

TINBERGEN'S INFLUENCE ON ADVANCES IN FEMALE INTRASEXUAL COMPETITION RESEARCH

Maryanne L. Fisher

Department of Psychology, Saint Mary's University, Halifax, CA

ABSTRACT

Tinbergen (1963) proposed that there were four types of questions that could be used to collectively comprehend the biological underpinnings of behavior. These questions have been highly influential in several areas of investigation, and in this paper I review how they have shaped our understanding of women's intrasexual competition for mates. While proximate (i.e., more descriptive and less adaption focussed) questions were historically popular, particularly among anthropologists who were among the first to document this behavior, there has been a recent shift towards understanding the ultimate level (i.e., evolutionary focussed) explanations for why these behaviors occur. This growing body of literature incorporates many sub-themes, such as voice perception, eating disorders, economic game theory, social psychology, pheromonal effects, and to a large extent, hormonal influences on behavior. I conclude with a short review of some of the topics that still require investigation in light of Tinbergen's four questions.

Key words: *Competition, women, proximate, ultimate, Tinbergen*

INTRODUCTION

Women's intrasexual competition for acquiring and retaining mates has become a frequent topic of research investigation within the last decade (see Fisher, 2013 for an overview). I posit that the success experienced by researchers in this area is due to their adoption of Tinbergen's (1963) four questions.

Using Tinbergen's Questions

One of Tinbergen's most significant contributions to understanding of behavior was his development of four distinct but overlapping types of questions, which are divided into two levels of explanation. Expressed in terms of female intrasexual competition, proximate level questions broadly capture the idea of *how* women (and girls) compete. Many of the studies that tap into this concept deal with indirect and relational aggression. In contrast, ultimate level questions instead focus on *why* women (and girls) compete. Studies in this arena tend to focus on competition for mates and resources.

Table 1 reviews the four different types of questions, and provides examples of how they may be applied to the study of women's intrasexual competition for mates. Note that the way Tinbergen (1963) labeled them has been changed over time, and hence, the two titles (e.g., survival value/adaptation) refer to his label, and then the more modern nomenclature.

The four questions are complementary, not competing, although each one is independent and worthy of consideration. Together, they provide a comprehensive view of the biological underpinnings of behavior.

Table 1. Proximate vs Ultimate Explanations of Intrasexual Competition

Proximate Level Explanations	
Causation/mechanism	Ontogeny
Women's competition with rivals is indirect and circuitous in order to allow women to have low-risk of physical altercation, and sometimes an actual rival is not identified (i.e., in the case of self-promotion).	Developmental factors influence girls (and later, women) to express competition carefully to avoid direct physical confrontations.
Examples	
Women compete by using cosmetic surgery to be more attractive relative to female friends or younger women.	Girls are taught to compete using indirect aggression to gain social status so that they can still seem nice.
Ultimate Level Explanations	
Survival function/adaptation	Evolution/phylogeny
Women compete with rivals to acquire the best mate possible, which increases the survivability and/or mating success of their children.	Like other female great apes, women who used tactics for intrasexual competition were more likely to be reproductively successful, and have children who survived and later reproduced.
Examples	
Women self-promote or derogate rivals in the presence of potential mates, such that they will draw positive attention to themselves and negative attention to rivals.	Similar to other female great apes, social status and dominance among females may influence access to quality mates.

Although Tinbergen's (1963) conceptualization was novel to a large extent, and extremely influential, some scholars have noted that it was not entirely new. For example, Dewsbury (1992) outlines how Tinbergen's work built on that of Mayr's (1960) work on structural versus functional explanations.

Women and Aggression

For the purposes of this paper, competition is defined in terms of rivalry, as originally suggested by Burbank (1994). When two or more individuals are in pursuit of the same resource and that resource is perceived to be insufficient in quantity, the individuals can be considered as being engaged in competition. The individuals do not have to be conscious of the rivalry, or be aware of their competitors, but they must be engaging in an activity that draws them closer to attaining the desired resource (Hrdy, 1999).

