are enriched also because the reliability of reputational information needs to be checked. Receivers of third-party information often purposively inquire after the original source of information in order to evaluate the content of communication properly, especially after hearing something surprising or

that is against their prior beliefs. People also regularly cross-check information with trusted contacts. Hence, reputation is shaped carefully through extending communication. As a result, reputational information exchange might also be responsible for social network dynamics (Redhead et al., 2019; Takács et al., 2021).

As a result of cross-checks, information might turn out to be fake or strategically manipulated. In this case, receivers might downgrade the reputation of the sender. Consequently, honesty of communication is also a valued dimension for the construction of reputations. People in general are more willing to trust others who do not lie, and do not intend to manipulate others. Thanks to these supporting mechanisms and the additional complexity they imply, reputations can be reliably used to guide social behavior.

We argue that increasing complexity is a consequence of reputation-based human solutions to fundamental problems, but social complexity is also a catalyst of the development of sophisticated tools for maintaining social order and cooperation in larger societies. In order to get a better understanding of the essential features of human uniqueness, in the next section, we guide the reader through levels of emerging complexity of human life that are calling for an increasing guidance by reputation.

3   The Increasing Complexity of Social Life and the Increasing Relevance of Reputation

3.1   Individual struggles

In this section, we take account of an increased complexity of social life from the individual pursuit for survival and reproduction up to the integration into large-scale societies. This review is aimed at showing the origins and the role of reputation in solving increasingly difficult problems of interdependencies. We start from the individual struggle for survival and reproduction. The assessment of problems subsequently moves towards the formation and maintenance of stable partnerships. It is followed by the discussion of small group contexts, intra-group competition, and intergroup relations. We finally arrive at life in large-scale societies (Figure 1).
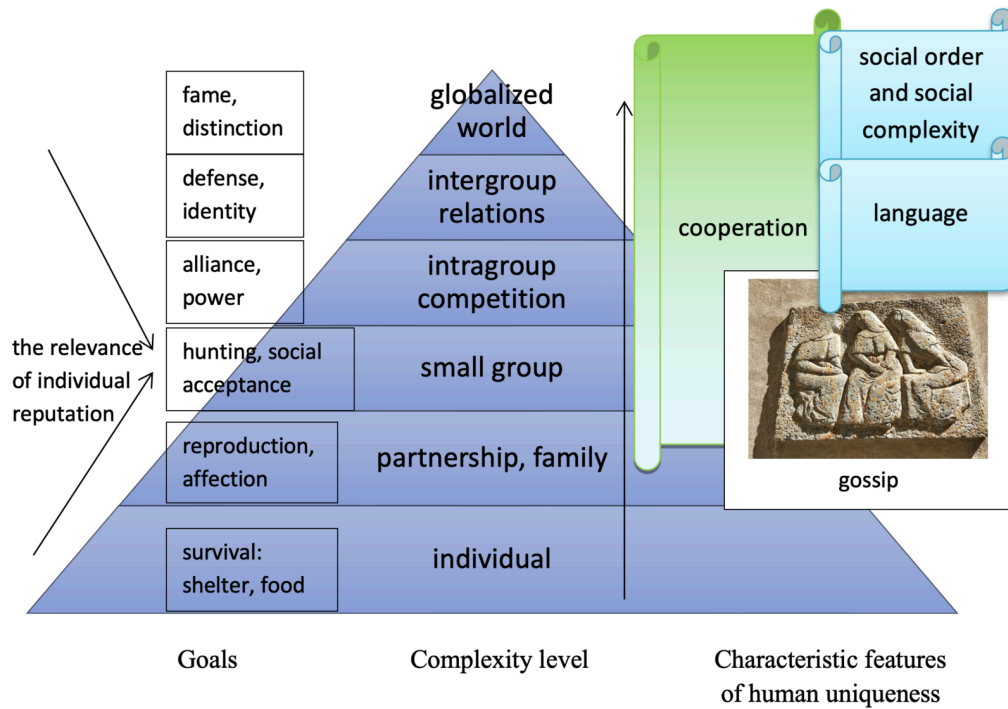
| Goals | Complexity level | Characteristic features of human uniqueness |

Figure 1. Reputation and the increasing complexity of human social life

The essential elements of life are individual struggle for survival and reproduction. Individuals competing for survival and reproduction are in conflict of interest with each other. The conflict of interest is most severe when there is a shortage of food, possible mates, or breeding sites. In such circumstances, physical fighting might occur with the likely success of the stronger, larger, more experienced, better equipped, more motivated individual. But injuries can occur for both sides, and therefore physical fights are better avoided (e.g., Hess & Hagen, 2019). This is possible, for instance, if mating competition is organized openly. Observation of fights of others is supplemented with threat, dominance, submission, and walk-by signals that assist keeping of physical fights at minimum (Bradbury & Vehrenkamp, 2011). The assessment of previous encounters enables the ranking of individuals based on their wins, losses, and retreats and can support the establishment of dominance hierarchies that determine access to mating (Chase, 1982, 1986; Dugatkin, 1997b, 2001). Hence, hierarchies exist also in species living a solitary life but are able to recognize each other. The ranks are based on fighting ability and dominance signals, and assessments are made based on direct experience and bystander observation (Dugatkin 2001; Dugatkin & Earley 2003).

While human individuals, just as other animals, are in conflict of interest with each other for limited resources, the existence of language, successful cooperation, and social norms significantly alter and pacify how we compete with each other for our elementary needs.

3.2 Partnership

An additional complexity can be attributed to the consequences of sexual competition. Qualities and skills of possible partners matter for reproduction, which implies monitoring and eval-

uation of a larger set of individuals. Furthermore, at the moment of partner selection, no information is available on actual parenting qualities. Individuals communicate and rely on signals to arrive at their choice. In some species, particularly in those with stable partnerships, females have the freedom to actively make a choice and males need to court and impress their potential partner. This is possible in species where the female is able to escape from coercive mating attempts (e.g., females are strong enough or quick enough). Mate attraction and courtship are therefore sources of development of complex forms of animal communication (Bradbury & Vehrenkamp, 2011, ch. 12). In simple cases, only body size and strength are displayed. Coloration is often used to impress the potential partner and, more importantly, it is shown in a movement such that the best impressions can be formed. In some species, males compete with impression-making and by creating artwork. These artworks could represent shelter and the creative capacity of nest building and could be made from stones, bones, shells, or other material. In other species, courting takes place with visual movement displays (dancing) or advanced vocalizations (singing). These forms of behavioral displays are performed often for long periods and repeatedly, in an energetically costly way, to create the best impression for the potential partner. The potential partner is assessing the performance quality of the complex display and makes a quality-dependent partner choice.

These elements of costly impression making, evaluation, and partner choice based on perceived quality are also parts of more complex reputation systems. Humans make significant investments in courtship in multiple dimensions. In addition to body size, shape, and decoration, showing off resources (cars, clothes, diplomas), and complex behavioral displays, including dancing, music, poetry, storytelling, and humor, are used to make a good impression for potential partners. These skills and qualities are often discussed through the uniquely human tool of gossip to shape reputations in dimensions relevant to partner choice (Hess & Hagen, 2006; Davis et al., 2019; Wyckoff et al., 2019). When partner choice is taking place, third-party channels are the greatest source to obtain credible information on the attractiveness, qualities, and behavior of potential partners. Furthermore, as human partnerships are not strictly monogamous (de Waal & Gavrilets 2013), infidelities also open opportunities for reputational discussions.

3.3 Small group life

3.3.1 Coordination

Group life makes it easier to obtain food, to have a successful hunt, to escape from predators, to provide shelter, to find the way, to assist in better adaptation to environmental challenges (e.g., weather conditions), to find reproduction partners, to raise offspring, and to learn successful behavior. Groups might come together to enjoy one or more of these benefits, but they all have to face the challenges that are characterized by conflicts of interest between group members.

One kind of interdependence is *coordination*, for instance, concerning joint movement and action (e.g., in Aktipis, 2004, 2011). Such coordination problems might be solved in a self-organized way. There is no pre-determined decision maker, but a school of fish can go around a rock or move away from a predator. Common in such situations is that one or more individual, who could be any member of the group, initiates a move, and the rest follow and coordinate by keeping relative distance. There is *no need of reputations* or hierarchy in relation to such decision-making processes.

Coordination problems are resolved successfully in ants, wasps, and bees. These species live in complex societies and have developed advanced signals to manage their daily existence, to

find and collect food, and to fight predators (Rangel & Seeley, 2008; Bradbury & Vehrenkamp, 2011). These communication systems have evolved *without* the need to assign *reputation* to helpers. There is no need of reputation: the high genetic relatedness (equivalence) of the entire insect society makes individual distinctions unnecessary (Dawkins, 1976).

For more complex coordination problems, a self-organized solution is less likely, especially in the absence of communication. Migrating birds, for instance, have to unite for a journey that requires coordination about preparation, flying speed, and route. In flock flight, flying in front implies taking higher energetic costs. This transforms the coordination problem into a more difficult problem of the volunteer's dilemma (see Diekmann, 1985; Nunner et al., 2022). In the volunteer's dilemma, one individual has to take a major cost in order to benefit the entire group, making further sacrifices by others unnecessary. High motivation, such as hunger can explain initiation and costly group leading in migrating birds and in mammals (Bradbury & Vehrenkamp, 2011). The high costs of leadership could also be taken by the strongest individuals. In such a case, the volunteer's dilemma could be solved by dominance, in which the strongest individual, who is able to take high energetic costs, is attributed with power and privileges.

Strength, however, does not guarantee *knowledge* of the optimal route or of the location of a food source, and therefore other dimensions become relevant for determining which individuals can be trusted to lead the group. As *age* is a correlate of wisdom, elderly individuals are *trusted* more for leadership, e.g., in migrating broad-winged hawk flocks (Maransky & Bildstein, 2001) and elephants (Foley et al., 2008; Bradbury & Vehrenkamp, 2011). Similarly, knowledgeable elderly members of human societies are typically granted high reputation and privileges despite their decreased physical and movement capacities. Elderly individuals are often asked to settle disputes within the group and have in general strong influence. Copying older members of the group is a social learning strategy that is widely used (Laland, 2004; Galef & Laland, 2005).

For guiding a group of non-closely related individuals in *complex tasks*, leadership requires multiple skills. In human societies, the relative standing of individuals is commonly founded upon a diversity of individual qualities and assets (Redhead et al. 2021). Complex assessment is less likely to be unanimous and therefore necessitates a great amount of time with communication around leadership (Bradbury & Vehrenkamp 2011). Physical strength and coercive potential is just one factor that is sometimes not considered as an advantage, or even ostracized and punished, especially in small-scale subsistence communities (Boehm et al. 1993; Clutton-Brock 2009). Among adolescents, for instance, bullies might gain reputation in the beginning of the school trajectory, but continued bullying increase their rejection by peers (de Vries et al. 2021) and popularity later is determined more likely by prosociality (Mayeux et al. 2011).

3.3.2   Other-regarding action and cooperation

Solving problems of coordination, and organizing coordination, can undoubtedly lead to reputation gains. An even more likely candidate for the origins of reputation is another interdependency that is the most challenging of all: costly other-regarding actions and cooperation that involves a conflict between private and public interests.

