

INDIVIDUAL DIFFERENCES IN INTRASEXUAL COMPETITION

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Abstract. Intrasexual competition implies viewing the confrontation with same-sex individuals, especially in the context of contact with the opposite-sex, in competitive terms. After constructing the items for the preliminary scale and after conducting a pilot study, in two studies with a total of 706 participants from The Netherlands and Canada, a 12-item scale for individual differences in intrasexual competition was developed that was sex neutral, and that had a high degree of cross-national equivalence. In The Netherlands, sociosexuality, sex drive and social comparison orientation were independently related to intrasexual competition. In Canada, intrasexual competition was strongly, and independently of the Big Five, related to social comparison orientation, but only among women. There was no effect of birth order, but sibling rivalry did correlate with intrasexual competition. Among men, intrasexual competition was more strongly, and differently, related to the Big Five than among women. Among women, intrasexual competition was predicted by a lack of agreeableness, and among men by a high level of neuroticism and extraversion.

Keywords: intrasexual competition, individual differences, Big Five

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Intrasexual competition refers to rivalry with same-sex others over access to mates. Darwin (1871) already recognized the importance of intrasexual competition for sexual selection, and suggested that it evolved as an important behavioral adaptation for attracting mates and for gathering resources necessary for reproduction and offspring care. In most species males invest little in their offspring and engage in often fierce competition with other males over the access to females, whereas females show few signs of intrasexual competition. However, because in humans both

sexes invest resources and parental care in their offspring, both sexes will be discriminating in the choice of mates; therefore, both sexes will engage in competition with same sex conspecifics (e.g., TRIVERS 1972).

Indeed, while it has often been assumed that men are more intrasexually competitive and physically aggressive than women (e.g., ARCHER 2006), in the past decades it has become increasingly clear that women may be intrasexually quite competitive and even aggressive (e.g., BETTENCOURT and MILLER 1996; FRODI, MACAULAY and THOME 1977). For example, in a cross-cultural examination, BURBANK (1987) found that in polygynous societies, co-wives may intrasexually compete for food and money, paternal care for their offspring, and for their offsprings' inheritance. In 61% of the 137 cultures she analyzed, women engaged in physical aggression, typically fighting other women over men.

However, male and female intrasexual competition differs in various ways. First, males tend to be more physically aggressive, and females more verbally aggressive (e.g., CAMPBELL 2001; CASHDAN 1998). Second, males and females compete in part in different domains, i.e. in the traits that are most preferred by the opposite-sex (see also ANDERSSON 1994; BUUNK, MASSAR and DIJKSTRA 2007; DIJKSTRA and BUUNK 2002). While throughout human history, men have competed more in the domains of status, resources, and dominance, women tend to compete more in the domains of physical attractiveness (e.g., CASHDAN 1998; DIJKSTRA and BUUNK 2002). For example, when confronted with highly attractive rivals, women tend to "dislike" such a rival, particularly when she makes intrasexual competition salient, such as when she is conversing with a male (BAENNINGER, BAENNINGER and HOULE 1993).

This is not to imply that for males, physical attractiveness does not play a role in intrasexual competition. Indeed, among men, physical attractiveness has been found to correlate with their reproductive strategy. More specifically, physically attractive men, relative to physically unattractive men, have been found to spend more time in mating effort and less time with kin (e.g., WAYNFORTH 1999; SCHMITT 2005). This finding is generally explained by the fact that physically attractive men are preferred as sex partners, and therefore have to offer less parental investment and commitment in exchange for sexual opportunities (GANGESTAD and SIMPSON 2000).

