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## Dominance Theory (Cummins)



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### Definition

A theory proposed by Denise D. Cummins that interprets specific social cognitive functions as adaptations to the exigencies of living in a dominance (or status) hierarchy.

### Introduction

Eight decades of empirical investigation have unequivocally demonstrated that human reasoning performance varies as a function of problem content. Problems with identical formal properties but different subjective contents often produce vastly different levels of performance, a phenomenon referred to as *content effects*. The most robust performance differences are observed when people are asked to reason about rules that describe constraints on behavior, such as permissions, obligations, prohibitions, or warnings. When asked to test the truth of such rules, people invariably and wrongly adopt a confirmation bias strategy, choosing to investigate cases that could prove the rule true rather than those that could prove the rule false. The latter strategy is the

only one that can provide incontrovertible proof concerning the truth status of the rule (Popper 1959). In contrast, when asked to test compliance with the rule, people invariably and correctly choose to investigate cases of possible non-compliance, that is, to seek to discover whether someone is doing something that is not permitted or is failing to do something they are obligated to do. Permissions, obligations, and prohibitions are called deontic concepts, and reasoning about what one may, must, or must not do in a given set of circumstances is called *deontic reasoning* (Hilpinen 1981). The superior performance elicited by deontic content is called the *deontic advantage* in human reasoning.

Several explanations have been offered for the deontic advantage. One of the most influential is social contract theory, which was proposed by psychologist Leda Cosmides (1989). According to the theory, social contracts are cases of reciprocal cooperation for mutual benefit. When a reasoning problem is interpreted as a social contract, a genetic “look for cheaters” algorithm is spontaneously triggered that causes people to investigate individuals who have accepted benefits (to ensure they have paid the required cost) and individuals who have not paid the cost (to ensure they have not accepted the restricted benefit). The difficulty is that problem contents that elicit a violation detection strategy do not always define opportunities for two individuals to participate in mutually beneficial cooperative transactions. Instead, they typically describe deontic rules that are more

appropriately described as *social norms*, constraints created by authorities that dictate what is permitted and obligated when specific conditions apply. For example, the cassava root scenarios used by Cosmides (1989) describe a rule created by village elders or a chief named “Big Kiku” that restricts the eating of cassava root to members of a particular tribe. Scenarios like these do not describe a reciprocal exchange between two individuals. They instead describe a social norm created and enforced by village authorities. “Cheating” does not take the form of failing to reciprocate a benefit. Instead, it takes the form of failing to comply with an obligatory rule that is imposed by authorities on subordinates. Stanovich and West (1998, Experiment 1) found that adult performance plummeted from approximately 80% to 30% when reference to authority was removed from “social thematic” problem descriptions. Compliance with norms – not reciprocation – is expected and required. Moreover, social norms may or may not be mutually beneficial. Indeed, social norms may have as their goal the exploitation or subjugation of one group of individuals by another, privileged group.

## Dominance Theory

To address this discrepancy, psychologist Denise Cummins proposed *dominance theory* (Cummins 1996a, b, c, 1998, 1999, 2000, 2001, 2002, 2004, 2005, 2013a, b, 2016a, b; Cummins and Cummins 1999, 2003). The core tenet of the theory is that social cognition (including the deontic advantage) was shaped by the continual need to survive within dominance (or status) hierarchies, the social organization that is ubiquitous in the societies of humans and nonhuman animals throughout evolutionary time. High-status individuals are essentially authorities in this type of social organization, monitoring and controlling the behavior of subordinates in order to maintain priority of access to competitive resources (such as food and mating opportunities). Dominance theory posits five main cognitive functions that were shaped by the exigencies of living within status hierarchies: rank discrimination, acquiring social

norms, monitoring compliance with social norms, monitoring reciprocity, and flouting social norms through deception.