Some of women's intrasexual competition for mates involves physical aggression. For example, Burbank (1987) found that in 61% of the 137 cultures she analysed, women engaged in physical aggression, typically fighting other women over men, and she further notes the need to distinguish between frequency and intensity of aggression. In terms of frequency, rates of physical aggression are lower for women than men (e.g., Cashdan, 1998; Fry, 1998; Maccoby & Jacklin, 1974). The same seems to be true of intensity (e.g., Fry, 1992, p.190 for a brief review). Thus, it appears to be the case that women generally compete in ways other than by physical aggression, such as by using verbal attacks or indirect social aggression (e.g., Campbell, 1999; Mealey, 2000). Due to women possessing less physical strength than men, women develop alternative methods of competing, and thus have different competitive strategies than men (Björkqvist, 1994). Campbell (1999) suggests that this lack of physical competitiveness reflects a successful female adaptation that results in reproductive benefit. She argues that when females become mothers, they become the primary caregivers and protectors of their offspring. It is more important for the mother to remain alive than the father, leading to less risk-taking by women and the use of indirect, low-risk, strategies to resolve disputes. Furthermore, mothers are more likely to invest in their children since they are assured of their genetic relatedness to their offspring through the act of birthing, whereas fathers may be uncertain of their paternity. In summary, "female choice... and ... reproductive strategies are selected not by virtue of being the female half of reproductive pair, but by being an individual woman reproducing in competition with other women to raise her offspring successfully" (Lancaster, 1991, p.2).

Using Tinbergen's Questions

Findings at the Proximate Level of Explanation

Prior to Anne Campbell's research (1999, 2002), in particular, much of the work on female intrasexual competition was of a proximate nature. Cultural anthropologists were documenting how women were competing in various ways. The most noteworthy of these explorations is Burbank's (1987) cross-cultural investigation of 317 societies, which revealed that women are the most common target of female aggression (but consider the possibility that women spend the majority of their time in the presence of other women). She discovered that, cross-culturally, women are physically aggressive, destroy property, refuse to perform duties, and insult others nonverbally (e.g., gestures, locking someone out of a domicile). Hines and Fry (1994) examined competition in Argentina and found women use more indirect aggression (e.g., gossiping, lying, ridiculing, invidious comparisons of clothing and attractiveness) than men, and that men use more physical aggression. Similar results were obtained by Olson's (1994) examination of Tongan women and Fry's (1992) study of Zapotec women in Mexico. An

account of a holiday in Greece, by Kostash (1987), demonstrated indirect aggression via exclusion and “cold stares.” The small island society of Vanatinai, New Guinea, yielded similar findings of frequent use of indirect aggression by females (Lepowsky, 1994). In many of these investigations, the authors note that sexual jealousy was a strong motivation for aggressive acts. However, they did not clearly explain *why* sexual jealousy was a motivator, but rather focussed on *how*.

One widely cited investigation (Schuster, 1983) provides a good example of the use of a proximate level of analysis. In Zambian society, women were (and perhaps still are) faced with a scarcity of desirable (e.g., reliable and resourceful) men due to pronounced social and economic stratification based on an economy of surplus rather than substance. Over time, women in this society grew increasingly dependent on men for resources, and men became unreliable as providers, resulting in a rarity of highly desirable men. Promiscuity was highly prevalent, and thus marital relationships were considered to be unstable, such that a man was often a potential target of sexual advances from other women. Women, especially co-wives, competed by gossiping, quarrelling, and often physical fighting.

Many of these studies are well aligned with the conclusion of Burbank (1987, p. 93), that female aggression “is largely a form of female competition, often over matters of direct relevance to life and livelihood.” What is also interesting is that researchers who do mention evolutionarily relevant theory tend to do so very weakly. For example, Fry (1992, p. 197) simply writes at the end of his article, “the fact that Zapotec men fight over women more regularly and more severely, sometimes killing rivals, than women fight over men is in accordance with the evolutionary principles of sexual selection for male-male competition and parental investment theory (cf. Symons, 1979)”. Although he includes at least one reference to evolutionary theory, he does not expand upon it, and also dismisses women’s intrasexual competition (the topic of his chapter in which that quotation appeared) with respect to any evolutionary interpretation.

The widespread use of a proximate level of analysis has also been the focus of several recent books written on women’s competition, such that the majority of them describe how, and not why (at least in an ultimate sense) women engage in these actions. Some examples include Simmons (2003) and Tanenbaum (2003), both written for the lay public, that describe actions that girls and women take while excluding biological explanation. Tracy (1991), written for a more academic audience, again reviews how women compete in various areas of their lives, including against mothers, sisters, friends, and in the workplace. Holiday and Rosenberg (2009) describe women’s indirectly aggressive behaviors, often with the conclusion that girls and women are “mean” because they want to “get ahead” and are taught to engage in behaviors that are mean. They provide tips throughout their book on how to curtail negative interactions and start to cultivate ‘positive’ practices. Ironically, their conclusions are in spite of a small 2.5 page inclusion of Campbell’s (2002) work. In that section, they outline men’s preference for attractiveness as leading women to compete in these terms, and that women compete for men who have resources, as well as status and reproductive success. Overall, they focus on how women compete, rather than the reasons why these preferences are important. Some books are based on interview data, and arrive at proximate, descriptive conclusions, such as Valen (2010) or Barash (2006), who discuss how competition

exists in every realm of women's lives, but not why it occurs, other than to point out that women may perceive 'not enough pie' (i.e., scarcity of power, resources, etc.).

