



Short Communication

Three factors of the Intrasexual Competition Scale?☆



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ABSTRACT

In a multinational project ($N = 3707$), we factor analyzed a commonly used self-report measure of intrasexual competition and found a three-dimensional system. We called these factors *envy* (i.e., wanting what others have), *jealousy* (i.e., protecting what one has), and *competitiveness* (i.e., beliefs that one is better). To better understand these factors and test whether the solution is sensible, we examined sex differences and correlations with the Dark Triad traits (i.e., psychopathy, narcissism, and Machiavellianism), life history strategies, and age. Results are discussed using an adaptationist lens.

To understand individual differences in intrasexual competition, Buunk and Fisher (2009) developed a scale capturing things people may do when engaging in intrasexual competition. While originally hypothesized as a unidimensional scale, it might be two-dimensional, composed of superiority enjoyment and inferiority frustration factors (Albert et al., 2022). While the movement from a uni- to a bidimensional scale may reveal previously obscured nuance, it is exploratory in nature, tied to the specific factor analytic approach the authors took (i.e., principal axis factoring) when other approaches may reveal new

information (Joliffe & Morgan, 1992). In addition, work in this area tends to focus on WEIRD participants undermining adaptationist accounts (but see Buunk, 2022). Therefore, in this exploratory study, we used principal components analyses in a cross-cultural database and try to understand those factors using classical test methods.

If there are previously undiscovered latent dimensions to the scale, there are several ways to understand these dimensions. First, we consider sex differences. Sex differences in intrasexual competition are well-known in animal behavior research but they seem muted in self-

☆ Authors' note: Data for this study was collected as part of a larger study with the help of researchers from around the world including David Bourgeois and the late Gregory Carter (who died in early 2022) who are not included as co-authors.

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report, questionnaire data (Puts, 2010; Reynolds, 2021). It is possible they are minimized in self-report methods and obscured by averaging conflicting variance across dimensions. Second, an examination of how aspects of intrasexual competition may also be revealed by testing them in relation individual differences like age (e.g., younger people may be more competitive) and their life history strategy (i.e., risk-taking, aggression, temporal discounting, promiscuity) strategy as per psychopathy, narcissism, Machiavellian, and mating effort (i.e., fast life history traits) because they may be socially dominant (Semenyna, Vasey, & Honey, 2019) to fulfill their social strategy.

In this study, we explore the possibility that a commonly used scale to capture individual differences in intrasexual competition may be composed of hitherto unknown latent dimensions. Relying on classical test methods, we factor analyzed the scale, tested sex differences, examined correlations with age and personality traits, and explored potential differences between WEIRD and non-WEIRD data. While exploratory, we think such a project can reveal hitherto uncovered aspects of intrasexual competition.

1. Method

1.1. Participants and procedures

In 2013–14, we collected data¹ from 42 countries online. Translations were conducted following the back-translation procedure (Brislin, 1970). At each site, when needed, researchers obtained ethical clearance, informed consent, administered a larger battery of variables not reported here (e.g., Jonason & Luoto, 2021), and upon completion, were thanked and debriefed participants. The sample was composed of 3707 heterosexuals (2333 women) who received course credit or were volunteers, aged 18 to 69 years old ($M = 24.80$, $SD = 7.62$). Given gross imbalances across countries, we made an ad hoc, exploratory classification of WEIRD ($n = 2349$) and non-WEIRD ($n = 1358$) nations as previously done (e.g., Rogoza, Žemojtel-Piotrowska, Jonason, et al., 2021).

1.2. Measures²

We used the 12-item Dirty Dozen (Jonason & Webster, 2010) measuring psychopathy (e.g., “I tend to be unconcerned with the morality of my actions.”), Machiavellianism (e.g., “I have used deceit or lied to get my way.”), and narcissism (e.g., “I tend to want others to pay attention to me.”). Participants reported how much they agreed with statements (1 = *strongly disagree*; 5 = *strongly agree*) that were summed to create indexes of psychopathy (Cronbach $\alpha = 0.75$), Machiavellianism ($\alpha = 0.79$), and narcissism ($\alpha = 0.81$).