Evolutionary theory is based on the assumption that there is a causal relationship between the adaptive problems a species repeatedly encounters during its evolution and the design of its phenotypic structures, including cognitive and behavioral traits. Solving problems of social competition and cooperation has direct impact on survival rates and reproductive success. The ubiquitous social structure that evolved from this pressure is the dominance (or status) hierarchy, a social organization in which some individuals have regular priority of access to resources and fertile mates in competitive situations. These individuals are referred to as high status (or high ranking). Individuals who have lower priority of access are called subordinate or low status.

From a cognitive standpoint, status hierarchies can be interpreted and analyzed as systems of implicit social norms that impose constraints on what is permitted, obligated, or prohibited based on one’s status within the group. Surviving within a dominance hierarchy depends crucially on the capacity to learn these constraints, the capacity to recognize violations of these constraints, and the capacity to use deceptive strategies to flout these constraints in order to garner a larger share of resources. Failure to do so carries a high risk of eliciting agonistic encounters or ostracism. According to the theory, the deontic concepts of permission, obligation, and prohibition are primitives (innate concepts) in the cognitive architecture of social animals that were selected for because they were crucial for survival within status hierarchies. It is these primitive concepts that confer the deontic advantage in reasoning performance.

Support for the theory comes from six sources: comparative psychology (particularly primatology), developmental psychology, anthropology, behavioral economics, neuroscience, and cognitive psychology.

**Primatology.** *Homo sapiens* is a primate species whose ancestors diverged within the primate line a scant five million years ago. Because evolution builds upon existing structures, studying

nonhuman primates can provide insight into the characteristics of human reasoning that reach deep into our evolutionary past, prior to the splitting of hominids within the primate line. The most striking of these characteristics is that, like human reasoning, the reasoning of nonhuman primates is subject to content effects, and social content provides the most robust effects. For example, nonhuman primates readily make rank discriminations among individuals in their social groups, even when all possible dyadic interactions are not directly witnessed (Cheney and Seyfarth 1990, pp. 91–96): They readily infer that A is dominant to C if they witness interactions in which A is dominant to B and B is dominant to C. In contrast, they can perform transitive inference on object-oriented tasks only after considerable drilling with paired stimuli (Gillan 1981).

Primate status hierarchies are replete with “implicit social norms” that dictate who is allowed to groom, sit next to, play with, share food with, and mate with whom. In order to avoid punishment (or ostracism, which can mean death due to predation or starvation), individuals must learn what is *permitted*, *forbidden*, and *obligated given their place in the hierarchy*. High-ranking individuals monitor the behavior of subordinates in order to protect their privileged access to resources. They also frequently take on the role of enforcing norms, aggressing against those who violate them and breaking up disputes between lower-ranking individuals (Boehm 1999).

The hierarchies that characterize primate groups are rarely static structures. Instead, individuals continually vie for control of resources. Higher-ranking individuals defend their privileged access to resources by detecting and punishing acts that threaten privileged access, while lower-ranking individuals attempt to engage surreptitiously in forbidden activities in order to secure a larger share of resources. Individuals move up in rank to the extent that they form alliances with dominants through the formation of reciprocal obligations. Rank within primate dominance hierarchies is acquired and maintained through dyadic aggression, and alliances typically determine the outcome (Harcourt and de Waal 1992; Uehara et al. 1994). Alliances