Many of these descriptive-style studies address both of Tinbergen's proximate level questions (that of causation and ontogeny). Admittedly, in my opinion, the studies that address ontogeny tend to focus on girls and how culture impacts on girls' indirect aggression, rather than making the connection between indirect aggression and competition. It could be that this is the missing link; if researchers in this area were to start thinking in terms of what function indirect aggression serves, they may arrive at answers that are more in keeping with those from intrasexual competition theory, and consequently, begin to address ultimate levels of understanding.

Findings at the Ultimate Level of Explanation

Following Hrdy's (1999; reprint from 1981) and Campbell's (2002) work, there was an outpouring of studies that examined the evolutionary bases of women's intrasexual competition. A cursory look at the literature within the past three years supports this contention, as well as the informal finding that many of these investigations include an examination of fertility. Before discussing some of the range of work that has been recently performed, it must be noted that this list is not intended to be comprehensive. Instead, my goal is to show the breadth of the work that has been undertaken.

Using economics as a springboard, Lucas and Koff (2013) found that women in the low fertility phase of the menstrual cycle (i.e., low risk of conception) were more cooperative with attractive men and women, as compared to highly fertile women, who withheld resources from other women in an economic game. They argue that women withhold resources to increase their own overall attractiveness and decrease that of their rivals, with the idea that they are accruing benefits according to their cycle for the purpose of attracting men who will invest in them when most fertile. In the area of health, Hill and Durante (2011) examined the risks women may accept in order to enhance their attractiveness. When primed with courtship and intrasexual competition, women increased their willingness to engage in tanning and taking dangerous diet pills. Romantic relationships seem to matter, too. Cobey, Klipping and Buunk (2013) found that self-report competition scores from a survey were low for women in romantic relationships, using hormonal contraception who were, and higher for single women, with no influence across the ovulatory cycle. Pheromones were another topic of study; Parma et al. (2012) found that women in the fertile part of their cycle spent more time looking at female faces than male faces, independent of exposure to androstadienone (which is thought to be a chemosignal of male mate quality; Havlicek, Murray, Saxton, & Roberts, 2010). In contrast, women in the low fertility phase examined female faces more than male faces only when exposed to this signal. In a study from social psychology, Piccoli, Foroni and Carnaghi (2013) studied dehumanization and found normally cycling women exhibited it more, and that intrasexual competition increased only in these women and not in those using hormonal contraceptive users. They suggest that the dehumanization of women, by women, is dependent on menstrual cycle status and ultimately related to women's mate-attraction goals.

Voice perception has also been the topic of investigation. Puts et al. (2011) examined how women monitor other women's vocal femininity to track whether they are

potential threats. They report that feminine voices are considered more attractive to men (which women know), and perceived by women as indicating flirtatiousness. How one dresses also matters, as Vaillancourt and Sharma (2011) found that women reacted negatively to another woman (a female confederate) when she dressed in a sexually provocative manner, but did not notice her when dressed conservatively. Indeed, women responded that they would not want the sexy confederate to meet their boyfriend or spend time alone with him, or be friends with him. Another final example is eating disorders, which has been the topic of several studies. For example, Mehta et al. (2011) suggest that intense competition is the ultimate cause of all eating disorders, in that the pursuit of thinness is an adaptation to intrasexual competition in modern environments.

As may be ascertained from the above description of the articles, the issue of function is well explained by the findings. However, in my opinion, much of the work implies, but does not directly grapple with, adaptation, nor with phylogeny. The assumption seems to be that women who outcompete rivals have had more children, such that their daughters have genetically adopted these winning strategies. This adaptation aspect of Tinbergen's framework warrants more attention in the future. Likewise, although Hrdy (1999) drew some cursory parallels between women and female great apes, there has been little investigation of phylogenetic similarities (and differences) with respect to female intrasexual competition.

CONCLUSIONS

The advantages of examining multiple levels of explanation for female intrasexual competition are readily apparent. Reviewing the proximate literature reveals that it exists cross-culturally, and is linked to reproductive investment, in as far as women are attempting to protect or obtain access to "good" mates. Some of the books involving interview data are extremely helpful, too, in that they identify potential areas that still require further exploration by evolutionarily minded researchers. For example, the topic of mothers who compete for access to resources or for status (reviewed by Barash 2006) has not yet been examined. Likewise, the advice that women pass along to younger female kin has been documented, at least to some extent (e.g., Valen, 2010), but not analysed according to an ultimate framework. By using all of Tinbergen's questions, not only has the diversity of topics increased, as evidenced by the recent literature included in this paper, but it also has enabled informed researchers to arrive at a much more complete view of behavior.

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