In the present paper we describe the development of a scale assessing individual differences in intrasexual competition, examine the psychometric characteristics of this scale, and provide some preliminary evidence for the validity of the scale. Evolutionary psychologists have been concerned particularly with universal human adaptations (such as jealousy, cognitive adaptations for social exchange, and mechanisms for kin recognition and incest avoidance), and have often assumed that there should not exist individual differences in such adaptations because natural selection should eventually result in a single fitness enhancing mechanism. According to TOOBY and COSMIDES (1990), "Heritable variation in a trait generally signals a *lack* of adaptive significance" (p. 38, italics in original). However, a number of

theorists have suggested that such heritable variation may continue to exist *because* individual differences may reflect equally adaptive strategies (e.g., BUSS 1991; GANGESTAD and SIMPSON 1990; MACDONALD 1995). FIGUEREDO et al. (2005) suggested a *sociality* hypothesis, arguing that personality differences are characteristic of social species, and might be adaptive in social competition because of the operation of frequency dependent selection. For example, in a population with predominantly cooperative individuals, there would be a niche for competitive individuals (and vice versa). In a similar vein, NETTLE (2006) argued that individual differences in basic personality characteristics are highly heritable, and are related to reproductive success. Drawing on a blossoming animal literature, he suggested that different levels of the same trait may be adaptive under different conditions. Indeed, it seems probable that being strongly intrasexually competitive may be adaptive under certain conditions, yet maladaptive under other conditions. Such other conditions might include a low life expectancy, a low perceived chance of attaining a high status in the long run, and a low mate value.

The scale we developed did not assess the strategies individuals may use in intrasexual competition, which have been investigated by BUSS (1991) and others, but rather intrasexual competition as an attitude. This attitudinal focus concerns the degree one views the confrontation with same-sex individuals, especially in the context of contact with the opposite-sex, in competitive terms. This attitude implicates a number of phenomena that have been well-described in the psychological literature, albeit not in a mating context, including the desire to beat others rather than to perform well (cf. VAN YPEREN 2003); the desire to view oneself as better than others (cf. self-enhancement, ZUCKERMAN and O'LOUGHLIN 2006); envy and frustration when others are better off and negative feelings towards such others (cf. SMITH and KIM 2006); and malicious pleasure when high achievers ("tall poppies") lose face (cf., FEATHER 1994). For the present purpose, these phenomena were operationalized on dimensions relevant to mating, or formulated in mating contexts. In addition, following up on the study by LUXEN and van de VIJVER (2005) who showed that women often reject attractive women as candidates for a position in their department, we included questions on the resistance to having others with higher mate value as close colleagues. While it seems obvious that males and females may compete on different dimensions, there does not seem any rationale for expecting an overall sex difference in intrasexual competition. It was therefore considered important to construct a scale on which men and women did not differ.

The present research has a preliminary and exploratory character. After constructing the scale and conducting a pilot study, in two samples from The Netherlands and Canada, we examined the validity of the scale by exploring in Study 1 its relationship with two mating related variables, i.e., sociosexual orientation and sex drive. As intrasexual competition assumes an interest in being better than others in the mating domain, it should be related to both mating related variables, but should also be a sufficiently distinct construct, and thus not be strongly related to either one. To provide further evidence for the convergent validity of the scale we exam-

ined in Study 1 and 2 the relationship with social comparison orientation, i.e., the disposition of individuals who are inclined to base the evaluation of their own characteristics upon comparison with others, and who tend to be monitoring their own standing viz. others (GIBBONS and BUUNK 1999). As social comparison orientation is distinct from competitiveness (BUUNK and GIBBONS 2006), intrasexual competition should not correlate too highly with this variable; nevertheless, it should at least show some correlation because both variables refer to comparisons with others. To provide additional evidence for the validity, we examined how intrasexual competition is related to perceived competition with one's siblings. Finally, to provide evidence for the construct validity of the scale and to position the scale in the basic personality dimensions recognized within psychology, the relationship between intrasexual competition and the Big Five personality characteristics was assessed. As the Big Five reflect basic, largely genetically determined traits that are recognizable in many species, and as these traits may be related to mating strategies and reproductive success (FIGUEREDO et al. 2005; NETTLE 2006), it would seem particularly important to assess the extent to which intrasexual competition is rooted in these traits. Given the exploratory nature of the present research, we did not formulate hypotheses concerning the way in which intrasexual competition would be related to the Big Five.