Care about others, for instance, that entails a significant cost to the individual, is widespread in humans. We care and help others beyond our family members and partners. Caring is an essential element of *friendship ties* (Dunbar, 2021). Friendship exists in all human societies. We develop very strong bonds with non-related individuals of the same gender, typically as a result

of close and repeated interactions, gradually building up mutual trust, emotional support, and mutual enjoyment (Wellman & Wortley, 1990). Friendship, similar to partnerships, is characterized by a great deal of coordination, cooperation, and joint conflict resolution. Although friendship is a dyadic phenomenon, friendship ties are highly transitive (Granovetter, 1973), and they are responsible for high local clustering and a modular structure of social networks for every human (Watts & Strogatz, 1998; Watts, 2003), but also in some non-human (Croft et al., 2008; Krause et al., 2015) contexts. Gossip and reputation in transitive friendship ties provide a safety net (Ellwardt et al., 2012) that ensures commitment, alliance, trust, and cooperation within the friendship circle and penalizes norm violations, free riding, and betrayal.

Probably because of the commitment and care for the other it involves, individuals who have a large number of friends are appreciated by others. Popularity in the friendship network implies receiving further friendship nominations and many friendship ties increase informal status (Lin, 1999; Barabási & Albert, 1999; Kawakatsu et al., 2021).

In humans, caring for others goes beyond a circle of friends. We have emotions of grief, sorrow, and empathy also towards never-seen individuals (Batson et al., 2002; Goldstein & Winner, 2012). Customary sharing of food and helping with labor beyond the household are universally present in all human cultures (Smith, 2003), as evidence from non-industrial societies shows in the Standard Cross-Cultural Sample (Ember et al., 2018). In exchange, there is evidence that prosocial individuals are liked more by others, indicating that other-regarding behavior and prosocial action are a relevant dimension of reputation (Wang et al., 2019).

Sharing food, group protection, conflict resolution, and hunting are forms of cooperation that have been the characteristic of human group life throughout evolutionary history. Group protection and involvement in conflict resolution are other examples of costly acts of cooperation. Cooperation in these complex tasks might require strength, skills, knowledge, or coalition-making potential. Humans are able to evaluate the presence of these multiple dimensions in others, to share and discuss these evaluations with others, and reward outstanding individuals with good reputation.

In some situations, the challenging problem of cooperation can be solved by a transformation to a coordination problem. Group protection and social hunting, for instance, can be coordinated in an egalitarian way requiring contributions from all members. Alternation in a predator warning duty is such an example. Such a transformation of the problem of cooperation, however, can be better achieved and become sustainable with advanced *communication*. The advantages of using language, particularly for preparing the coordinated hunt in the absence of the large prey and for execution with a division of labor, are enormous (Hewes, 1973; Számadó, 2010). Once early humans had the ability to describe their prey in advance, they acquired the cognitive capacity to communicate about something that was not present. This capacity could also be used to evaluate the efforts of the hunters themselves. Information on free riding as well as on heroic contributions could be shared. Once the efforts of hunters have been evaluated and shared, good hunters could be rewarded with good reputations and high status in the community. Accordingly, individuals who are skilled at hunting are rewarded with high reputation in small-scale societies (Smith & Bliege Bird, 2000; Bliege Bird & Power, 2015). Hunters often exhibit and share their prey to demonstrate their hunting abilities and in order to attain high social recognition. Once a good reputation can be earned with superior hunting skills and success, individuals are motivated in learning and showing off these qualities to others.

The exhibition of group-beneficial action highlights its relevance for reputation. In general, it has been observed that cooperation and prosocial behavior are increased in the presence of

others and if others are knowingly watching (Bateson et al., 2006; Manesi et al., 2016).

Altruism, prosociality, and cooperation are among the most important determinants of who is having a high reputation in a human group, along with practical skills, competence, and wisdom (Curry et al., 2019). In contrast to dominance hierarchies, across all human groups, prestige seems to be associated with the ability and willingness to take costs for others (Redhead et al., 2019; Redhead & von Rueden, 2021).

Given the importance of group-beneficial actions for the welfare of the group and for the relative standing of individuals in human groups, it is common to *take account* of help and contributions given and received, distinguish group-beneficial sacrifices, and publicly condemn actions that disturbed the group or exploited its resources. This implies public discussions, social information seeking, and gossip.

3.3.3 Belonging to the group

Group membership in humans has several stages from entering the group, being accepted, being committed and identified with the group, gaining respect, influence, and power, and fearing punishment and ostracism. Reputation seems to be highly important in all stages. Social comparisons are made on the basis of reputational information about the acceptance and relative position of the self in the group (e.g., in Smith et al., 2014), but can also be about the risks of being excluded. Reputation is elementary also to assess what is successful behavior. Once success is interpreted through reputation, actions of individuals with good reputation might be copied (Boyd & Richerson, 1985; Henrich & Gil-White, 2001). It has been argued by various classical thinkers in the social sciences that individuals preferentially copy highly reputed or "prestigious" others (Miller & Dollard, 1941; Veblen, 1899; Brand & Mesoudi, 2019).

Entering an existing group is not easy and typically requires costly investments from the individual to demonstrate commitment and willingness to contribute to group welfare. Either coming from the outside or growing up from childhood, new members often have to go through inauguration rituals and have to build up their reputation from scratch. Rituals are costly in terms of energy and time, and performing the ritual is often painful and involves major individual sacrifices. These inaugural ceremonies have been common in different human historical ages, are common in small-scale societies and adolescent groups, and are characteristic features of modern human collectives as well. Even after a costly entry, new members need to socialize and earn a good reputation, which takes time and effort. Socialization is a long and complex process that covers the acceptance of order within the group, following relevant social norms, and obedience to existing hierarchical relations. Old group members typically observe the behavior of the newcomer with particular caution and evaluate behavior accordingly. In the lack of available social information, therefore, new members are often the target of evaluative discussions as they need to earn *acceptance* by group members.

Once we are accepted members of the group, we have to continuously preserve our good image and keep up our reputation. This can be achieved with orderly behavior, group-beneficial action, and displaying *commitment* and *group identity*. If we make a mistake or forget to contribute to a group task, we feel guilt, make apologies, and hope for forgiveness. At the same time, being an accepted member allows us to enjoy group membership: we benefit from the public goods of being protected, being entertained, and many more.

Group identity and group bonds are facilitated in several ritualistic ways. While singing and music play a significant role in courtship, they are relevant also in the group context (Hagen & Bryant, 2003). Tribal groups play music around the campfire and in doing so they exercise

a common ritual. Music is a communication method to synchronize movements and achieve embodied entrainment and hence social connectedness (Hari et al., 2013). The best performers in these artistic performances gain high reputation, which can be explained by their skills that contribute to rituals of group cohesion.

Being accepted, committed, and having group identity, however, might not be sufficient to enjoy all potential benefits of group life, primarily because some resources are limited and can only be unequally distributed. Privileges can be earned in competition with other accepted members. The best way to come out first in social comparisons is to continue and enlarge investments in reputation. When respect and distinction are earned, privileged access to limited resources can be enjoyed along with increased influence, power, and leadership in the group.

Because reputation is highly important in all stages of group membership, members invest in its build-up through group-beneficial action. Investments, however, could also be of different kind. They include private *impression making*, such as show-offs in conversations and the *public marketing* of the self. Reputational concern explains why we willingly share heroic stories about ourselves and emphasize our goodwill in public appearances. Investments could also include more subtle methods, such as strategic communication, manipulation, and deception (Charness et al., 2011; Yoeli et al., 2013). Manipulation and deception are rational only to the extent that they indirectly increase the reputation of the self or a related individual. Manipulation can also be used to favor a friend, for instance.

Once these methods are available, they might be suspected by others. It becomes common to invest in monitoring, cross-checking, and controlling the processes of reputation construction. Sensing strategic behavior of others presumes an elaborate theory of mind that considers individual perspectives and intentions, formulates expectations about behavior, discounts self-marketing strategies, assesses strategic elements of communication, and translates the content of third-party communication into reputational assessment with necessary caution (Sperber et al., 2010).

It is also an essential part of group life to monitor norm violations, free riding, betrayal, and disobedience. Once these are detected, individuals concerned might easily ruin their reputation, especially if their action becomes publicly known, for instance, via gossip. The communication of unwanted actions is therefore quite essential for group life, and therefore negative gossip about third parties creates a safety net in human groups. The loss of good reputation is a *punishment* itself, but gossip about norm violations, free riding, and disobedience can also lead to other sanctions directly imposed by interaction partners or by third parties. These punishments are prosocially motivated as they serve group interests (Podder et al., 2021a; Balliet et al., 2022). Human groups are also able to coordinate and enforce collective punishment against their members (Wrangham, 2019).

In order to avoid the escalation of punishment, individuals may attempt to repair their bad standing. They do so because they prefer to preserve their group membership. Building up reputation from scratch in a new environment is typically costlier than repair. This makes *social exclusion* one of the most serious forms of punishment. Notorious defectors and deviant members can have such a bad reputation that they incur collective and coordinated *ostracism*, which has been common practice in human groups and societies from hunter-gatherers through ancient Greece to modern social media (Vock et al., 2013). The discomfort imposed by social exclusion and ostracism is severe and might lead to feeling deprived, lonely, and depressed. The threat of exclusion is therefore a major force that drives reputation repair and consequently helps within-group cooperation, maintenance of in-group order, strengthens group cohesion, and social identity (Fotouhi et al., 2018; Smith et al., 2018).

3.4   Intragroup coalitions and competition

Competition and advanced cognitive capacities enable the emergence of fissions, coalitions, and alliances within the group. It has been argued that the relevance of alliances and coalitions increase when resources are not abundant and dispersed (Kappeler & van Schaik, 2002; Hess & Hagen, 2019). *Coalitions* to monopolize resources are formed and coalition-based competition takes place also in other species (Bissonnette et al., 2015; Redhead & von Rueden, 2021), including chimpanzees (de Waal, 1998). For humans, most social events that concern us happen around these coalitions and not in large-scale intergroup relations. The small group is a familiar environment for us in which we can confidently assess the intentions of others and predict their behavior. In the small group setting, we are aware of relative reputations, relationships, and conflicts with high certainty. Accurate perceptions about group members enable us to properly evaluate the veracity of information we receive (Dores Cruz et al., 2021a). Accordingly, we are cautious about whom we are talking about with our interaction partners, considering also the relationship between the receiver and the target (Dores Cruz et al., 2021a; Estévez et al., 2022). Hence, we select with whom we share information, we filter about whom we share information, and we take into account the expected reactions from the other side (Burt, 2001; Giardini & Wittek, 2019c).

When group size increases, single leaders alone cannot efficiently direct the entire group. They need supporting allies, and they rule jointly, often against overt opposition. Coalitions can act together to enforce action of their own members or isolate outsiders (Bingham, 1999). *Politics* becomes essential in group governance in which individual reputations for leadership is largely supplemented with the relative strength of supporting alliance. Social networking in the form of maintaining or constructing certain ties or joining alliances are elements of strategic individual reputation building. Skills that assist the ability of forming strong coalitions are therefore essential in gaining a leadership position in the group. These skills include persuasion, bargaining, organization, and management. Once a leadership position is acquired, *charismatic* leaders talented in self-marketing and representation will be able to preserve their positions.

