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## Costly Signaling Theory



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### Synonyms

[Competitive altruism](#); [Handicap principle](#); [Honest signaling](#)

### Definition

“Costly signaling theory” proposes that animals (including humans) may send honest signals about desirable personal characteristics and access to resources through costly biological displays, altruism, or other behaviors that would be hard to fake.

### Introduction

The existence of altruism was something of an obstacle for early evolutionary theorists, since an organism that engaged in behavior that came at a great personal cost and seemed to solely benefit other individuals appeared difficult for natural selection to explain. It was not until the introduction of the concept of *inclusive fitness*, also known as *kin selection*, by Hamilton in 1964 that evolutionists had a satisfactory theoretical framework

for discussing altruism. The concept of kin selection, however, could not account for the many altruistic acts performed for individuals who are not genetic kin. An additional form of altruism, *reciprocal altruism* (Trivers 1971), explained why these important and socially necessary behaviors occur so frequently. Reciprocal altruism occurs when one organism provides a benefit to another organism at a cost to itself because it has received, or is likely to receive, a similar benefit in return from the other organism.

Neither of the aforementioned models of altruism, however, can explain large philanthropic gifts, heroic self-sacrificial behavior, or handouts to beggars that will never be directly reciprocated. The most useful perspective on such behaviors has come to be known as “costly signaling theory,” which was first introduced by the Israeli biologist Amotz Zahavi in 1975. Costly signaling theory (Bliege Bird and Smith 2005; Grafen 1990; McAndrew 2002; Zahavi 1977) attempted to deal with these types of altruistic acts by proposing that such behaviors are a vehicle for individuals to advertise desirable personal qualities or resources. This may ultimately benefit the altruist by increasing the likelihood that he or she will be chosen as a mate or an ally and it may also be a way of positioning the individual for greater access to resources through direct or indirect reciprocation (Grafen 1990; McAndrew 2002; Nowak and Sigmund 2005; Roberts 1998; Zahavi 1977).

When the altruistic act is performed primarily for the purpose of advertising one’s own altruistic

tendencies, it is referred to as *competitive altruism* because the signaler is effectively competing with individuals who are also attempting to establish altruistic reputations in the eyes of others (Barclay and Willer 2007).

The main distinction between competitive altruism and reciprocal altruism is that reciprocal altruism requires that the altruist is reimbursed by individuals who directly benefited from the original altruistic act, whereas costly signaling and competitive altruism can lead to future rewards from individuals who may not have directly benefited from the original act of altruism (Bowles and Gintis 2011).

### Costly Signaling as Honest Signaling

The signals that conspecifics transmit to each other are only useful to the recipients of those signals to the extent that a signal communicates honest, reliable information about the sender. For example, a female who responds to misleading or false information about the quality of a mate may end up being saddled with low-quality offspring and a nonsupportive partner, both of which would significantly impair her reproductive success. Consequently, there has been significant selective pressure to develop strategies for detecting honest signals of quality in others. In such a system, there must be a cost to the sender if a signal is discovered not to be honest (i.e., cheaters will be punished), and there will be a cost to receivers if dishonest signals are not detected (Higham 2014).

The “cost” of a signal to the sender is a reliable way of confirming the honesty of that signal, so costly signaling is very much about truth in advertising. A “low-quality” signaler who attempts to fake a high-quality signal will deplete whatever resources that he may have available, leaving the signaler in such a vulnerable position that the strategy will prove to be counterproductive. Conversely, a high-quality signaler has resources to burn and can easily afford a high-quality signal, so the adaptive benefits will outweigh the costs (Grafen 1990). Hence, costly signaling theory (CST) proposes that individuals often engage in behaviors that are very costly as a way of signaling honest information about themselves.

Smith and Bird (2000) have described the four qualities that a behavior must have to qualify as a costly signal. First, the behavior must be easily observable by others. Second, it must be costly to the actor in resources, energy, or some other significant domain. Third, the signal must be a reliable indicator of some trait or characteristic of the signaler, such as health, intelligence, or access to resources. Finally, the behavior in question must lead to some advantage for the signaler.