PILOT STUDY AND SCALE CONSTRUCTION

The scale intended to assess the degree to which one views the confrontation with same-sex individuals, especially in the context of contact with the opposite-sex, in competitive terms, including the desire to beat others rather than the desire to perform well, the desire to view oneself as better than others, envy and frustration when others are better off, and malicious pleasure when high achievers loose face. With this construct in mind, we tried to formulate as many items as possible that would apply to males as well as females. Each item had 7 possible answers varying from 'not at all applicable' to 'completely applicable'. The items were given to a bilingual research group who formulated the survey simultaneously in English and in Dutch. The comparability and the similar meaning of the items were checked thoroughly by discussing various possible equivalent translations. This process resulted in a total of 22 items that were administered to a group of 73 students. Scale analysis resulted in a preliminary scale of 15 items with an alpha of .80 (.7997), that could not be enhanced by deleting an item (the highest alpha if item deleted was .7987). As intended, males and females did not at all differ significantly on the scale, $F(1, 72) = .12, p = .73$; for the total scale, $M = 3.22, SD = .72$. The scale had a low kurtosis (-.012) as well as skewness (.02).

Study 1

SAMPLE

The sample consisted of 84 male and 287 female students at the University of Groningen in the Netherlands (age $M = 20.07$, $SD = 4.16$). They completed questionnaires via the Internet as partial fulfillment of course requirements. The questionnaire was administered in Dutch.

MEASURES

In addition to the items for intrasexual competition, the questionnaire contained the 11-item scale for social comparison orientation (GIBBONS and BUUNK 1999), the 7-item scale for sociosexual orientation (SIMPSON and GANGESTAD 1991), and the 4-item scale for sex drive (OSTOVICH and SABINI 2004). In the present sample, the alpha's for these scales were respectively .84, .77, and .88.

Table 1. Items of the Intrasexual Competition Scale

I can't stand it when I meet another man/woman who is more attractive than I am. ^{1,2}
When I go out, I can't stand it when women/men pay more attention to a same-sex friend of mine than to me. ^{3,4}
I tend to look for negative characteristics in attractive men/women. ²
When I'm at a party, I enjoy it when women/men pay more attention to me than other men/women. ⁶
I wouldn't hire a very attractive man/woman as a colleague.
I just don't like very ambitious men/women. ⁵
I tend to look for negative characteristics in men/women who are very successful.
I wouldn't hire a highly competent man/woman as a colleague.
I like to be funnier and more quick witted than other men/women. ^{5,6}
I want to be just a little better than other men/women.
I always want to beat other men/women. ^{5,6}
I don't like seeing other men/women with a nicer house or a nicer car than mine.

Answers vary from "not at all applicable" (1) to "completely applicable" (7)

¹ Women score significantly higher than men in Dutch sample

² Women score significantly higher than men in Canadian sample

³ Women score marginally significantly ($p = .058$) higher than men in Dutch sample

⁴ Women score marginally significantly ($p = .055$) higher than men in Canadian sample

⁵ Men score significantly higher than women in Dutch sample

⁶ Men score significantly higher than women in Canadian sample

Psychometric qualities of the scale. The 15-item scale also had a high reliability in this sample ($\alpha = .87$), which could not be enhanced by deleting an item, even when considering four decimals. Nevertheless, to shorten the scale, we looked for additional possibilities of reducing the number of items. Therefore, we conducted a factor analysis that resulted in a major, dominant first factor (eigenvalue 5.40, explained variance 36%), and three minor factors (eigenvalues 1.63, 1.28, and 1.01, explained variances 11%, 9 % and 7%, respectively), with 5 items loading lower than .57 on the first unrotated factor. As will be described below in Study 2, three of these items were eventually omitted from the scale. On the final 12-item scale, there was no sex difference, $F(1, 370) = .20, p = .66$, for males, $M = 3.37, SD = .84$, for females, $M = 3.32, SD = .94$. The scale is presented in *Table 1*, and the psychometric properties in *Table 2*. The kurtosis is slightly positive in the present sample, the skewness close to zero, and the alpha reliability high. The alpha could not be enhanced by deleting an item. As *Table 1* shows, on most items there were no sex differences, but women scored higher on two items, and men on three items.