Coalitions that are able to acquire the ruling positions might be able to harvest the benefits that are accrued to leaders and turn them into private gains. These benefits might be large enough that some actors collaborate and jointly become *political entrepreneurs*. Given the complexity of human social organization, their potential benefits are well beyond access to food and mating; they include the accumulation of wealth and inheritance of possessions and political influence.

Once individuals alone are unable to secure leadership positions, individual reputations lose some relevance. Individual reputation becomes less important for formal group leadership due to the increased importance of coalition-formation. The central role of coalitional enforcement in human uniqueness could even be considered as appearing at a higher level of complexity with intragroup cleavages than individual reputation.

Still, individual reputation remains important also with more complex informal group structures. First, with group cleavages, reputation becomes less consensual and often becomes *localized* (Okada et al., 2017; Podder et al., 2021b). This means that reputations of certain individuals are not universally shared, debated, or consensual in the local social network only. Still, it is likely that individual reputation remains highly relevant, but potentially will not be agreed upon across cleavages. Second, coalitions could also develop *collective or group reputation* (Székely et al., 2020). Good collective reputation is important to consolidate and attract

group membership.

While coalitions compete for leadership and could accept the circulation of power, *group fission* might also occur. Separation is natural also with the increase of group size. Humans, however, are able to manage intra-group conflict also without group separation. In such a development, leadership requires skills of conflict resolution and bargaining, and is assisted with a more sophisticated organization including institutions and norms of conflict resolution.

3.5   Inter-group relations

3.5.1   Inter-group conflict

Groups that live close to each other are interdependent in several ways. There might be kinship ties to some out-group members as a result of individual migration or group fission. Physical proximity creates competition for limited resources, such as for territory rich in resources. In order to defend or conquer resources, in-group cooperation is necessary. The organization of raids or successful defence requires individual contributions and coordinated action. Such organized action against an out-group is common in chimpanzees and humans. It includes collective murder, destruction of shelter, rape, the stealing of young females, and of livestock in humans (Beckwith, 2009). The rise of new states has also been argued to take place as a result of successful in-group cooperation and mobilization *against* an outside power, for instance in the case of Mongols against the Chinese state (Turchin, 2007).

Hence, inter-group conflict and competition are facilitators of in-group cooperation in the short-term (Takács, 2002), in historical perspectives (Turchin & Gavrilets, 2009), and also considering group selection in evolutionary perspectives (Wilson & Wilson, 2007). It has been shown that groups achieve a higher level of cooperation if competing with an out-group than if facing the same cooperation problem alone (Bornstein & Ben-Yossef, 1994; De Dreu et al., 2020). A reason why cooperation against an out-group can be achieved easier is the high internal reputational reward for cooperation (Takács, 2001). Individual contributions in inter-group conflict are largely esteemed by in-group members and rewarded by formal and informal acknowledgments in overall in-group agreement. Another reason is that those who fail to contribute might lose their good reputation or even be punished severely within the group (Mathew & Boyd, 2011).

Successful in-group mobilization in inter-group conflict is a serious threat to rival groups that also need to mobilize in return. The high risks of the out-group threat might contribute to the development of quick and efficient decision-making structures and the strengthening of hierarchies in the interest of the in-group. This is also the case in informal groups where individual reputations could be used to define leadership needed to perform quick organized action (Gavrilets et al., 2016).

3.5.2   Intergroup cooperation

Most often, inter-group relations in current human societies are not competitive. Mutual benefits are gained through *exchange* and *trade*, which are safer alternatives to raids and stealing. As a condition of beneficial exchange, the trustworthiness of trading partners must be assessed and remembered. This implies the need for reputation that is earned by honesty in trade. Human families might live far away from each other (e.g., in farms), but they are still largely interdependent and gain mutual advantages through exchange. Exchange occurs within a small community, but also between more distant communities. For decreasing the costs of transac-

tion, many human societies independently developed institutions for exchange; for instance, seasonal meetings, fairs, mating markets, and professionalization in trade. Because of the risks involved in exchange, the reputation of foreign traders is communicated within the group to assist beneficial trade. Ever since, reputation has remained an important guide for trade in markets, and communication about the trustworthiness of sellers and the quality of their products is part of our small talk (Rooks et al., 2011).

Acquiring information about out-group members is more difficult via direct experience. Overall, the reputational assessment of out-group members is less precise than that of in-group members (e.g., Hechler et al. 2016; Peters and Fonseca 2020). Information about out-group members who might be interaction partners in the future is more likely based on indirect information, stereotypes, and signals of trustworthiness. Information is therefore typically exchanged with trusted in-group members. Gossip of this kind has made it easier to meet with strangers, give recommendations, and develop peaceful intergroup relations for trade.

3.5.3   Intergroup differentiation

The social organization of human groups show remarkable variations. Group differentiation has led to the emergence of a variety of *cultures*, *institutions*, and *norms* (Richerson & Boyd, 1998; McElreath et al., 2003; Smaldino, 2014). Cultural development has increased group identification, and attachment to local customs, conventions, etiquette, concepts of morality, religion, traditions, and language (Boyd & Richerson, 1987; Moffett, 2013). These differences make it more difficult to assess the reputation of out-group members in interactions such as trade and increases the value attributed to the ability of quick adaptation to out-group norms and rules if interactions between members of different groups have occurred.

The existence of culture, institutions, and norms that are specific to the group imply a differential relevance of variant dimensions for individual reputation. Differences in which dimensions matter for reputation create obstacles for migration between groups and complicate intergroup cooperation including trade. While in general, the violation of group norms can have strong reputational consequences, groups that are aware of existing differences with other groups, for instance in etiquette, could also decrease the significance of norms concerned and abstain from ruining the reputations of norm violators.

3.5.4   The globalized world

Our globalized world is a very recent phenomenon. Its complex relations, in particular with cooperation and individual reputations would require a deeper analysis that goes beyond the scope of this paper (see, for instance, Buchan et al., 2009, for some insights). Today, altruistic acts are publicized and highly rewarded also at the global scale. Those who make large sacrifices for peace, for saving the environment, for the development of our knowledge, or for saving others, often find themselves on the front pages of newspapers and are granted with state medals. Fame is enjoyed in several segments of life, including the world of performing arts, business, politics, and academia.

Formal institutions, rules, awards, and sanctions have developed partly based on informal reputations (Elster, 2004). Institutions have emerged for partner selection, for acquiring group membership, for rewarding group-beneficial action, and for the punishment of wrong-doing. The institutionalization process has resulted in a complex regulation of politics, trade, and civic life (Powers et al., 2016; Turchin et al., 2013, 2018).

Thanks to the advanced social machinery of reputations, social norms, and language, humans are able to solve coordination problems at a large scale. Institutions and advanced machineries of surveillance support successful coordination. Cooperation itself has also been institutionalized, as institutions collect individual contributions, patrol and punish free-riding, and re-distribute obtained public good benefits. Social order is maintained through guards, night-watch patrols, police, the military, and various agencies monitoring the hygiene, economic production, and interactions. Institutions emerged also to facilitate and standardize communication, for instance, translating spoken language to writing that can be sent to interaction partners far away. The large social complexity of our current globalized world is the product of these institutionalization processes.

4 Conclusion

Humans live in groups in a highly interdependent way. Human action almost never occurs without consequences to others. A larger extent of interdependence is a natural correlate of living densely in larger and more complex societies. Still, the structure of interdependencies (the games we play) is not unique to humans (Dugatkin, 1997a). Games of coordination, cooperation, and conflict are experienced by several species interacting with each other. It is neither the payoff structure nor the set of alternatives that make humans unique. If we have to search for our distinctive character, then the answer is not in the structure or in the situations we face or faced in the past, but in the *actions* we chose that are *conditional on* the *reputation of the opponent* or *selective* and guided by the *reputation of possible opponents*. These reputation-based strategies make it possible to solve problems of coordination, cooperation, and social order at an unprecedented scale.

In this paper we built upon previous literature in claiming that human uniqueness lies in exceptional human sociality. We identified the abundance of cooperation with strangers in various contexts, living in orderly societies, communication through complex language, advanced social cognition, and social complexity guided by social norms as the main characteristics of unique human sociality.

We have argued that reputation is a key device that contributes to the emergence of all of these main characteristics. This reputation-centered view of unique human sociality has been put forward following a large variety of research in various disciplines recognizing the central importance of reputation (Conte & Paolucci, 2002; Giardini & Wittek, 2019a). Reputation-based mechanisms are able to support large-scale cooperation among non-closely related individuals. Reputation is the basis of informal social hierarchies that contribute to the maintenance of emergent social order. In human groups, reputation has replaced dominance that is a common ranking device in other species for maintaining social order. Reputation concerns constitute major parts of gossip that covers a large extent of our conversations and requires language and abstraction about absent others. The evaluation of others creates large cognitive demands, but also enables co-existence in larger groups. Reputation can be used as a shortcut for guiding conditional behavior helped by social norms that prescribe how reputations should be formed and how they should be incorporated into conditional actions. In short, the reputation systems that humans uniquely established has enabled us to solve fundamental challenges, but has contributed to an increased complexity of social organization.

We took a short journey from the level of individual goals up to the globalized human world to analyze which goals, which size and which type of interdependencies are correlated with the distinct relevance of reputation. We related reputations to the fundamental goals individuals

follow and to the challenges of interdependence that groups and societies need to solve (Figure 1). We argued that reputation reached its central importance in humans *in small group life* and not at a lower or higher level of complexity. This could be linked with earlier research that featured *bounded generalized reciprocity* as the core of reputation-based cooperation, in which indirect benefits of cooperation come from and target in-group members (Yamagishi et al., 1999; Yamagishi & Kiyonari, 2000). We have highlighted that coalition-formation in intra-group competition has likely resulted in an upper constraint to the centrality of individual reputation as a social organizing tool. We have also emphasized, however, how and why individual reputations continued to be relevant even after the emergence of collective reputations, in inter-group relations, and in large-scale societies.

These arguments have been collected to demonstrate the key importance of reputation for unique human sociality. Although the current evidence might not be sufficient to fully justify our claims, a reputation-based explanation of unique human sociality is worth investigating in future research. Future modeling and simulation work could underline the theoretical relevance of reputation for cooperation, social order, language evolution, social cognition, and social norm evolution. Although animal groups are studied in several species, more research is needed to draw proper comparisons with species in which individuals are able to identify, memorize, and call others, and hence possess some preliminary conditions for the development of socially constructed reputations. Complex social behavior and communication in primates, dolphins, and eusocial species needs therefore to be placed under closer scrutiny. In order to justify claims about the universal relevance of reputation in human groups, more anthropological research is needed in non-standard social settings and deviant groups about the relationship between and development of cooperation, social order, gossip, social norms, and reputations. A review could identify further evidence to support the relevance of reputation in human prehistory. Experiments with human participants in controlled settings could test simple hypotheses about the relationship between reputation and cooperation, order, gossip, and socio-cognitive processes. Furthermore, quickly developing methods in computational social science could be used to gather and analyze large-scale data from text corpora and digital footprints to highlight the relevance of reputations in our globalized world. These potential research directions define a multidisciplinary program that require expertise and insights from animal social behavior, human evolutionary theory, human prehistory, social anthropology, social cognition, sociology, and political science.