We used the 8-item Brief Life History Scale (Kruger, 2017) measuring parenting (e.g., “Good at taking care of children”) and mating effort (e.g., “Sleep with a large number of people in your lifetime”). Participants reported how much (1 = *not at all*; 7 = *very much*) each item described them, and the items were averaged into indexes for parenting ($\alpha = 0.61$) and mating ($\alpha = 0.66$) efforts.

Intrasexual competition was measured with the 12-item Intrasexual Competition Scale (Buunk & Fisher, 2009) asking applicability (1 = *not at all applicable*; 7 = *completely applicable*) of sex-specific statements (e.g., “I want to be just a little better than other men/women.”). A principal components analyses with an oblimin rotation detected three factors (62.02 %) we named intrasexual jealousy, envy, and competitiveness with four items on each factor (Table 1), modest cross-loadings (0.11 to 0.53; $M = 0.34$, $SD = 0.13$), and interfactor correlations (0.25 to 0.47).

¹ Data for this study are available on the Open Science Framework: <https://osf.io/shgzj/>.

² Confirmatory and Multigroup Confirmatory Factor Analyses are reported on the Open Science Framework for this paper.

Table 1
Factor structure of the Intrasexual Competition Scale.

	Envy	Jealousy	Competitiveness
1. I can't stand it when I meet another XX who is more attractive than I am.	0.87		
2. When I go out, I can't stand when XX pay more attention to a same-sex friend of mine than to me.	0.81		
3. I tend to look for negative characteristics in attractive XX.	0.79		
12. I don't like seeing other XX with a nicer house or nicer car than mine.	0.62		
6. I just don't like very ambitious XX.		0.79	
8. I wouldn't hire a highly competent XX as a colleague.		0.76	
7. I tend to look for negative characteristics in XX who are very successful.		0.69	
5. I wouldn't hire a very attractive XX as a colleague.		0.68	
10. I want to be just a little better than other XX.			0.85
9. I like to be funnier and more quick-witted than other XX.			0.81
11. I always want to beat others XX.			0.78
4. When I'm at a party, I enjoy it when XX pay more attention to me than other XX.			0.70
% variance accounted for	40.83	12.83	8.35
Eigen	4.90	1.54	1.00
Cronbach's α	0.80	0.73	0.80

Note. Principle components analysis, oblimin rotation; XX reflects participant-specific same-sex-other gender-noun.

2. Results

We tested a 2 (participant's sex) \times 2 (world region) \times 3 (intrasexual emotions) mixed model ANOVA, we found a main effect of intrasexual emotions ($F[2, 7406] = 3735.28$, $p < .001$, $\eta_p^2 = 0.50$) suggesting that people scored highest on intrasexual competitiveness ($M = 4.17$, $SE = 0.03$), then on intrasexual jealousy ($M = 2.82$, $SE = 0.02$), and then intrasexual envy ($M = 2.31$, $SE = 0.02$), with significant differences between all three ($p < .001$) which were qualified by a small interaction ($F[2, 7406] = 25.94$, $p < .001$, $\eta_p^2 < 0.01$; Table 2), two two-way mixed model interactions (Fig. 1), and one between-subjects interaction.

In non-WEIRD nations, there was only a sex difference in intrasexual envy, suggesting women were more likely to feel this way than men. In WEIRD nations, by contrast, there were sex differences in all three forms of intrasexual emotions but women again, and more strongly than women in non-WEIRD nations, score higher on intrasexual envy whereas men scored higher on intrasexual jealousy (albeit a small effect) and competitiveness. When comparing across intrasexual competition factors, the differences among them were significant in men and women regardless of region, but differences between them were larger in women in both regions but the magnitudes of those differences were larger in WEIRD countries than non-WEIRD countries. Intrasexual emotions and participant's sex interacted ($F[2, 7406] = 65.12$, $p < .001$, $\eta_p^2 < 0.02$) suggesting that women scored higher than men on intrasexual envy ($t[3705] = -4.73$, $p < .001$, $d = -0.16$) whereas men scored higher than women on intrasexual competitiveness ($t[3705] = 8.06$, $p < .001$, $d = 0.27$), with no sex difference in intrasexual jealousy and intrasexual emotions and world region interacted ($F[2, 7406] = 77.46$, $p < .001$, $\eta_p^2 = 0.02$) suggesting that for intrasexual envy, those in WEIRD countries scored higher than those in non-WEIRD countries ($t[3705] = 4.24$, $p < .001$, $d = 0.15$) whereas those in non-WEIRD countries scored higher on intrasexual jealousy than those in WEIRD countries ($t[3705] = -9.48$, $p < .001$, $d = -0.32$); with no difference in intrasexual competitiveness. And, last, participant's sex and world region interacted ($F[1, 3703] = 7.81$, $p = .005$, $\eta_p^2 < 0.01$) such that in men, there was more ($p < .001$) intrasexual competitiveness in WEIRD ($M = 3.16$, $SE = 0.03$) than non-