Table 2. Psychometric properties of the Intrasexual Competition Scale

	Netherlands	Canada
M	3.33	3.30
SD	.92	1.05
Skewness	-.018	.05
Kurtosis	.39	-.32
Alpha	.85	.87

Validity of the scale. Intrasexual competition correlated significantly, though lowly, with social comparison orientation ($r = .14, p < .01$), sociosexual orientation ($r = .23, p < .001$) and sex drive ($r = .19, p < .001$). The correlations for men and women were virtually the same. A hierarchical multiple regression showed that each of these three variables had an independent association with intrasexual competition, for social comparison orientation, $B = 1.16, p < .05$, for sociosexual orientation, $B = .42, p < .01$, and for sex drive $B = .38, p = .05$. For the total equation, $F(3, 355) = 9.07, p < .001, R = .27, R^2 = .07$. These findings suggest that intrasexual competition is, as expected, related to all three variables, but in a modest way. Overall, intrasexual competition is independently associated with a tendency to compare one selves with others, an openness to short-term mating, and a high sex drive. At the same time, however, it is clearly a distinct variable that is not captured by these variables.

Study 2

SAMPLE

This sample consisted of 65 male and 193 female students at Saint Mary's University in Halifax, Canada (age $M = 21.16$, $SD = 3.88$). Participants completed questionnaires in small groups using paper-and-pencil format and received partial course credit.

MEASURES

In addition to the intrasexual competition scale, participants completed the 11-item social comparison orientation scale (GIBBONS and BUUNK 1999), with a reliability of .79, and the 7-item scale for sociosexual orientation (SIMPSON and GANGESTAD 1991), with a reliability of .78. As well, participants completed a brief questionnaire concerning perceived competition with same and opposite-sex sibling(s), where applicable, with respect to attention from parents, mates, gifts, marks at school, and sports. Responses were provided on a scale where 0 indicated no competition and 3 indicated extreme competition. The personality variables neuroticism, extroversion, openness, agreeableness and conscientiousness, were assessed using the NEO Five Factor Inventory (NEO-FFI; COSTA and MCCRAE 1992). The NEO-FFI is a short form of the revised NEO personality inventory, consisting of 60 items with five 12-item subscales each measuring one of the "Big Five." The reliability of neuroticism was .87 ($M = 36.22$, $SD = 8.49$), of extroversion .75 ($M = 42.33$, $SD = 5.97$), of openness .69 ($M = 39.76$, $SD = 5.99$), of agreeableness .72 ($M = 40.85$, $SD = 5.75$), and of conscientiousness .81 ($M = 43.00$, $SD = 6.54$).

RESULTS AND DISCUSSION

Psychometric qualities of the scale. The original 15-item scale developed in the pilot study also had a high reliability in this study ($\alpha = .88$), and the reliability could not be enhanced by deleting an item, even when considering four decimals. As in Study 1, we conducted a factor analysis that resulted in a dominant first factor (eigenvalue 5.74, explained variance 38.23%), and in three minor factors (eigenvalues 1.98, 1.36, and 1.05, explained variances 13%, 10% and 7%), with also 5 items loading lower than .57 on the first unrotated factor. There were two items that had loadings lower than .57 in both Study 1 and Study 2, and these were therefore omitted from the final scale. To make the Canadian scale as similar as possible to the Dutch scale, an item was omitted on which men scored higher than women in the Canadian sample, but on which men and women in the Dutch sample did not differ. The final 12-item scale in the Canadian sample also did not show any sex difference, $F(1, 257) = .27$, $p = .60$, for males, $M = 3.36$, $SD = 1.02$, for females, $M =$

3.28, $SD = 1.06$. As can be seen in *Table 2*, the properties of the scale are quite similar for both samples, although the standard deviation is slightly higher in the Canadian sample, and the kurtosis negative in the Canadian sample (and positive in the Dutch sample). The alpha could not be enhanced by deleting an item. As *Table 1* shows, on half of the items there were no sex differences, but both women and men scored higher on three items than the opposite sex did. Most sex differences found in Study 1 were also found in Study 2.