References

Adler, P.A., & Adler, P. (1995). Dynamics of Inclusion and Exclusion in Preadolescent Cliques. *Social Psychology Quarterly*, *58*(3), 145–162. http://dx.doi.org/10.2307/2787039

Adler, P.S., & Borys, B. (1996). Two Types of Bureaucracy: Enabling and Coercive. *Administrative Science Quarterly*, *41*(1), 61–89. https://doi.org/10.2307/2393986

Aktipis, C.A. (2004). Know When to Walk Away: Contingent Movement and the Evolution of Cooperation. *Journal of Theoretical Biology*, *231*(2), 249–260. http://dx.doi.org/10.1016/j.jtbi.2004.06.020

Aktipis, C.A. (2011). Is Cooperation Viable in Mobile Organisms? Simple Walk Away Rule Favors the Evolution of Cooperation in Groups. *Evolution and Human Behavior 32*(4), 263–276. https://doi.org/10.1016/j.evolhumbehav.2011.01.002

Andrighetto, G., & Vriens, E. (2022). A Research Agenda for the Study of Social Norm Change. *Philosophical Transactions of the Royal Society A*, *380*(2227), 20200411. https://doi.org/10.1098/rsta.2020.0411

Axelrod, R. (1984). *The Evolution of Cooperation.* New York, NY: Basic Books.

Balliet, D., Wu, J., & De Dreu, C.K. (2014). Ingroup Favoritism in Cooperation: A Meta-analysis. *Psychological Bulletin*, *140*(6), 1556–1581. https://doi.org/10.1037/a0037737

Balliet, D., Molho, C., Columbus, S., & Dores Cruz, T.D. (2022). Prosocial and Punishment Behaviors in Everyday Life. *Current Opinion in Psychology*, *43*, 278–283. https://doi.org/10.1016/j.copsyc.2021.08.015

Barabási, A.L., & Albert, R. (1999). Emergence of Scaling in Random Networks. *Science*, *286*(5439), 509–512. https://doi.org/10.1126/science.286.5439.509

Barclay, P. (2004). Trustworthiness and Competitive Altruism Can Also Solve the "Tragedy of the Commons". *Evolution and Human Behavior*, *25*(4), 209–220. https://doi.org/10.1016/j.evolhumbehav.2004.04.002

Barclay, P., Bliege Bird, R., Roberts, G., & Számadó, S. (2021). Cooperating to Show That You Care: Costly Helping as an Honest Signal of Fitness Interdependence. *Philosophical Transactions of the Royal Society B*, *376*(1838), 20200292. https://doi.org/10.1098/rstb.2020.0292

Bateson, M., Nettle, D., & Roberts, G. (2006). Cues of Being Watched Enhance Cooperation in a Real-world Setting. *Biology Letters*, *2*(3), 412–414. https://doi.org/10.1098/rsbl.2006.0509

Batson, C.D., Ahmad, N., Lishner, D.A., Tsang, J., Snyder, C.R., & Lopez, S.J. (2002). Empathy and Altruism. In K.W. Brown & M.R. Leary (Eds.), *The Oxford Handbook of Hypo-Egoic Phenomena* (pp. 161–174). New York, NY: Oxford University Press.

Beckwith, C.I. (2009). *Empires of the Silk Road: A History of Central Eurasia from the Bronze Age to the Present*. Princeton, NJ: Princeton University Press.

Besnier, N. (2009). *Gossip and the Everyday Production of Politics*. Honolulu, HI: University of Hawai'i Press.

Bergstrom, C. T., Számadó, S., & Lachmann, M. (2002). Separating Equilibria in Continuous Signalling Games. *Philosophical Transactions of the Royal Society of London. Series B: Biological Sciences*, *357*(1427), 1595–1606. https://doi.org/10.1098/rstb.2002.1068

Bicchieri, C. (2005). *The Grammar of Society: The Nature and Dynamics of Social Norms*. Cambridge: Cambridge University Press.

Bicchieri, C. (2016). *Norms in the Wild: How to Diagnose, Measure, and Change Social Norms*. New York, NY: Oxford University Press.

Bicchieri, C., & Mercier, H. (2014). Norms and Beliefs: How Change Occurs. In M. Xenitidou & B. Edmonds (Eds.), *The Complexity of Social Norms* (pp. 37–54). Cham: Springer.

Bingham, P.M. (1999). Human Uniqueness: A General Theory. *The Quarterly Review of Biology*, *74*(2), 133–169. https://doi.org/10.1086/393069

Bissonnette, A., Perry, S., Barrett, L., Mitani, J.C., Flinn, M., Gavrilets, S., & de Waal, F.B. (2015). Coalitions in Theory and Reality: A Review of Pertinent Variables and Processes. *Behaviour*, *152*(1), 1–56. https://doi.org/10.1163/1568539X-00003241

Blau, P.M. (1964). Justice in Social Exchange. *Sociological Inquiry*, *34*(2), 193–206. https://doi.org/10.1111/j.1475-682X.1964.tb00583.x

Bliege Bird, R. & Power, E.A. (2015). Prosocial Signaling and Cooperation Among Martu Hunters. *Evolution and Human Behavior*, *36*(5), 389–397. https://doi.org/10.1016/j.evolhumbehav.2015.02.003

Bliege Bird, R., & Smith, E.A. (2005). Signaling Theory, Strategic Interaction, and Symbolic Capital. *Current Anthropology*, *46*(2), 221–248. https://doi.org/10.1086/427115

Bloom, P. (2004). Postscript to the Special Issue on Gossip. *Review of General Psychology*, *8*(2), 138–140. https://doi.org/10.1037/1089-2680.8.2.138

Boehm, C. (1999). *Hierarchy in the Forest, The Evolution of Egalitarian Behavior*. Cambridge, MA, Harvard University Press.

Boehm, C. (2019). Gossip and Reputation in Small-scale Societies, A View from Evolutionary Anthropology. In F. Giardini & R.P.M. Wittek (Eds.), *The Oxford Handbook on Gossip and Reputation* (pp. 253–274). New York, NY, Oxford University Press.

Boehm, C., Barclay, H.B., Dentan, R.K., Dupre, M-C., Hill, J.D., Kent, S., Knauft, B.M., Otterbein, K.F., & Rayner, S. (1993). Egalitarian Behavior and Reverse Dominance Hierarchy [and comments and reply]. *Current Anthropology*, *34*(3), 227–254. https://doi.org/10.1086/204166

Boero, R., Bravo, G., Castellani, M., Laganà, F., & Squazzoni, F. (2009). Pillars of Trust, An Experimental Study on Reputation and its Effects. *Sociological Research Online*, *14*(5), 49–67. https://doi.org/10.5153/sro.2042

Borgerhoff Mulder, M., Bowles, S., Hertz, T., Bell, A., Beise, J., Clark, G., Fazzio, I., Gurven, M., Hill, K., Hooper, P. L., Irons, W., Kaplan, H., Leonetti, D., Low, B., Marlowe, F., McElreath, R., Naidu, S., Nolin, D., Piraino, P., Quinlan, R., Schniter, E., Sear, R., Shenk, M., Smith, E. A., von Rueden, C., & Wiessner, P. (2009). Intergenerational Wealth Transmission and the Dynamics of Inequality in Small-Scale Societies. *Science*, *326*(5953), 682–688. https://doi.org/10.1126/science.1178336

Bornstein, G., & Ben-Yossef, M. (1994). Cooperation in Intergroup and Single-group Social Dilemmas. *Journal of Experimental Social Psychology*, *30*(1), 52–67. https://doi.org/10.1006/jesp.1994.1003

Boyd, R. & Richerson, P.J. (1985). *Culture and the Evolutionary Process*. Chicaco, IL: University of Chicago Press.

Boyd, R., & Richerson, P.J. (1987). The Evolution of Ethnic Markers. *Cultural Anthropology*, *2*(1), 65–79. https://doi.org/10.1525/can.1987.2.1.02a00070

Boyd, R., & Richerson, P.J. (1996). Why Culture Is Common, but Cultural Evolution is Rare. *Proceedings of the British Academy 88*, 77–94.

Boyd, R., & Richerson, P.J. (2005). *The Origin and Evolution of Cultures*. Oxford, Oxford University Press.

Boyd, R., Richerson, P.J., & Henrich, J. (2011). The Cultural Niche: Why Social Learning is Essential for Human Adaptation. *Proceedings of the National Academy of Sciences of the United States of America*, *108*(Suppl. 2), 10918–10925. https://doi.org/10.1073/pnas.1100290108

Bradbury, J.W. & Vehrenkamp, S.L. (2011). *Principles of Animal Communication* (2nd ed.). Sunderland, MA: Sinauer

Brand, C.O., & Mesoudi, A. (2019). Prestige and Dominance-based Hierarchies Exist in Naturally Occurring Human Groups, but Are Unrelated to Task-specific Knowledge. *Royal Society Open Science*, *6*(5), 181621. https://doi.org/10.1098/rsos.181621

Brown, D.E. (2000). Human Universals and Their Implications. In N. Roughley (Ed.) *Being Humans: Anthropological Universality and Particularity in Transdisciplinary Perspectives* (pp. 156–174). Berlin: De Gruyter.

Brown, D.E. (2004). Human Universals, Human Nature and Human Culture. *Daedalus*, *133*(4), 47–54. https://doi.org/10.1162/0011526042365645

Buchan, N.R., Grimalda, G., Wilson, R., Brewer, M., Fatas, E., & Foddy, M. (2009). Globalization and human cooperation. *Proceedings of the National Academy of Sciences of the United States of America*, *106*(11), 4138–4142. https://doi.org/10.1073/pnas.0809522106

Buss, D.M. (2001). Human Nature and Culture: An Evolutionary Psychological Perspective. *Journal of Personality*, *69*(6), 955–978. https://doi.org/10.1111/1467-6494.696171

Burt, R.S. (2001). Bandwidth and Echo: Trust, Information, and Gossip in Social Networks. In A. Casella & J.E. Raunch, *Networks and Markets* (pp. 30–74). New York, NJ: Russell Sage Foundation.

Cavalli-Sforza L.L., & Feldman, M.W. (1973). Models for Cultural Inheritance. I. Group Mean and within Group Variation. *Theoretical Population Biology*, *4*:42–44. https://doi.org/10.1016/0040-5809(73)90005-1

Charness, G., Du, N., & Yang, C.L. (2011). Trust and Trustworthiness Reputations in an Investment Game. *Games and Economic Behavior*, *72*(2), 361–375. https://doi.org/10.1016/j.geb.2010.09.002

Chase, I.D. (1982). Dynamics of Hierarchy Formation: The Sequential Development of Dominance Relationships. *Behaviour*, *80*, 218–240. https://doi.org/10.1163/156853982X00364

Chase, I.D. (1986). Explanations of Hierarchy Structure. *Animal Behaviour*, *34*: 1265–1266.

Clutton-Brock, T.H. (2009). Cooperation between Non-kin in Animal Societies. *Nature*, *462*(7269), 51–57. https://doi.org/10.1038/nature08366

Clutton-Brock, T.H., & Parker, G.A. (1995). Punishment in Animal Societies. *Nature*, *373*, 209–216. https://doi.org/10.1038/373209a0

Conte, R., & Paolucci, M. (2002). *Reputation in Artificial Societies: Social Beliefs for Social Order*. New York, NY: Springer.

Croft, D.P., James, R., & Krause, J. (2008). *Exploring Animal Social Networks*. Princeton, NJ: Princeton University Press.

