Kin Recognition

Antti O. Tanskanen (1, 2, 3) and Mirkka Danielsbacka (1, 3)

1 Population Research Institute of Finland, Helsinki, Finland

2 University of Helsinki, Helsinki, Finland

3 University of Turku, Turku, Finland

Synonyms

Altruistic behavior; Genetic relatedness; Incest avoidance; Kin detection

Definition

Kin recognition refers to individuals' ability to distinguish kin from nonkin. Kin recognition helps to avoid harmful consequences of incestuous relationships and is a precondition for nepotistic altruism.

Introduction

There are two major selection pressures for distinguishing relatives from nonrelatives. The first selection pressure is related to inbreeding avoidance. Inbreeding depression—that is, the decreased survival and fertility rates of the offspring of individuals who are genetically related to each other—is well documented among humans and nonhuman species (Charlesworth & Willis, 2009). Because inbreeding has extremely harmful consequences in the case of the two most important fitness

indicators, survival and fertility, natural selection should have produced strategies for helping individuals to avoid mating with close relatives.

A second evolutionary selection pressure is related to consequences on inclusive fitness (Hamilton, 1964). In terms of one's fitness, it is beneficial to help close relatives, even if the costs are high, because relatedness is also high, whereas helping nonrelatives at high cost is less beneficial in terms of inclusive fitness. By helping genetically related kin, especially when said kin are descendants, it is possible to increase the probability that one's own genes will spread to future generations. An increasing number of empirical studies of humans and nonhuman animals have provided support for this prediction, showing that individuals invest more material and nonmaterial support towards one another according to their degree of relatedness (see Salmon & Shackelford, 2011; Tanskanen & Danielsbacka, 2019 for reviews).

Direct and Indirect Kin Recognition Cues

To regulate social behavior according to degree of genetic relatedness, individuals need ways to recognize to whom they are related. With the exception of mothers' relatedness to their children, all other kin relationships are more or less uncertain and need to be inferred. Because genes do not directly recognize other genes, individuals have to use cues, which help to determine whether another individual is related to her or him. These kin recognition cues can be either direct or indirect. Direct cues can be either physical or psychological, and they may include, for instance, facial and odor resemblance or personality similarity (Krupp et al. 2011). However, for the most part, humans have to use indirect environmental kin-detection cues, such as residential proximity and familial living arrangements.

Lieberman and colleagues (2007) have argued that the most important indirect kin recognition cues are duration of childhood coresidence and maternal perinatal association (i.e., an individual seeing her or his mother nurse a newborn baby) (Lieberman et al., 2007). Although the childhood coresidence cue would encompass all coresiding relatives, studies have considered kin recognition as it particularly applies to siblings. Several such studies have tested Westermarck's (1921) hypothesis, which states that coresidence during early childhood is the proximate mechanism activating inbreeding aversion among siblings, because living very close to a person from early childhood provides a valid social cue of actual genetic relatedness. Perhaps the most prominent evidence for the Westermarck hypothesis comes from anthropological investigations that have found that childhood proximity is associated with sexual avoidance among genetically unrelated individuals who been raised in sibling-like conditions (Talmon, 1964; Wolf, 1995). In addition to inbreeding aversion, childhood proximity tends to be a driver of sibling-directed altruism (Lieberman et al., 2007; Sznycer et al., 2016). Finally, studies have shown support for the argument that maternal perinatal association is an important kin-detection cue among siblings; as a matter of fact, it could be even more important cue than duration of childhood coresidence (Lieberman, 2009; Lieberman et al., 2007; Sznycer et al., 2016).

Although sibling recognition has received reasonably good attention among evolutionary scientists, studies detecting how children recognize their parents have been scarce (but see DeBruine, 2005; Marcinkowska & Rantala, 2012). In particular, there has been lack of studies considering father recognition, although most likely children recognize their fathers as the adult males living with their mothers during childhood (Haig, 2011).

Conclusion

This entry has reviewed studies considering how individuals can detect their relatives. To detect kin, individuals can sometime use direct cues, such as facial or odor resemblance. However, most of the time, individuals have to use indirect environmental kin-recognition cues, such as childhood coresidence and maternal perinatal association, which have tended to be correlated with degree of relatedness in the ancestral surroundings (Lieberman et al., 2007). To conclude, empirical investigations have shown that the presence of kin-recognition cues tends to regulate human social behavior in present-day societies.

Cross-References

Adaptive Problem of Detecting Kinship

Kin Detection by Odor

Kin Recognition and Classification in Humans

Phenotypic Resemblance and Kinship Detection

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