The term “handicap principle” has often been used interchangeably with “costly signaling theory.” This reflects the origins of this theory in research on animal communication where it has been established that some animals “handicap” themselves with extremely costly biological features that only individuals in excellent condition can afford to maintain. The brilliant plumage of the peacock’s tail and the impressive antlers of elk are classic (if a bit timeworn) examples of such handicaps. Many researchers no longer think of these terms as synonymous and believe that handicaps are neither necessary nor sufficient for honest signaling but may still be helpful insofar as they prevent low-quality individuals from sending high-quality signals (Higham 2014).

### Philanthropy as Costly Signaling

Public philanthropy is one of the most common costly signals of social status in humans, especially in Western cultures such as the United States. Universities, public television stations, museums, and the arts depend upon it for their very survival. CST suggests that such philanthropy is a conspicuous display of resources that reinforces the status, resources, helpfulness, and all-around quality of the benefactor. After all, if a person can afford to expend a great deal of money, energy, or time in a manner that seems to be irrelevant to his or her selfish interests, then the resources that are being held in reserve must be very great indeed.

This type of competitive altruism may be a way of positioning oneself for access to resources during unforeseen future times of need (Boone 1998), and there is in fact evidence to support the belief that individuals who have a history of being

magnanimous are rewarded by others when times get tough. Among the Ache of Paraguay, for example, individuals who shared more than average with others in good times received more food from more people when they were sick or injured than did those who had been less generous (Gurven et al. 2000). Apparently, having everyone owe you for past unselfishness can be a good hedge against future calamities, and costly signaling may be an effective strategy for inducing reciprocal altruism.

Anthropological studies provide numerous examples of exaggerated displays of public generosity. For example, Smith and Bird (2000) described a form of costly signaling among the Meriam, a Melanesian society located on an island off the coast of Australia. Two to 5 years after a death, the family of the deceased puts on an elaborate feast to coincide with the erection of an expensive and showy permanent tombstone. Gifts are given to all guests, along with prodigious amounts of food. Ideally, one of the main courses is turtle meat obtained through a dangerous, time-consuming turtle hunt. Successful turtle hunting requires careful coordination of effort and great physical agility, strength, and diving abilities because the turtle hunters have to jump from a boat onto moving turtles in open water. The ability to supply many turtles for the funeral feast serves as an honest signal of the physical quality of the males in the family. Everyone is invited to the feast, and no reciprocation of any kind is expected.

Laboratory studies by psychologists have also demonstrated that charitable donations and other acts of kindness are most likely to take place when the behaviors are easily observed and recognized by others (Bereczkei et al. 2010; Haley and Fessler 2005), and van Vugt and Hardy (2010) have even shown that people will make wasteful contributions in “public goods” situations, knowing full well that the contribution will not make a difference, as long as the contribution is publicly observed. The reason that this occurs is because the contribution is primarily a self-presentation strategy designed to increase the contributor’s status and prestige, with other outcomes of the philanthropy being less consequential to the donor.

Some researchers posit that conspicuous displays of philanthropy and benevolence can be triggered by mating motives, possibly as a way of advertising prosocial personality traits valued by prospective mates, and there are data to confirm that males are more likely to display altruism in the presence of attractive members of the opposite sex; the same does not hold true for females (Farrelly et al. 2007; Iredale et al. 2008). Griskevicius et al. (2007) found that mating motives are especially likely to encourage male generosity if the act of benevolence highlights a man’s prestige or his heroic nature.

The evolutionary roots of philanthropy as a costly signal may be found in the tradition of meat sharing by prehistoric hunters. Successful hunters signaled desirable physical qualities such as physical vigor and health, eye-hand coordination, and mastery of weapons, and by sharing meat they could also demonstrate cooperative, prosocial tendencies that would have been highly valued (Gurven et al. 2000).