are formed on the basis of reciprocal obligations, such as reciprocal grooming or food sharing (Schino 2007). Alliances are also terminated when an individual fails to reciprocate in giving aid, grooming, or food sharing (de Waal 1992). Cosmides’ social contract theory addresses the reciprocal nature of these interactions. It does not address, however, the impact of social rank on reciprocation. The terms “despotic” and “egalitarian” have been applied to animal social groups to describe end points on a continuum of the degree of bias in which benefits are distributed (Vehrencamp 1983). A recent analysis of hierarchies falling on the extreme ends of this dimension indicated that the rate of reciprocity and prosocial behavior varies considerably as a function of the steepness of the hierarchy (Kaburu and Newton-Fisher 2015): In chimpanzee groups that show steep rank relationships, dominants provide more agonistic support than subordinates, males direct grooming up the hierarchy, and the rate of reciprocation of grooming is lower for dominants than for subordinates. These observations are best explained as strategies employed by subordinates to obtain rank-related benefits from dominants. In contrast, within shallow hierarchies, high-ranking individuals do not offer agonistic support more frequently than low-ranking males, and dominance rank does not affect grooming distribution, with males of similar dominance rank showing stronger reciprocity than those who hold more distant ranks. Even in steep hierarchies, other research has shown that among chimpanzees, for instance, dominants may trade meat for coalitionary support or mating, as long as they cannot obtain these commodities by force (Jaeggi and Gurven 2013). In fact, primatologists have noted that the most generously sharing individuals are often fully dominant (de Waal and Brosnan 2005).

Lower status individuals also frequently engage in deceptive behaviors that improve their access to resources (Byrne 1995). They conceal objects or behaviors from others by hiding them from view, acting quietly so as not to attract attention, avoiding looking at desirable objects themselves, and distracting attention away from a desired object (such as fruit) or forbidden

behaviors (such as mating with non-dominants). For example, dominant males monopolize reproduction opportunities by aggressing against females and subordinate males who are caught socializing or consorting. Because of the high risks involved in such forbidden liaisons, females and subordinate males often engage in deception, such as concealing their trysts from the view of dominants and suppressing their copulation cries (Kummer 1988; de Waal 1988).

Finally, the neocortex ratio expresses the relative volume of the neocortex compared to the volume of the rest of the brain. It correlates with the mean group sizes that characterize primate species, with larger group sizes corresponding to greater neocortical volume. This ratio correlates with the prevalence of tactical deception observed across primate species (Byrne 1995, pp. 219–221).

**Developmental Psychology.** Since the 1980s, developmental psychologists have used techniques borrowed from comparative psychology to investigate the cognition of preverbal infants and very young children. They have discovered that infants and toddlers possess an astonishing wealth of knowledge about agents and objects long before there is sufficient time to induce such knowledge from experience. The best explanation for this state of affairs is that these techniques have provided a window into human cognitive evolution, showing us the types of cognition that were shaped by evolutionary pressures.

Infants as young as 6 months of age infer the social dominance relationship between two competing individuals based on the size of the group to which they belong and expect individuals from a numerically larger group to get their way (Pun et al. 2016). By 10 months of age, they can transitively infer dominance relations, just as other primates do (Gazes et al. 2015). Yet, like other primates, children can perform object-based transitive reasoning only if they are extensively drilled on the object pairs upon which the inference is to be performed. Truly content-free transitive reasoning does not reliably appear until 6 years of age.

Status hierarchies are apparent in the playgroups of preschool children as young as

2 years of age (Strayer and Trudel 1984). As early as 3 years of age, preschoolers are able to infer dominance not only from physical supremacy but also from decision power, age, and resources (Charafeddine et al. 2015). They expect an individual who imposes his choice on another to exhibit higher competence in games and to have more resources. Children also prefer to associate with and imitate high-status as opposed to low-status individuals (La Freniere and Charlesworth 1983).

Children also show a marked *precocity* for acquiring social norms and monitoring compliance with them (Cummins 2013a, b). By the age of 3 years, children's reasoning performance is characterized by a deontic advantage as large as that seen in adults: They rightly seek violations when testing behavioral compliance with a rule but wrongly seek confirmation when testing the truth of a rule, just as adults do (Cummins 1996b). Children as young as 3 years of age do not just follow social norms; they actively enforce them on others – even when serving as spectators rather than players in the game (Schmidt and Tomasello 2012).