Finally, we calculated the coefficient of congruence ϕ to assess the metric equivalence (CHEUNG and CHEUNG 2003) of the scale, i.e., the equivalence in the psychometric properties of the Dutch and English versions of the scales. This coefficient was .99, which is excellent and indicates the highest level of congruence according to Tucker (1951). On the basis of an empirical analysis of the perceived similarity of factors, LORENZO-SEVA and ten BERGE (2006) suggested that a range between .85–.94 corresponds to a fair similarity, while a value higher than .95 implies that both scales can be considered equal. Thus, the congruence between the Dutch and English version of the scale can be considered as very high.

Validity of the scale. Also in this study, intrasexual competition was significantly correlated with social comparison orientation, especially among females, $r = .40$, $p < .000$, and marginally significantly among males, $r = .24$, $p = .06$. The difference between both correlations was not significant, $p = .11$. In neither sex was intrasexual competition significantly correlated with sociosexuality, respectively $r = .06$ and $.04$, p 's $> .40$. Thus, while the association of intrasexual competition with social comparison orientation seems rather robust, that does not seem to be the case for the association with sociosexuality. There was no significant difference in intrasexual competition according to whether the participant was an only child ($n = 29$) or not ($n = 231$), independent samples $t(254) = .68$, $p > .05$. Order of birth (participant coded as first, middle or last born; only child coded as first born) also did not have a significant impact on intrasexual competition $F(3, 252) = .32$, $p > .05$. With respect to competition with siblings, the following were significantly correlated with intrasexual competition scores (because these data only applied to a minority of the participants, we mention the *df*'s here). First, female's intrasexual competition scores were significantly correlated with their competition with sisters for parental attention, $r(103) = .21$, $p < .05$, for mates, $r(100) = .27$, $p < .01$, for gifts, $r(103) = .26$, $p < .01$, and with brothers for school marks, $r(123) = .22$, $p < .05$, and sports, $r(123) = .19$, $p < .05$. Male's competition scores were significantly correlated with their competition with brothers for gifts, $r(40) = .32$, $p < .05$, and with sisters for parental attention, $r(40) = .44$, $p < .01$. All other correlation comparisons were not significant.

Finally, the relationship of competition with the "Big Five" was assessed. For women, agreeableness ($r = -.24$, $p < .001$) and neuroticism ($r = .16$, $p < .05$) were correlated with intrasexual competition. For men, only neuroticism ($r = .41$, $p < .001$) correlated with intrasexual competition, and rather highly. All other correlations were $< .18$, p 's $> .17$. Hierarchical multiple regressions with all Big Five fac-

tors included as predictors showed that for women only agreeableness made an independent contribution, $\beta = -.22$, $p < .01$, with neuroticism making only a marginally significant contribution, $\beta = .14$, $p = .08$. For the total equation, $F(5, 173) = 3.48$, $p < .01$, $R = .31$, $R^2 = .09$. For men, neuroticism, $\beta = -.35$, $p < .001$ made a strong independent contribution, but also extroversion (that correlated only $r = .17$, $p = .18$ with intrasexual competition), had an independent effect, $\beta = .35$, $p < .05$, suggesting that other personality variables acted as suppressors. For the total equation, $F(5, 54) = 4.74$, $p < .001$, $R = .57$, $R^2 = .33$. Thus, intrasexual competition is particularly characteristic of less agreeable women, and of neurotic and extroverted men, and seems among males much more strongly rooted in personality than among women.

DISCUSSION

We conceptualized intrasexual competition as the degree to which one views the confrontation with same-sex individuals, especially in the context of contact with the opposite-sex, in competitive terms. In a preliminary and exploratory set of studies, we developed simultaneously in two countries, i.e., The Netherlands and Canada, a 12-item scale for individual differences in intrasexual competition that proved to be sex neutral, to have a high reliability, and to have a high degree of cross-national equivalence. However, the relationships with sociosexuality was not completely consistent across countries. In The Netherlands, sociosexuality, sex drive and social comparison orientation were independently, but not very strongly related to intrasexual competition. In Canada, sociosexuality was not related to intrasexual competition, suggesting that there may not be a robust association between the two variables; in fact, there is no theoretical reason to expect it to be related.