### **Risk Taking and Heroism as Costly Signaling**

It’s no secret that young men are notorious for engaging in foolish, risky behavior and that most people fear violent behavior by young men more than violent behavior by older men. In fact, the tendency of young men to engage in risky and/or aggressive behavior prompted the Canadian psychologists Margo Wilson and Martin Daly (1985) to give it a name: Young Male Syndrome. The results of the annual “Darwin Awards” competition support their position convincingly. The Darwin Awards feature those individuals who have lost their lives in dramatic fashion during the previous year by taking stupidity to a colossal new level. For the 5-year period from 2010 through 2014, the Darwin Award winners were skewed toward men by a margin of 38 to 5, with two of the five women who made the list getting there by being talked into having sex with men under less than rational circumstances (<http://www.darwinawards.com/>).

Why would this predilection for recklessness have evolved in young men?

For sound evolutionary reasons, younger men find themselves especially concerned with status and dominance. In early human societies, competitive success in early adulthood established a man's standing in his social group for the rest of his life; it wasn't possible to simply hit the "reset" button and join another group, so what happened during the teen years mattered a great deal. For this reason, high-risk competition between young males provided an opportunity for "showing off" the abilities needed to acquire resources, exhibit strength, and meet any challenges to one's status. Consequently, heroic or even recklessly daredevil behavior was rewarded with status and respect – assuming, of course, that the young man survived the ordeal. Anthropologist Kristen Hawkes (1991) has developed the "show-off hypothesis" to explain the well-replicated finding that men in hunter-gatherer societies who are predisposed toward more risky hunting strategies end up with greater sexual access to women (Hill and Hurtado 1996; Smith 2004; Wiessner 2002).

Today, the widespread promotion of sport in our culture undoubtedly developed as a constructive alternative for dealing with the proclivities of young males that evolved in a very different time. In a legally sanctioned gladiatorial arena, young men are able to exhibit the same skills – throwing, clubbing, running, wrestling, tackling, hand-eye coordination – that would have made them successful fighters or hunters in the ancestral environment. Participating in team sports enables athletes to exhibit other qualities such as cooperativeness, loyalty, and planning ability – all of which are hard to fake (Kniffin and Sugiyama 2018).

This proclivity for recklessness may also be relevant to understanding why men are more likely to flout the conventions of polite society than are women (McAndrew 2018). In other words, why are men more disgusting than women?

Much of the time disgusting behavior is also risky behavior. By eating or drinking things that might be contaminated in some way or by risking social ostracism by flouting the rules of your group, you are putting yourself on the line. You are risking serious illness or excommunication

from the group, both of which would have been deadly in the brutal prehistoric world of our ancestors. If you can take such risks and survive them, you are signaling to others that you have special qualities. Hence, behaving in a disgusting manner may in fact be a perverse form of costly signaling that demonstrates superior genetic or personal qualities.

Along these lines, a team of anthropologists at UCLA led by Dan Fessler tested what they called the "crazy bastard hypothesis" in a series of studies (Fessler et al. 2014). They gathered data online from thousands of Americans and in person from dozens of individuals in the Fiji Islands. They had people read short scenarios about individuals who engaged in risky, daredevil behavior or in more cautious, risk-averse behavior. They then asked them to make judgments about the characteristics that they thought the person in the story might possess. Among other things, the daredevil was perceived to be taller, stronger, and generally more physically formidable than the cautious individual. Thus, risky male behavior may not just be about advertising genetic quality, but it may also advertise how one might behave as an adversary or an ally. If one sees a "crazy bastard" who behaves with apparent disregard for his own personal well-being by doing things that would scare ordinary men away, one might definitely end up wanting to have this person as a friend rather than as an enemy. Even though the crazy bastard's behavior is not overtly aggressive, one can easily imagine the terror of dealing with such a reckless opponent in combat and the comfort that one might have going into battle with that individual as a comrade. Going back to the dawn of recorded human history, one can find rituals (often involving excessive consumption of alcohol) used by warriors to at least temporarily make themselves feel and appear to be formidable crazy bastards as a way of intimidating their enemies and taking the fight out of them before the battle even began.