Curry, O.S., Mullins, D.A., & Whitehouse, H. (2019). Is It Good to Cooperate?: Testing the Theory of Morality-as-Cooperation in 60 Societies. *Current Anthropology*, *60*(1), 47–69. https://doi.org/10.1086/701478

Davis, A., Vaillancourt, T., Arnocky, S., & Doyel, R. (2019). Women's Gossip as an Intrasexual Competition Strategy. In F. Giardini & R.P.M. Wittek (Eds.) *Oxford Handbook on Gossip and Reputation* (pp. 303–324). New York, NY: Oxford University Press.

Dawkins, R. (1976). *The Selfish Gene*. New York, NY: Oxford University Press.

De Dreu, C.K., Balliet, D., & Halevy, N. (2014). Parochial Cooperation in Humans: Forms and Functions of Self-sacrifice in Intergroup Conflict. *Advances in Motivation Science*, *1*, 1–47. https://doi.org/10.1016/bs.adms.2014.08.001

De Dreu, C.K., Gross, J., Fariña, A., & Ma, Y. (2020). Group Cooperation, Carrying-capacity Stress, and Intergroup Conflict. *Trends in Cognitive Sciences*, *24*(9), 760–776. https://doi.org/10.1016/j.tics.2020.06.005

De Dreu, C.K., Fariña, A., Gross, J., & Romano, A. (2022). Prosociality as a Foundation for Intergroup Conflict. *Current Opinion in Psychology*, *44*, 112–116. https://doi.org/10.1016/j.copsyc.2021.09.002

de Vries, E., Kaufman, T.M.L., Veenstra, R., Laninga-Wijnen, L., & Huitsing, G. (2021). Bullying and Victimization Trajectories in the First Years of Secondary Education: Implications for Status and Affection. *Journal of Youth and Adolescence*, *50*(10), 1995–2006. https://doi.org/10.1007/s10964-020-01385-w

de Waal, F.B.M. (1996). *Good Natured: The Origins of Right and Wrong in Humans and Other Animals*. Cambridge, MA: Harvard University Press.

de Waal, F.B.M. (1998). *Chimpanzee Politics: Power and Sex among Apes* (Revised ed.). Baltimore, MD: John Hopkins University Press.

de Waal, F.B.M. (2006). *Our Inner Ape*. London: Penguin.

de Waal, F.B.M., & Gavrilets, S. (2013). Monogamy with a Purpose. *Proceedings of the National Academy of Sciences of the United States of America*, *110*(38), 15167–15168. https://doi.org/10.1073/pnas.1315839110

Diekmann, A. (1985). Volunteer's Dilemma. *Journal of Conflict Resolution*, *29*(4), 605–610. https://doi.org/10.1177/0022002785029004003

Diekmann, A., Jann, B., Przepiorka, W., and Wehrli, S. (2014). Reputation Formation and the Evolution of Cooperation in Anonymous Online Markets. *American Sociological Review*, *79*(1), 65–85. https://doi.org/10.1177/0003122413512316

Dores Cruz, T.D., Thielmann, I., Columbus, S., Molho, C., Wu, J., Righetti, F., de Vries, R.E., Koutsoumpis, A., van Lange, P.A.M., Beersma, B., & Balliet, D. (2021a). Gossip and

Reputation in Everyday Life. *Philosophical Transactions of the Royal Society B, 376*(1838), 20200301. https://doi.org/10.1098/rstb.2020.0301

Dores Cruz, T.D., Nieper, A.S., Testori, M., Martinescu, E., and Beersma, B. (2021b). An Integrative Definition and Framework to Study Gossip. *Group & Organization Management, 46*, 252–285. https://doi.org/10.1177/1059601121992887

Dugatkin, L.A. (1997a). *Cooperation among Animals: An Evolutionary Perspective.* Oxford: Oxford University Press.

Dugatkin, L.A. (1997b). Winner and Loser Effects and the Structure of Dominance Hierarchies. *Behavioral Ecology, 8*, 583–587. https://doi.org/10.1093/beheco/8.6.583

Dugatkin, L.A. (2001). Bystander Effects and the Structure of Dominance Hierarchies. *Behavioral Ecology, 12*, 348–352. https://doi.org/10.1093/beheco/12.3.348

Dugatkin, L.A., & Earley, R.L. (2003). Group Fusion: The Impact of Winner, Loser, and Bystander Effects on Hierarchy Formation in Large Groups. *Behavioral Ecology, 14*, 367–373. https://doi.org/10.1093/beheco/14.3.367

Dunbar R. (1996). *Grooming, Gossip and the Evolution of Language.* Cambridge, MA: Harvard University Press.

Dunbar R. (1998a). Theory of Mind and the Evolution of Language. In J.R. Hurtford, M. Studdert-Kennedy & C. Knight (Eds.), *Approaches to the Evolution of Language* (pp. 130–147). Cambridge: Cambridge University Press.

Dunbar, R.I. (1998b). The Social Brain Hypothesis. *Evolutionary Anthropology: Issues, News, and Reviews, 6*(5), 178–190. https://doi.org/10.1002/(SICI)1520-6505(1998)6:5%3C178::AID-EVAN5%3E3.0.CO;2-8

Dunbar, R.I. (2004). Gossip in Evolutionary Perspective. *Review of General Psychology, 8*, 100–110. http://dx.doi.org/10.1037/1089-2680.8.2.100

Dunbar, R. (2021). *Friends. Understanding the Power of our Most Important Relationships.* Cincinnati, OH: Brown.

Dunbar, R.I.M., Duncan, N.D.C., & Marriott, A. (1997). Human Conversational Behavior. *Human Nature, 8*(3), 231–246. https://doi.org/10.1007/BF02912493

Eder, D. (1985). The Cycle of Popularity: Interpersonal Relations among Female Adolescents. *Sociology of Education, 58*(3), 154–165. https://doi.org/10.2307/2112416

Ellwardt, L., Steglich, C., & Wittek, R. (2012). The Co-evolution of Gossip and Friendship in Workplace Social Networks. *Social Networks, 34*(4), 623–633. https://doi.org/10.1016/j.socnet.2012.07.002

Elster, J. (2004). *Closing the Books: Transitional Justice in Historical Perspective.* Cambridge: Cambridge University Press.

Ember, C.R., Skoggard, I., Ringen, E.J., & Farrer, M. (2018). Our Better Nature: Does Resource Stress Predict Beyond-household Sharing? *Evolution and Human Behavior, 39*(4), 380–391. https://doi.org/10.1016/j.evolhumbehav.2018.03.001

Emerson, R.M. (1962). Power-dependence Relations. *American Sociological Review*, *27*(1), 31–41. https://doi.org/10.2307/2089716

Emler, N. (1992). The Truth about Gossip. *Social Psychology Section Newsletter*, *27*, 23–37.

Emler, N. (1994). Gossip, Reputation and Social Adaption. In R. Goodman & A. Ben-Zeev (Eds.), *Good Gossip* (pp. 117–138). Lawrence, KS: University of Kansas Press.

Érdi, P. (2019). *Ranking: The Unwritten Rules of the Social Game We All Play*. Oxford: Oxford University Press.

Estévez, J.L., Kisfalusi, D., & Takács, K. (2022). More than One's Negative Ties: The Role of Friends' Antipathies in High School Gossip. *Social Networks*, *70*, 77–89. https://doi-org.e.bibl.liu.se/10.1016/j.socnet.2021.11.009

Farley, S. (2019). On the Nature of Gossip, Reputation, and Power Inequality. In F. Giardini & R.P.M. Wittek (Eds.), *The Oxford Handbook on Gossip and Reputation* (pp. 343–358). New York, NY: Oxford University Press.

Fehr, E., & Schurtenberger, I. (2018). Normative Foundations of Human Cooperation. *Nature Human Behaviour*, *2*(7), 458–468. https://doi.org/10.1038/s41562-018-0385-5

Fehr, E., & Gächter, S. (2000). Cooperation and Punishment in Public Goods Experiments. *American Economic Review*, *90*(4), 980–994. https://doi.org/10.1257/aer.90.4.980

Flanagan, J.G. (1989). Hierarchy in Simple "Egalitarian" Societies. *Annual Review of Anthropology*, *18*, 245–266. https://doi.org/10.1146/annurev.an.18.100189.001333

Foley, C., Pettorelli, N., & Foley, L. (2008). Severe Drought and Calf Survival in Elephants. *Biology Letters*, *4*, 541–544. https://doi.org/10.1098/rsbl.2008.0370

Foster, E.K. (2004). Research on Gossip: Taxonomy, Methods, and Future Directions. *Review of General Psychology*, *8*(2), 78–99. https://doi.org/10.1037/1089-2680.8.2.78

Fotouhi, B., Momeni, N., Allen, B., & Nowak, M.A. (2018). Conjoining Uncooperative Societies Facilitates Evolution of Cooperation. *Nature Human Behaviour*, *2*(7), 492–499. https://doi.org/10.1038/s41562-018-0368-6

Frank, R.H. (1985). *Choosing the Right Pond. Human Behavior and the Quest for Status*. Oxford: Oxford University Press.

Galef, B.G., & Laland, K.N. (2005). Social Learning in Animals: Empirical Studies and Theoretical Models. *Bioscience 55*, 489–499. https://doi.org/10.1641/0006-3568(2005)055%5B0489:SLIAES%5D2.0.CO;2

Gambetta, D. (2011). *Codes of the Underworld*. Princeton, NJ: Princeton University Press.

Gärdenfors, P. (2004). Cooperation and the Evolution of Symbolic Communication. In K. Oller & U. Griebel (Eds.), *Evolution of Communication Systems* (pp. 237–256). Cambridge, MA: MIT Press.

Garfield, Z.H., Schacht, R., Post, E.R., Ingram, D., Uehling, A., & Macfarlan, S.J. (2021). The Content and Structure of Reputation Domains across Human Societies: A View from the

Evolutionary Social Sciences. *Philosophical Transactions of the Royal Society B*, *376*(1838), 20200296. https://doi.org/10.1098/rstb.2020.0296

Gavrilets, S., Auerbach, J., & Van Vugt, M. (2016). Convergence to Consensus in Heterogeneous Groups and the Emergence of Informal Leadership. *Scientific Reports*, *6*(1), 1–10. https://doi.org/10.1038/srep29704

Giardini, F. (2012). Deterrence and Transmission as Mechanisms Ensuring Reliability of Gossip. *Cognitive Processing*, *13*(2), 465–475. https://doi.org/10.1007/s10339-011-0421-0

Giardini, F., & Wittek, R.P.M. (Eds.). (2019a). *The Oxford Handbook on Gossip and Reputation*. New York, NY: Oxford University Press.

Giardini, F., & Wittek, R.P.M. (2019b). Gossip, Reputation, and Sustainable Cooperation: Sociological Foundations. In F. Giardini R.P.M. & Wittek (Eds.), *The Oxford Handbook on Gossip and Reputation* (pp. 1–37). New York, NY: Oxford University Press.