The ability to deceive is closely tied to theory of mind, that is, the ability to understand that individuals have inherently private intentions, desires, and beliefs and will act accordingly (Bartsch and Wellman 1989). Deception relies on this ability because to deceive, individuals must understand their target's mental state – what the target knows, wants, or believes. Within the first year of life, infants engage in subtle manipulations that succeed in deceiving others at least temporarily, and the bulk of these deceptions have as their goal hiding activities that are forbidden by adults (dominants) (Reddy 2007). For example, they will hold eye contact with an adult in order to draw attention away from a forbidden activity, such as discreetly throwing disliked food or objects onto the floor. They will also do forbidden things quietly so as not to draw attention to their behavior, wait until a parent leaves the room before rushing to engage in a forbidden activity, and turn their backs or use their bodies to screen a forbidden activity or object from other's view (Reddy 2007). By the

second year of life, infants can reason not only about the actions of agents who hold false beliefs but also about the actions of agents who seek to implant false beliefs (Scott et al. 2015).

**Anthropology.** The egalitarianism of small-scale societies is often misconstrued as an absence of dominance motivations (or status striving) on the part of group members. Yet leaders in these societies may orchestrate collective actions that produce goods more beneficial to themselves and their kin (von Rueden and van Vugt 2015). Instead, small-scale society egalitarianism is better understood as an active leveling of would-be dominants through norms compelling humility and coordinated punishment of aggrandizers (Boehm 1999). These norms strongly impact decisions members of small-scale societies make in economic games. Henrich et al. (2005) conducted a cross-cultural study of decision-making in 15 small-scale horticultural, foraging, and pastoral cultures in Africa, South America, and Asia. Their results clearly showed a pattern of behavior best described as status seeking and alliance formation through gift giving, which is common throughout Melanesia. The authors concluded that economic behaviors emerge from “a set of basic human psychological mechanisms involving fairness and resource distribution, constrained in different ways by kinship, age, status, and other biologically meaningful variables.”

**Behavioral Economics.** A cornerstone of economic theory is that rational agents are self-interested agents. When making choices about allocations of resources, rational agents will choose to maximize benefits to themselves. More than a decade of research in experimental economics, however, has shown that people do not always behave this way, often choosing to be more generous or stingy than predicted by rational self-interest. In the dictator game, dictators have full control over allocation of a windfall resource between themselves and another individual. Rational dictators should keep all of the resource for themselves, but experimental results indicate that, on average, dictators freely give away about 15–35% of the resource to their partners (Camerer 2003). In the ultimatum game, one party proposes

how to divide a sum of money, and the other party chooses whether to accept or reject the proposed division. If the offer is rejected, the entire sum is forfeit. From a rational standpoint, any amount (no matter how small) should be accepted since something is always better than nothing. But results indicate that proposers tend to be more generous in their offers, with 40–50% comprising the modal range, while recipients tend to be choosy, with offers of less than 20% being routinely rejected. Here, proposers appear to behave strategically, taking into consideration which offers are likely to be acceptable to their partners.

Importantly, several studies have reported that perceived relative status strongly impacts behavior in both dictator and ultimatum games (Ball and Eckel 1996, 1998; Eckel and Wilson 2007; Hoffman et al. 1994, 1996). Dictators offer less to their partners when they are told that they scored higher on a trivia test than their partners did. Ultimatum proposers also offer less when they believe they ranked higher than their partners, and responders are willing to accept lower offers when they believe proposers ranked higher.

**Neuroscience.** In the last decade, studies involving fMRI and ERP technology have revealed broad brain regions that detect and process social dominance and social rank, indicating that recognition of relative social rank occurs quite rapidly – within 200 ms (Chiao et al. 2008). These regions include the amygdala, hippocampus, striatum, and various cortical networks such as the prefrontal and parietal cortices. The amygdala and anterior hippocampus have been implicated in tracking social rank but also in expressing signals that code for social rank (Kumaran et al. 2012). Additionally, it has been found that neurotransmitter systems, such as the dopaminergic and serotonergic systems, modulate and are modulated by the formation of the social hierarchy in a group.