A form of risky behavior that serves as an especially effective costly signal is physically risky altruistic behavior, which is the very definition of heroism. Evolutionary psychologists believe that even apparently selfless impulses such as true heroism must provide some adaptive

advantage for individuals; otherwise, such behaviors would have been strongly selected against, and many studies confirm that people who sacrifice for the group by engaging in physically costly altruistic activities do in fact achieve elevated social status, respect, and recognition as a result of their public selflessness (McAndrew and Perilloux 2012; Willer 2009), especially when the behavior displays courage and physical strength (Farthing 2005; Griskevicius et al. 2007; Kelly and Dunbar 2001; Sylwester and Pawlowski 2011).

For example, on Ifaluk Atoll in Micronesia, males sometimes engage in torch fishing (luring flying fish into nets at night with torches) when other fishing techniques would actually be more efficient. Torch fishing is a difficult, time-intensive activity but also a highly visible activity that serves to advertise a man's work ethic (Sosis 2000).

Displaying heroism in time of war is another powerful way for young men to acquire rewards from costly signaling, and historical data confirm that the proportion of a population made up of young men is one of the best predictors of when a society is most likely to go to war (Mesquida and Wiener 1996).

A team of European psychologists explored the proposition that war provides an arena for men to compete and impress both their male rivals and females who might be potential mates (Rusch et al. 2015). In one study, they found that 464 American men who had won the Medal of Honor during World War II eventually had more children than other US service men who had not been so heroically distinguished. This is consistent with the idea that heroism gets rewarded with greater reproductive success.

In a second study, 92 women rated the sexual attractiveness of men who had behaved heroically in war as being higher than that of soldiers who had served but not been identified as heroes. Tellingly, women did not show this increased attraction toward men who had behaved heroically in sports or business situations. A third study revealed that behaving heroically in war does not increase the attractiveness of female war heroes to men. In summary, heroism in time of war is sexier

than any other kind of heroism but only for men. Similarly, enhanced access to females has been documented for males who join violent street gangs (Palmer and Tilley 1995).

Therefore, while there are certainly many examples of women behaving heroically, physically risky, self-sacrificial heroism is commonly perceived to be a stereotypically male behavior (Griskevicius et al. 2007; Iredale and Van Vugt 2009; Lyons 2005). If self-sacrificial altruistic behavior is indeed a "male thing," it should be most likely to occur when males show off and compete directly with each other for status (and ultimately for mating opportunities). In a series of laboratory studies, McAndrew and Perilloux (2012) demonstrated that men were most likely to volunteer for physically costly experiences (experiencing pain and getting soaked in a dunk tank without any advance notice) so that their group could win money when there was both a female *and* another male present in a three-person group. Their studies also confirmed that those who volunteered for such activities were liked better, were rewarded with more money, and were preferred as future work partners by their colleagues in the experiment.

### **Conspicuous Consumption as Costly Signaling**

Perhaps the most readily observable form of costly signaling in capitalistic societies is wasteful spending on luxury goods that by definition are not essential for survival, or even for comfort, in daily life. This "conspicuous consumption" is driven by a desire for status and the clear signaling of this status to onlookers (Saad 2007). In a series of seven studies, Nelissen and Meijers (2011) confirmed that wearing brand label clothing does indeed increase perceptions of a person's wealth and status, and that this perception leads to all sorts of advantages. Specifically, these studies demonstrated that individuals wearing expensive branded clothing are more likely to gain compliance to their requests, be recommended for jobs and higher salaries, achieve better outcomes in social dilemma and dictator games, and that they

are more successful when soliciting charitable donations from others. Griskevicius et al. (2010) have also determined that people buy expensive, environmentally friendly products specifically to boost perceptions of status and to advertise their own altruistic tendencies.