Giardini, F., & Wittek, R.P.M. (2019c). Silence Is Golden. Six Reasons Inhibiting the Spread of Third-Party Gossip. *Frontiers in Psychology*, *10*, 1120. https://doi.org/10.3389/fpsyg.2019.01120

Giardini, F., Vilone, D., Sánchez, A., & Antonioni, A. (2021). Gossip and Competitive Altruism Support Cooperation in a Public Good Game. *Philosophical Transactions of the Royal Society B*, *376*(1838), 20200303. https://doi.org/10.1098/rstb.2020.0303

Giardini, F., Balliet, D., Power, E.A., Számádó, Sz., & Takács, K. (2022). Four Puzzles of Reputation-Based Cooperation: Content, Process, Honesty, and Structure. *Human Nature*, *33*(1), 43–61. https://doi:10.1007/s12110-021-09419-3

Gintis, H. (2000). Strong Reciprocity and Human Sociality. *Journal of Theoretical Biology*, *206*(2), 169–179. https://doi.org/10.1006/jtbi.2000.2111

Glowacki, L., & Lew-Levy, S. (2022). How Small-scale Societies Achieve Large-scale Cooperation. *Current Opinion in Psychology*, *44*, 44–48. https://doi.org/10.1016/j.copsyc.2021.08.026

Goffman, E. (1959). *The Presentation of Self in Everyday Life*. New York, NY: Anchor.

Goldstein, T.R., & Winner, E. (2012). Enhancing Empathy and Theory of Mind. *Journal of cognition and development*, *13*(1), 19–37. https://doi.org/10.1080/15248372.2011.573514

Granovetter, M.S. (1973). The Strength of Weak Ties. *American Journal of Sociology*, *78*(6), 1360–1380. https://doi.org/10.1086/225469

Grove, M. (2020). A Comparative Perspective on the Origins of Inequality. In L. Moreau (Ed.), *Social Inequality Before Farming? Multidisciplinary Approaches to the Study of Social Organization in Prehistoric and Ethnographic Hunter-Gatherer-Fisher Societies* (pp. 167–177). Cambridge: McDonald Institute for Archaeological Research.

Hagen, E.H., & Bryant, G.A. (2003). Music and Dance as a Coalition Signaling System. *Human Nature*, *14*(1), 21–51. https://doi.org/10.1007/s12110-003-1015-z

Handley, C., & Mathew, S. (2020). Human Large-scale Cooperation as a Product of Competition Between Cultural Groups. *Nature Communications*, *11*(1), 1–9. https://doi.org/10.1038/s41467-020-14416-8

Hansen, S. (2013). The Birth of the Hero: The Emergence of a Social Type in the 4th Millennium BC. In E. Starnini (Ed.), *Unconformist Archaeology: Papers in Honour of Paolo Biagi* (pp. 101–112). Oxford: Archaeopress.

Hari, R., Himberg, T., Nummenmaa, L., Hamalainen, M., & Parkkonen, L. (2013). Synchrony of Brains and Bodies During Implicit Interpersonal Interaction. *Trends in Cognitive Sciences*, *17*(3), 105–106. https://doi.org/10.1016/j.tics.2013.01.003

Hauser, M., McAuliffe, K., & Blake, P.R. (2009). Evolving the Ingredients for Reciprocity and Spite. *Philosophical Transactions of the Royal Society B: Biological Sciences*, *364*(1533), 3255–3266. https://doi.org/10.1098/rstb.2009.0116

Hechler, S., Neyer, F.J., & Kessler, T. (2016). The Infamous Among Us: Enhanced Reputational Memory for Uncooperative Ingroup Members. *Cognition*, *157*, 1–13. https://doi.org/10.1016/j.cognition.2016.08.001

Henrich, J. (2004). Cultural Group Selection, Coevolutionary Processes and Large-Scale Cooperation. *Journal of Economic Behavior and Organization*, *53*(1), 3–35. https://doi.org/10.1016/S0167-2681(03)00094-5

Henrich, J. & Gil-White, F.J. (2001). The Evolution of Prestige: Freely Conferred Deference as a Mechanism for Enhancing the Benefits of Cultural Transmission. *Evolution and Human Behavior*, *22*, 165–196. https://doi.org/10.1016/S1090-5138(00)00071-4

Henrich J., & McElreath, R. (2003). The Evolution of Cultural Evolution. *Evolutionary Anthropology*, *12*, 123–135. https://doi.org/10.1002/evan.10110

Herrmann, E., Keupp, S., Hare, B., Vaish, A., & Tomasello, M. (2013). Direct and Indirect Reputation Formation in Nonhuman Great Apes (Pan paniscus, Pan troglodytes, Gorilla gorilla, Pongo pygmaeus) and Human Children (Homo sapiens). *Journal of Comparative Psychology*, *127*(1), 63–75. https://doi.org/10.1037/a0028929

Hess, N.H., & Hagen, E.H. (2006). Sex Differences in Indirect Aggression: Psychological Evidence from Young Adults. *Evolution and Human Behavior*, *27*(3), 231–245. https://doi.org/10.1016/j.evolhumbehav.2005.11.001

Hess, N.H., & Hagen, E.H. (2019). Gossip, Reputation, and Friendship in Within-group Competition. In F. Giardini & R.P.M. Wittek (Eds.), *The Oxford Handbook on Gossip and Reputation* (pp. 275–302). New York, NY: Oxford University Press.

Hewes, G. (1973). Primate Communication and the Gestural Origin of Language. *Current Anthropology*, *14*, 5–25. https://doi.org/10.1086/201401

Hill, K., Barton, M., & Hurtado, A.M. (2009). The Emergence of Human Uniqueness: Characters Underlying Behavioral Modernity. *Evolutionary Anthropology: Issues, News, and Reviews*, *18*(5), 187–200. https://doi.org/10.1002/evan.20224

Høgh-Olesen, H. (2010). Human Mind – Human Kind: An Introduction. In H. Høgh-Olesen (Ed.), *Human Morality and Sociality*. New York, NY: Red Globe Press.

Hoyt, W.T. (1994). Development and Awareness of Reputations in Newly Formed Groups: A Social Relations Analysis. *Personality and Social Psychology Bulletin*, *20*(5), 464–472. https://doi.org/10.1177/0146167294205003

Jacques, S. (2017). What Criminals' Tattoos Symbolize: Drawing on Darwin, Durkheim, and Lombroso. *Deviant Behavior*, *38*(11), 1303–1317. https://doi.org/10.1080/01639625.2016.1197606

Kappeler, P.M., & van Schaik, C.P. (2002). Evolution of Primate Social Systems. *International Journal of Primatology*, *23*(4), 707–740. https://doi.org/10.1023/A:1015520830318

Kawakatsu, M., Chodrow, P.S., Eikmeier, N., & Larremore, D.B. (2021). Emergence of Hierarchy in Networked Endorsement Dynamics. *Proceedings of the National Academy of Sciences of the United States of America*, *118*(16). https://doi.org/10.1073/pnas.2015188118

Kettler, N., Schweinfurth, M.K., & Taborsky, M. (2021). Rats Show Direct Reciprocity When Interacting with Multiple Partners. *Scientific Reports*, *11*(1), 1–8. https://doi.org/10.1038/s41598-021-82526-4

Krause, J., James, R., Franks, D.W., & Croft, D.P. (Eds.). (2015). *Animal Social Networks*. New York, NY: Oxford University Press.

Krauss, R.M., & Fussell, S.R. (1991). Perspective-taking in Communication: Representations of Others' Knowledge in Reference. *Social Cognition*, *9*(1), 2–24. https://doi.org/10.1521/soco.1991.9.1.2

Kuhn, S.L. (2014). Signaling Theory and Technologies of Communication in the Paleolithic. *Biological Theory*, *9*(1), 42–50. https://doi.org/10.1007/s13752-013-0156-5

Laland, K. (2004). Social Learning Strategies. *Animal Learning & Behavior*, *32*, 4–14. https://doi.org/10.3758/BF03196002

Laland, K., & Seed, A. (2021). Understanding Human Cognitive Uniqueness. *Annual Review of Psychology*, *72*, 689–716. https://doi.org/10.1146/annurev-psych-062220-051256

Levinson, S.C., & Enfield, N.J. (Eds.). (2020). *Roots of Human Sociality: Culture, Cognition and Interaction*. Abingdon: Routledge.

Lin, N. (1999). Social Networks and Status Attainment. *Annual Review of Sociology*, *25*(1), 467–487. https://doi.org/10.1146/annurev.soc.25.1.467

Lindenberg, S. (1996). Continuities in the Theory of Social Production Functions. In H. Ganzeboom & S. Lindenberg (Eds.), *Verklarende Sociologie: Opstellen voor Reinhard Wippler* (pp. 169-184). Amsterdam: Thela Thesis.

Manesi, Z., van Lange, P.A.M., & Pollet, T.V. (2016). Eyes Wide Open: Only Eyes That Pay Attention Promote Prosociality. *Evolutionary Psychology*, *14*, 1–15. http://doi.org/10.1177/1474704916640780

Maransky, B.P., & Bildstein, K.L. (2001). Follow Your Elders: Age-related Differences in the Migration Behavior of Broad-winged Hawks at Hawk Mountain Sanctuary, Pennsylvania. *The Wilson Bulletin*, *113*, 350–353. https://doi.org/10.1676/0043-5643(2001)113%5B0350:FYEARD%5D2.0.CO;2

Mascaro, O., & Sperber, D. (2009). The Moral, Epistemic, and Mindreading Components of Children's Vigilance Towards Deception. *Cognition*, *112*(3), 367–380. https://doi.org/10.1016/j.cognition.2009.05.012

Mathew, S. and Boyd, R. (2011). Punishment sustains large-scale cooperation in prestate warfare. *Proceedings of the National Academy of Sciences of the United States of America* 108(28):11375-11380. https://doi.org/10.1073/pnas.1105604108

Mayeux, L., Houser, J.J., & Dyches, K.D. (2011). Social Acceptance and Popularity; Two Distinct Forms of Peer Status. In A.H.N Cillessen, D. Schwartz, & L. Mayeux (Eds.), *Popularity in the Peer System* (pp. 79–102). New York, NY: The Guilford Press.

McElreath, R., Boyd, R., & Richerson, P. (2003). Shared Norms and the Evolution of Ethnic Markers. *Current Anthropology*, *44*(1), 122–130. https://doi.org/10.1086/345689

Meier, S., Pierce, L., Vaccaro, A., & La Cara, B. (2016). Trust and In-group Favoritism in a Culture of Crime. *Journal of Economic Behavior & Organization*, *132*, 78–92. https://doi.org/10.1016/j.jebo.2016.09.005

Mesoudi, A., & Thornton, A. (2018). What Is Cumulative Cultural Evolution? *Proceedings of the Royal Society B*, *285*(1880), 20180712. https://doi.org/10.1098/rspb.2018.0712

Milinski, M. (2016). Reputation, a Universal Currency for Human Social Interactions. *Philosophical Transactions of the Royal Society B*, *371*(1687), 20150100. https://doi.org/10.1098/rstb.2015.0100

Miller, N. & Dollard, J. (1941). *Social Learning and Imitation.* New Haven, CT: Yale University Press.