**Cognitive Psychology.** When asked to monitor compliance with a social rule, adults are more likely to look for rule violations when they adopt a high-status position relative to the individuals whose behavior they are monitoring (Cummins 1998). But when engaged in reciprocal exchanges, adults instead exhibit noblesse oblige,

that is, greater generosity and greater tolerance for non-reciprocation when they adopt a high-status perspective, even when the lower-ranking partner was described as having a higher income than the higher-status partner (Fiddick and Cummins 2001, 2007). This pattern of behavior has been reported among participants from seven countries that vary along hierarchical and individualist/collectivist social dimensions; participants were more tolerant of non-reciprocation when they adopted a high-ranking perspective compared with a low-ranking perspective (Fiddick et al. 2013). The best explanation for these status effects is costly signaling theory which states that costly, altruistic acts may benefit an altruist indirectly by establishing a “reputation” that enhances alliance formation, a factor that is crucial for acquiring and maintaining a high-status position (Bird et al. 2001).

### Criticism of Dominance Theory

The main motivation for dominance theory is explaining the “deontic advantage” in human reasoning. But other interpretations of the “deontic advantage” have been offered that reject evolutionary accounts. Most of these explanations focus on studies employing the Wason card selection task in which participants are asked to choose which cards must be turned over to test the truth of a rule or compliance with the rule (Wason 1968). Oaksford and Chater (1994) have argued that people view the deontic (rule compliance) and truth-testing versions of these tasks in terms of optimal data selection and shift their strategies from maximizing expected information gain on the truth-testing version to maximizing expected utility on the deontic version. Manktelow and Over (1995) and Evans and Over (1996) also explain performance on the deontic version of the selection task by modeling it as a process in which subjects seek to maximize subjective expected utility. In the deontic version, reasoners are purported to construct a model of the rule along with possible outcomes and to evaluate these outcomes in terms of costs (negative utility) and benefits (positive utility). In contrast, on the

truth-testing version of the task, reasoners purportedly try to maximize expected epistemic utility by choosing evidence that will reduce their uncertainty about some particular claim relative to another.

While researchers differ in terms of their explanations for marked performance differences on deontic and truth-testing reasoning tasks, the larger question is why people perform exceptionally well on the deontic version of the task regardless of general intellectual ability or level of education, while performance on the truth-testing version correlates positively with intelligence (Stanovich and West 1998). Is it something about the nature of the tasks, or is it something about the nature of human cognition?

Dack and Astington (2011; Astington and Dack 2013), among others, argue that the extant data on the deontic advantage cannot speak to the issue of innateness or evolutionary impact on cognitive architecture. Instead, they argue that expertise in deontic reasoning is due to experience: The ubiquity of social rules in everyday life leads to the development of deontic reasoning schemas. These ubiquitous encounters with social rules facilitate conceptual development during the preschool years through explicit instruction and social enculturation. The difficulty is that these explanations fail to address the fact that children are exposed to lies and falsehoods as frequently as they are to social rules (Heyman et al. 2009, 2013), yet they infer no efficient strategy for testing the truth of statements (Cummins 1996b, 2016c).

### Conclusion

According to dominance theory, the evolution of social cognition was shaped by the continual need to survive within dominance (or status) hierarchies, the social organization that is ubiquitous in the societies of humans and nonhuman animals. Five main cognitive functions arose from the evolutionary pressures imposed by this social structure: rank discrimination, acquiring social norms, monitoring compliance with social norms, monitoring reciprocity, and flouting social norms

through deception. Support for the theory comes from six sources: comparative psychology (particularly primatology), developmental psychology, anthropology, behavioral economics, neuroscience, and cognitive psychology.

## Cross-References

- ▶ [Access to Resources](#)
- ▶ [Cooperative Alliances](#)
- ▶ [Dominance and Health](#)
- ▶ [Dominance in Humans](#)
- ▶ [Emergence of Deontic Reasoning](#)
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- ▶ [Status and Resources for Survival](#)
- ▶ [Status and Sexual Access](#)
- ▶ [Status and Sexual Opportunity](#)

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