There was no significant influence of birth order, but reports of sibling rivalry in one's childhood were associated with intrasexual competition. This may indicate a genetic influence on a competitive tendency that manifests itself in the family of origin, as well as in the responses to one's unrelated rivals, or it may suggest an effect of one's family of origin on one's tendency to engage in intrasexual competition. A high level of sibling rivalry may reflect an uncertain environment in which one learns that one has to compete over access to resources (cf., SALMON 2005). Whatever the explanation, the link between sibling rivalry and intrasexual competition provides evidence for the construct validity of the scale.

Remarkably, among men, intrasexual competition was more strongly, and differently, related to the Big Five than among women. Among women, intrasexual competition was predicted by a lack of agreeableness and to some extent by neuroticism, but the total amount of variance explained by the Big Five was only 9%. The finding that especially the less agreeable women tend to engage in intrasexual competition, is not surprising, and provides some evidence for the construct validity

of our scale. As noted by COSTA and MCCRAE (1992), the disagreeable or antagonistic person is egocentric, skeptical of others' intentions and competitive rather than cooperative. Intrasexual competition among men seems to have different, and stronger, personality roots than among women. Specifically, neurotic and extroverted men seem to have a stronger tendency to engage in intrasexual competition. In fact, no less than 30% of the variance in intrasexual competition is explained by the Big Five, with neuroticism making the strongest contribution. Although this is in line with evidence that those high in neuroticism respond with less positive affect to someone who is performing very well (BUUNK, VAN YPEREN and VAN DER ZEE 2001), it is particularly remarkable that the two traits that are related to male intrasexual competition are precisely those that might, according to FIGUEREDO et al. (2005), have been the first individual differences to have evolved in freely moving species. In addition, the finding that intrasexual competition seems among men more firmly rooted in personality than among women, may reflect the longer evolutionary history of male intrasexual competition, due to which the adaptive value of different levels of the same trait may have had more time to evolve (cf. NETTLE 2006).

Of course, the present research has a number of potential limitations. First, it must be emphasized that we found the associations of intrasexual competition with family variables and the Big Five only in Study 2 (with the smaller of the two samples), which limits the final conclusions we can make about the scale's valid relationships with these variables. A second potential limitation is that both samples are heavily skewed toward females, and, as males tend to exhibit higher variability for most behaviors, a reduced sample of males may have diminished this variability, particularly in intrasexual competition which is clearly relevant to sexual selection in males. However, the SD's in both samples are the same for males and females. We consider it rather unlikely and statistically implausible that the SD among males would be larger in a larger sample. Indeed, due to sexual selection pressures, for many features we find more variability among males than among females (e.g., ANDERSSON 1994). That does, however, not necessarily imply that intrasexual competition *as such* would show greater variability among males. We would expect such only on dimensions *on which* intrasexual competition takes place (such as intelligence).

To conclude, the present research has produced a reliable, cross-nationally validated scale for intrasexual competition that seems distinct from other mating-related variables, and appears in an interesting way related to the well-established Big Five. By doing so, this research may be a preliminary step to remedy the "dearth of information on documented relations between personality and intrasexual competition..." (FIGUEREDO et al. 2005, p. 863). The present scale may be of use in a variety of studies examining, among others, the conditionally adaptive value of intrasexual competition, the genetic and family origins of intrasexual competition and the consequences of intrasexual competition for reproductive success. Currently, a series of studies is underway to explore the various implications of in-

trosexual competition (as assessed with the present scale) and the initial results point clearly to the scale's relevance. For example, DALLEY and BUUNK (2008) found a high correlation (over .50) between intrasexual competition and the frequency with which women compared their own physical appearance with other women. It would be especially important to examine the behavioral implications of individual differences in intrasexual competition. Eventually, this may result in a better insight in the role of individual differences in intrasexual competition in human evolution.

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