Moffett, M.W. (2013). Human Identity and the Evolution of Societies. *Human Nature*, *24*(3), 219–267. https://doi.org/10.1007/s12110-013-9170-3

Næss, M.W., Bårdsen, B.-J., Fauchald, P., & Tveraa, T. (2010). Cooperative Pastoral Production – The Importance of Kinship. *Evolution and Human Behavior*, *31*(4), 246–258. https://dx.doi.org/10.1016/j.evolhumbehav.2009.12.004

Nieper, A.S., Beersma, B., Dijkstra, M.T., & van Kleef, G.A. (2022). When and Why Does Gossip Increase Prosocial Behavior? *Current Opinion in Psychology*, *44*, 315–320. https://doi.org/10.1016/j.copsyc.2021.10.009

Nowak, M.A. (2006). Five Rules for the Evolution of Cooperation. *Science*, *314*(5805), 1560–1563. https://doi.org/10.1126/science.1133755

Nowak, M.A., & Sigmund, K. (1998). Evolution of Indirect Reciprocity by Image Scoring. *Nature*, *393*(6685), 573–577. https://doi.org/10.1038/31225

Nowak, M.A., & Sigmund, K. (2005). Evolution of Indirect Reciprocity. *Nature*, *437*(7063), 1291–1298. https://doi.org/10.1038/nature04131

Nunner, H., Przepiorka, W., & Janssen, C. (2022). The Role of Reinforcement Learning in the Emergence of Conventions: Simulation Experiments with the Repeated Volunteer's Dilemma. *Journal of Artificial Societies and Social Simulation*, *25*(1), 7. https://doi.org/10.18564/jasss.4771

Ohtsuki, H., & Iwasa, Y. (2004). How Should We Define Goodness? — Reputation Dynamics in Indirect Reciprocity. *Journal of Theoretical Biology*, *231*(1), 107–120. https://doi.org/10.1016/j.jtbi.2004.06.005

Ohtsuki, H., & Iwasa, Y. (2006). The Leading Eight: Social Norms That Can Maintain Co-operation by Indirect Reciprocity. *Journal of Theoretical Biology*, *239*(4), 435–444. https://doi.org/10.1016/j.jtbi.2005.08.008

Okada, D., & Bingham, P.M. (2008). Human Uniqueness-Self-Interest and Social Cooperation. *Journal of Theoretical Biology*, *253*(2), 261–270. https://doi.org/10.1016/j.jtbi.2008.02.041

Okada, I. (2020). A Review of Theoretical Studies on Indirect Reciprocity. *Games*, *11*(3), 27. https://doi.org/10.3390/g11030027

Okada, I., Sasaki, T., & Nakai, Y. (2017). Tolerant Indirect Reciprocity Can Boost Social Welfare Through Solidarity with Unconditional Cooperators in Private Monitoring. *Scientific Reports*, *7*(1), 1–11. https://doi.org/10.1038/s41598-017-09935-2

Ostrom, E. (2000). Collective Action and the Evolution of Social Norms. *Journal of Economic Perspectives*, *14*(3), 137–158. https://doi.org/10.1257/jep.14.3.137

Page, A.E., Chaudhary, N., Viguier, S., Dyble, M., Thompson, J., Smith, D., Salali, G.D., Mace, R., & Migliano, A.B. (2017). Hunter-Gatherer Social Networks and Reproductive Success. *Scientific Reports*, *7*(1):1153. https://doi.org/10.1038/s41598-017-01310-5

Panchanathan, K., & Boyd, R. (2004). Indirect Reciprocity Can Stabilize Cooperation Without the Second-order Free Rider Problem. *Nature*, *432*(7016), 499–502. https://doi.org/10.1038/nature02978

Pápay, B.T., Kubik, B.G., Galántai, J., & Takács, K. (2022). Gossip Is Distinct from Other Topics of Spontaneous Conversation. *Intersections*, forthcoming.

Peters, K., & Fonseca, M.A. (2020). Truth, Lies, and Gossip. *Psychological Science*, *31*(6), 702–714. https://doi.org/10.1177/0956797620916708

Podder, S., Righi, S., & Pancotto, F. (2021a). Reputation and Punishment Sustain Cooperation in the Optional Public Goods Game. *Philosophical Transactions of the Royal Society B*, *376*(1838), 20200293. https://doi.org/10.1098/rstb.2020.0293

Podder, S., Righi, S., & Takács, K. (2021b). Local Reputation, Local Selection, and the Leading Eight Norms. *Scientific Reports*, *11*, 16560. https://doi.org/10.1038/s41598-021-95130-3

Potts, R. (2004). Sociality and the Concept of Culture in Human Origins. In R.W. Sussman & A.R. Chapman (Eds.), *The Origins and Nature of Sociality* (pp. 249–269). Abingdon: Routledge.

Powers, S.T., van Schaik, C.P., & Lehmann, L. (2016). How Institutions Shaped the Last Major Evolutionary Transition to Large-scale Human Societies. *Philosophical Transactions of the Royal Society B: Biological Sciences*, *371*(1687), 20150098. https://doi.org/10.1098/rstb.2015.0098

Premack, D., & Woodruff, G. (1978). Does the Chimpanzee Have a Theory of Mind? *Behavioral and Brain Sciences*, *1*(4), 515–526. https://doi.org/10.1017/S0140525X00076512

Rand, D.G. & Nowak, M.A. (2013). Human Cooperation. *Trends in Cognitive Sciences*, *17*, 413–425. https://doi.org/10.1016/j.tics.2013.06.003

Rangel, J., & Seeley, T.D. (2008). The Signals Initiating the Mass Exodus of a Honeybee Swarm from Its Nest. *Animal Behaviour*, *76*, 1943–1952. https://doi.org/10.1016/j.anbehav.2008.09.004

Rappaport, R.A. (1979). *Ecology, Meaning, and Religion*. Richmond, CA: North Atlantic.

Redhead, D., & von Rueden, C.R. (2021). Coalitions and Conflict: A Longitudinal Analysis of Men's Politics. *Evolutionary Human Sciences*, *3*, e31. https://doi.org/10.1017/ehs.2021.26

Redhead, D.J., Cheng, J.T., Driver, C., Foulsham, T., & O'Gorman, R. (2019). On the Dynamics of Social Hierarchy: A Longitudinal Investigation of the Rise and Fall of Prestige, Dominance, and Social Rank in Naturalistic Task Groups. *Evolution and Human Behavior*, *40*(2), 222–234. https://doi.org/10.1016/j.evolhumbehav.2018.12.001

Redhead, D., Dhaliwal, N., & Cheng, J.T. (2021). Taking Charge and Stepping in: Individuals Who Punish are Rewarded with Prestige and Dominance. *Social and Personality Psychology Compass*, *15*(2), e12581. https://doi.org/10.1111/spc3.12581

Richerson, P.J., & Boyd, R. (1998). The Evolution of Human Ultra-sociality. In I. Eibl-Eibesfeldt & F.K. Salter (Eds.), *Indoctrinability, Ideology, and Warfare: Evolutionary Perspectives* (pp. 71–95). New York, NY: Berghahn.

Richerson, P.J., & Boyd, R. (1999). Complex Societies. *Human Nature*, *10*(3), 253–289. https://doi.org/10.1007/s12110-999-1004-y

Righi, S. & Takács, K. (2022). Gossip: Perspective Taking to Establish Cooperation. *Dynamic Games and Applications*. https://doi.org/10.1007/s13235-022-00440-4

Roberts, G. (1998). Competitive Altruism: From Reciprocity to the Handicap Principle. *Proceedings of the Royal Society of London. Series B: Biological Sciences*, *265*(1394), 427–431. https://doi.org/10.1098/rspb.1998.0312

Roberts, G., Raihani, N., Bshary, R., Manrique, H.M., Farina, A., Samu, F., & Barclay, P. (2021). The Benefits of Being Seen to Help Others: Indirect Reciprocity and Reputation-based Partner Choice. *Philosophical Transactions of the Royal Society B*, *376*(1838), 20200290. https://doi.org/10.1098/rstb.2020.0290

Romano, A., Saral, A.S., & Wu, J. (2022). Direct and Indirect Reciprocity among Individuals and Groups. *Current Opinion in Psychology*, *43*, 254–259. https://doi.org/10.1016/j.copsyc.2021.08.003

Romano, A., Giardini, F., Columbus, S., de Kwaadsteniet, E.W., Kisfalusi, D., Triki, Z., Snijders, C., & Hagel, K. (2021). Reputation and Socio-ecology in Humans. *Philosophical Transactions of the Royal Society B*, *376*(1838), 20200295. https://doi.org/10.1098/rstb.2020.0295

Rooks, G., Tazelaar, F., & Snijders, C. (2011). Gossip and Reputation in Business Networks. *European Sociological Review*, *27*(1), 90–106. https://doi.org/10.1093/esr/jcp062

Rusch, H. (2014). The Evolutionary Interplay of Intergroup Conflict and Altruism in Humans: A Review of Parochial Altruism Theory and Prospects for Its Extension. *Proceedings of the Royal Society B: Biological Sciences*, *281*(1794), 20141539. https://doi.org/10.1098/rspb.2014.1539

Samu, F., Számadó, Sz., and Takács, K. (2020). Scarce and Directly Beneficial Reputations Support Cooperation. *Scientific Reports*, *10*, 11486. https://doi.org/10.1038/s41598-020-68123-x

Samu, F., & Takács, K. (2021). Evaluating Mechanisms That Could Support Credible Reputations and Cooperation: Cross-checking and Social Bonding. *Philosophical Transactions of the Royal Society B*, *376*(1838), 20200302. https://doi.org/10.1098/rstb.2020.0302

Schick, K.D., & Toth, N.P. (1994). *Making Silent Stones Speak: Human Evolution and the Dawn of Technology*. New York, NY: Simon and Schuster.

Smaldino, P.E. (2014). The Cultural Evolution of Emergent Group-level Traits. *Behavioral and Brain Sciences*, *37*(3), 243–295. https://doi.org/10.1017/S0140525X13001544

Smith, A. (1976). *The Theory of Moral Sentiments*. Oxford: Clarendon Press. (Original work published 1759)

Smith, E.A. (2003). Human Cooperation: Perspectives from Behavioral Ecology. In P. Hammerstein (Ed.), *Genetic and Cultural Evolution of Cooperation* (pp. 401–427). Cambridge, MA: The MIT Press.

Smith, E.A., & Bliege Bird, R. (2000). Turtle Hunting and Tombstone Opening: Public Generosity as Costly Signaling. *Evolution and Human Behavior*, *21*(4), 245–261. https://doi.org/10.1016/S1090-5138(00)00031-3

Smith, E.A., & Bliege Bird, R. (2005). Costly Signaling and Cooperative Behavior. In H. Gintis, S. Bowles, R. Boyd & E. Fehr (Eds.), *Moral Sentiments and Material Interests: The Foundations of Cooperation in Economic Life* (pp. 115–148). Cambridge, MA: MIT Press.

Smith, E.A., & Wishnie, M. (2000). Conservation and Subsistence in Small-scale Societies. *Annual Review of Anthropology*, *29*, 493–524. https://doi.org/10.1146/annurev.anthro.29.1.493

Smith, E.R., Mackie, D.M., & Claypool, H.M. (2014). *Social Psychology*. Abingdon: Routledge.