A number of studies have highlighted how closely conspicuous consumption as a costly signal is tied to mating motives. Wang and Griskevicius (2014) found that the need to guard their mates and ward off mate poachers triggers displays of luxury goods by women who wish to deter rivals by demonstrating the depth of their mates' devotion. Similarly, Hennighausen et al. (2016) found that priming men with concerns about competition with other men for status leads to an increased interest in acquiring luxury goods such as expensive cars, and that males are predisposed to see other men who own luxury cars as potential rivals than as potential friends. Saad (2011) has even reported that men's testosterone levels increase after publicly driving an expensive Porsche automobile and decrease when driving a beat-up old Toyota sedan.

However, the mating advantages of conspicuous consumption are apparently limited. Conspicuous consumption by men primarily reflects an interest in short-term mating rather than long-term mating, and this is accurately detected by females who nonetheless judge conspicuous consumers to be more desirable as short-term (but not as long-term) mates (Hennighausen et al. 2016; Sundie et al. 2011).

Many anthropologists have studied how expensive cultural rituals such as wedding receptions translate into costly signals. For example, Bloch et al. (2004) examined how the notoriously over-the-top lavishness of Indian weddings (paid for by the bride's family) came to be. The dowry (bride price) and the wedding reception can cost the family up to six times their annual income, and it is one of the leading causes of debt among Indian families. Bloch and his colleagues interviewed many Indian families about just this issue. The status of Indian families is strongly linked to the importance of the people that they know and the size of their social network, and wedding receptions are an ideal venue for

expanding and advertising the nature of this network. Their interviewees emphasized the importance of "making a good show" and they were keenly aware that the details of the wedding would be discussed by others. Marriage in general and the wedding in particular therefore become key ways of signaling prestige. Lavish weddings are especially important signals when the groom's family comes from a different village where the exact social standing of the bride's family may be unknown; they have less social impact when everyone in town already has in-depth knowledge of a family's economic situation. So, Bloch et al. (2004, p. 690) concluded that "wedding celebrations are a form of conspicuous consumption that signals the family's social status to the community."

### **Religious Commitment as Costly Signaling**

Evolutionary psychologists have long thought of religion as a social mechanism for enforcing cooperation within cultural groups (Wilson 2002). One of the ways in which it may successfully accomplish is by using religious commitment as a costly signaling device (Henrich 2009). All religions have rituals, taboos, and other requirements that can be very costly in terms of time, money, or effort. Fasting, tithing, frequent and lengthy prayer and/or religious services, and dietary requirements that are difficult to maintain require a good deal of commitment. Thus, religious commitment can be a hard to fake signal of commitment to the group's values and a signal that one is likely to be a reliable, cooperative group member. Sosis and Bressler (2003) conducted a historical analysis of communal societies and discovered that the ones with the costliest membership requirements survived for the longest times but only if the commune had an underlying religious reason for existence. Soler (2012) found that religious commitment predicted generosity in economic games and self-reported acts of generosity among adherents to an Afro-Brazilian religion in Brazil.

## Conclusion

Costly signaling theory provides a compelling rationale for altruistic acts that are not easily explainable by other mechanisms such as kin recognition or reciprocal altruism. Costly signaling occurs in a wide range of social situations such as consumer behavior, philanthropy, heroic action, and religious activity. Such costly signaling helps maintain social groups by providing honest information about the traits, resources, and behavior patterns of individuals who are members of those groups. All available evidence indicates that costly signaling does in fact result in rewards for the altruist in the form of increased mating opportunities, access to resources, and positive attention from others.

## Cross-References

- ▶ [Altruism](#)
- ▶ [Competitive Altruism](#)
- ▶ [Conspicuous Consumption](#)
- ▶ [Heroic Rescue in Humans](#)
- ▶ [Honest Signaling](#)
- ▶ [Men Riskier, More Aggressive](#)
- ▶ [Public Philanthropy](#)
- ▶ [Reciprocal Altruism](#)
- ▶ [Religion](#)
- ▶ [The Crazy Bastard Hypothesis](#)
- ▶ [The Handicap Principle](#)
- ▶ [The Show-Off Hypothesis](#)
- ▶ [War](#)
- ▶ [Young Male Syndrome](#)

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