Smith, K.M., Larroucau, T., Mabulla, I.A., & Apicella, C.L. (2018). Hunter-Gatherers Maintain Assortativity in Cooperation Despite High Levels of Residential Change and Mixing. *Current Biology*, *28*(19), 3152–3157. https://doi.org/10.1016/j.cub.2018.07.064

Sommerfeld, R.D., Krambeck, H-J., & Milinski, M. (2008). Multiple Gossip Statements and Their Effect on Reputation and Trustworthiness. *Proceedings of The Royal Society B*, *275*, 2529–2536. https://doi.org/10.1098/rspb.2008.0762

Spence, M.A. (1973). Job Market Signaling. *Quarterly Journal of Economics*, *87*(3), 355–374. https://doi.org/10.2307/1882010

Spence, M.A. (1974). *Market Signaling: Informational Transfer in Hiring and Related Screening Processes*. Cambridge, MA: Harvard University Press.

Sperber, D., Clément, F., Heintz, C., Mascaro, O., Mercier, H., Origgi, G., & Wilson, D. (2010). Epistemic Vigilance. *Mind & Language*, *25*(4), 359–393. https://doi.org/10.1111/j.1468-0017.2010.01394.x

Stevens, J.R., & Hauser, M.D. (2004). Why Be Nice? Psychological Constraints on the Evolution of Cooperation. *Trends in Cognitive Sciences*, *8*(2), 60–65. https://doi.org/10.1016/j.tics.2003.12.003

Subiaul, F., Vonk, J., Okamoto-Barth, S., & Barth, J. (2008). Do Chimpanzees Learn Reputation by Observation? Evidence from Direct and Indirect Experience with Generous and Selfish Strangers. *Animal Cognition*, *11*(4), 611–623. https://doi.org/10.1007/s10071-008-0151-6

Számadó, S. (2010). Pre-Hunt Communication Provides Context for the Evolution of Early Human Language. *Biological Theory*, *5*(4), 366–382. https://doi.org/10.1162/BIOT_a_00064

Számadó, S., & Szathmáry, E. (2006). Selective Scenarios for the Emergence of Natural Language. *Trends in Ecology and Evolution*, *21*(10), 555–561. https://doi.org/10.1016/j.tree.2006.06.021

Számadó, S., Balliet, D., Giardini, F., Power, E.A., & Takács, K. (2021). The Language of Cooperation: Reputation and Honest Signalling. *Philosophical Transactions of the Royal Society B*, *376*, 20200286. https://doi.org/10.1098/rstb.2020.0286

Székely, Á., Andrighetto, G., Payette, N., & Tummolini, L. (2020). Aggression, Conflict, and the Formation of Intimidating Group Reputation. *Social Psychology Quarterly*, *83*(1), 70–87. https://doi.org/10.1177/0190272519882389

Takács K. (2001). Structural Embeddedness and Intergroup Conflict. *Journal of Conflict Resolution*, *45*(6), 743-769. https://doi.org/10.1177/0022002701045006003

Takács K. (2002). *Social Networks and Intergroup Conflict*. [Doctoral dissertation, University of Groningen.] http://www.rug.nl/research/portal/en/publications/social-networks-and-intergroup-conflict(d518685a-7f68-4f4f-8f1d-f09f710972de).html

Takács, K., Gross, J., Testori, M., Letina, S., Kenny, A., Power, E., & Wittek, R.P.M. (2021). Networks of Reliable Reputations and Cooperation: A Review. *Philosophical Transactions of the Royal Society B*, *376*, 20200297. https://doi.org/10.1098/rstb.2020.0297

Tomasello, M. (2008). *Origins of Human Communication*. Cambridge, MA: MIT Press.

Tomasello, M. (2009). *Why We Cooperate*. Cambridge, MA: MIT Press.

Tomasello, M. (2014). The Ultra-social Animal. *European Journal of Social Psychology*, *44*(3), 187–194. https://doi.org/10.1002/ejsp.2015

Tomasello, M. (2020). The Role of Roles in Uniquely Human Cognition and Sociality. *Journal for the Theory of Social Behaviour*, *50*(1), 2–19. https://doi.org/10.1111/jtsb.12223

Torres, S. (2019). Aging Alone, Gossiping Together: Older Adults' Talk as Social Glue. *The Journals of Gerontology: Series B*, *74*(8), 1474–1482. https://doi.org/10.1093/geronb/gby154

Turchin, P. (2007). *War and Peace and War: The Rise and Fall of Empires*. New York, NY: Plume.

Turchin, P., & Gavrilets, S. (2009). Evolution of Complex Hierarchical Societies. *Social Evolution & History*, *8*(2), 167–198. https://www.socionauki.ru/journal/articles/129288

Turchin, P., Currie, T.E., Turner, E.A.L., & Gavrilets, S. (2013). War, Space, and the Evolution of Old World Complex Societies. *Proceedings of the National Academy of Sciences of the United States of America*, *110*(41), 16384–16389. https://doi.org/10.1073/pnas.1308825110

Turchin, P., Currie, T. E., Whitehouse, H., François, P., Feeney, K., Mullins, D., Hoyer, D., Collins, C., Grohmann, S., Savage, P., Mendel-Gleason, G., Turner, E., Dupeyron, A., Cioni, E., Reddish, J., Levine, J., Jordan, G., Brandl, E., Williams, A., Cesaretti, R., ..., & Spencer, C. (2018). Quantitative Historical Analysis Uncovers a Single Dimension of Complexity that Structures Global Variation in Human Social Organization. *Proceedings of the National Academy of Sciences of the United States of America*, *115*(2), E144–E151. https://doi.org/10.1073/pnas.1708800115

Vale, G.L., Davis, S.J., Lambeth, S.P., Schapiro, S.J., & Whiten, A. (2017). Acquisition of a Socially Learned Tool Use Sequence in Chimpanzees: Implications for Cumulative Culture. *Evolution and Human Behavior*, *38*(5), 635–644. https://doi.org/10.1016/j.evolhumbehav.2017.04.007

Veblen, T. (1899). *The Theory of the Leisure Class: An Economic Study in the Evolution of Institutions*. New York, NY: Macmillan.

Vincze, V., Üveges, I., Szabó, M.K., & Takács, K. (2021). A magyar beszélt és írott nyelv különböző korpuszainak morfológiai és szófaji vizsgálata. *Proceedings of the 17th Hungarian Computational Linguistics Conference* (pp. 169–182). http://publicatio.bibl.u-szeged.hu/20682/1/Amagyarbeszeltesirottnyelvkulonbozokorpuszainakmorfologiaiesszofajivizsgalata.pdf

Vitousek, P.M., Mooney, H.A., Lubchenco, J., & Melillo, J.M. (1997). Human Domination of Earth's Ecosystems. *Science*, *277*(5325), 494–499. https://doi.org/10.1126/science.277.5325.494

Vock, M., Dolen, W.V., & Ruyter, K.D. (2013). Understanding Willingness to Pay for Social Network Sites. *Journal of Service Research*, *16*(3), 311–325. https://doi.org/10.1177/1094670512472729

Wang, M., Wang, J., Deng, X., & Chen, W. (2019). Why Are Empathic Children More Liked by Peers? The Mediating Roles of Prosocial and Aggressive Behaviors. *Personality and Individual Differences*, *144*, 19–23. https://doi.org/10.1016/j.paid.2019.02.029

Watts, D.J. (2003). *Small Worlds: The Dynamics of Networks between Order and Randomness*. Princeton, NJ: Princeton University Press.

Watts, D.J., & Strogatz, S.H. (1998). Collective Dynamics of 'Small-world' Networks. *Nature*, *393*(6684), 440–442. https://doi.org/10.1038/30918

Wellman, B., & Wortley, S. (1990). Different Strokes from Different Folks. Community Ties and Social Support. *American Journal of Sociology*, *96*, 558–588. https://doi.org/10.1086/229572

Whiten, A., Goodall, J., McGrew, W.C., Nishida, T., Reynolds, V., Sugiyama, Y., Tutin, C.E.G., Wrangham, R.W., & Boesch, C. (1999). Cultures in Chimpanzees. *Nature*, *399*, 682–685. https://doi.org/10.1038/21415

Wilkinson, G.S. (1984). Reciprocal Food Sharing in the Vampire Bat. *Nature*, *308*(5955), 181–184. https://doi.org/10.1038/308181a0

Wilson, D.S., & Wilson, E.O. (2007). Rethinking the Theoretical Foundation of Sociobiology. *The Quarterly Review of Biology*, *82*(4), 327–348. https://doi.org/10.1086/522809

Wrangham, R. (2019). *The Goodness Paradox: The Strange Relationship between Virtue and Violence in Human Evolution*. New York, NY: Pantheon.

Wu, J., Balliet, D., & van Lange, P.A. (2016a). Reputation, Gossip, and Human Cooperation. *Social and Personality Psychology Compass*, *10*(6), 350–364. https://doi.org/10.1111/spc3.12255

Wu, J., Balliet, D., & van Lange, P.A. (2016b). Gossip versus Punishment: The Efficiency of Reputation to Promote and Maintain Cooperation. *Scientific Reports*, *6*(1), 1–8. https://doi.org/10.1038/srep23919

Wyckoff, J.P., Asao, K., & Buss, D.M. (2019). Gossip as an Intrasexual Competition Strategy: Predicting Information Sharing from Potential Mate Versus Competitor Mating Strategies. *Evolution and Human Behavior*, *40*(1), 96–104. https://doi.org/10.1016/j.evolhumbehav.2018.08.006

Yamagishi, T., Jin, N., & Kiyonari, T. (1999). Bounded Generalized Reciprocity: In-group Boasting and In-group Favoritism. *Advances in Group Processes*, *16*, 161–197. https://doi.org/10.2307/2695887

Yamagishi, T., & Kiyonari, T. (2000). The Group as the Container of Generalized Reciprocity. *Social Psychology Quarterly*, *63*, 116–132. https://doi.org/10.2307/2695887

Yamagishi, T., & Mifune, N. (2009). Social Exchange and Solidarity: In-group Love or Out-group Hate?. *Evolution and Human Behavior*, *30*(4), 229–237. https://doi.org/10.1016/j.evolhumbehav.2009.02.004

Yamamoto, H., Suzuki, T., & Umetani, R. (2020). Justified Defection is Neither Justified nor Unjustified in Indirect Reciprocity. *PloS One*, *15*(6), e0235137. https://doi.org/10.1371/journal.pone.0235137

Yoeli, E., Hoffman, M., Rand, D.G., & Nowak, M.A. (2013). Powering up with Indirect Reciprocity in a Large-scale Field Experiment. *Proceedings of the National Academy of Sciences of the United States of America*, *110*(supplement_2), 10424–10429. https://doi.org/10.1073/pnas.1301210110

Károly Takács – Institute for Analytical Sociology, Linköping University (Sweden); CSS-RECENS, Centre for Social Sciences (Hungary)

 https://orcid.org/0000-0001-9126-3233

 karoly.takacs@liu.se; https://liu.se/en/employee/karta65

Károly Takács received his Ph.D. from the University of Groningen / ICS (The Netherlands) in 2002. He has been an Assistant and later an Associate Professor at the Corvinus University of Budapest (Hungary) until 2019. He was a postdoctoral fellow at the University of Groningen / ICS and a Marie Curie Fellow at the University of Brescia (Italy). He founded and led the Research Center for Educational and Network Studies (RECENS) at the Hungarian Academy of Sciences. He received the "Lendület" grant of the Hungarian Academy of Sciences in 2012 on the dynamics of negative ties. He has received an ERC Consolidator Grant in 2014 on gossip, reputation, and cooperation.