Table 2
Three-way interaction of participant's sex, region, and scores on three emotions of intrasexual competition.

	WEIRD				Non-WEIRD			
	Men	Women	<i>t</i>	<i>d</i>	Men	Women	<i>t</i>	<i>d</i>
	<i>M</i> (<i>SD</i>)				<i>M</i> (<i>SD</i>)			
Envy	2.80 (1.27)	3.04 (1.31)	-4.39**	-0.19	2.64 (1.22)	2.82 (1.29)	-2.46*	-0.14
Jealousy	2.19 (1.10)	2.10 (1.05)	1.98*	0.08	2.47 (1.06)	2.50 (1.17)	-0.46	-0.03
Competitiveness	4.48 (1.35)	3.09 (1.36)	10.04**	0.42	4.14 (1.37)	4.13 (1.42)	0.20	0.01
<i>F</i>	1533.01**	1738.32**			467.70**	831.58**		
η_p^2	0.63	0.55			0.51	0.48		

Note. *d* is Cohen's *d* for effect size.

* *p* < .05.

** *p* < .01.

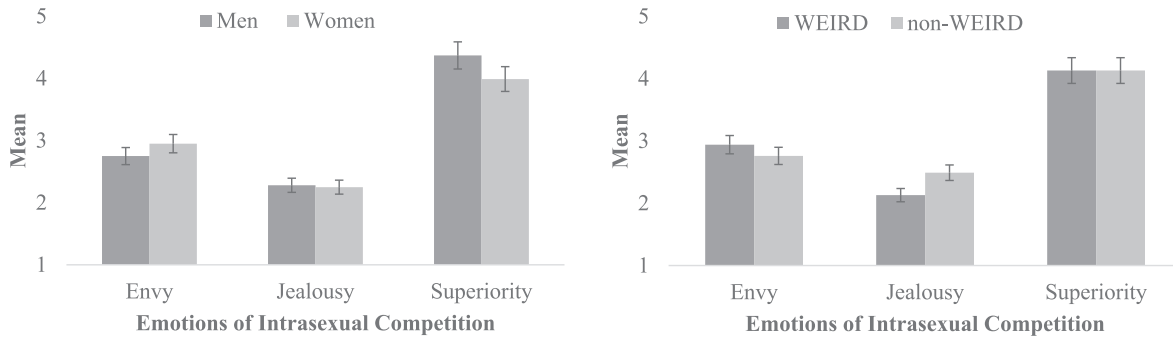


Fig. 1. Two-way interactions on mean scores of emotions for intrasexual competition by participant's sex and world region.

Note. Error bars are 5 % error.

WEIRD (*M* = 3.08, *SE* = 0.05) places whereas in women there was more (*p* < .001) intrasexual competitiveness in non-WEIRD (*M* = 3.15, *SE* = 0.03) than WEIRD (*M* = 3.02, *SE* = 0.03) places.

Last, we turned to correlational effects (Table 3). Age was correlated with less envy and competitiveness and more jealousy, with larger effects in women in each case. Parenting effort was associated with less envy and jealousy and more competitiveness with a larger effect in women in the competitiveness case. Mating effort and the Dark Triad traits were associated with higher rates of all three kinds of intrasexual competition, with larger effects in women for psychopathy and competitiveness, narcissism and envy, and narcissism and jealousy. Fifteen of these correlations differed by the WEIRDness of the nations, but those effects are our OSF site. Overall, there were more cases of no moderation than moderation ($\chi^2 = 5.24$, *p* < .03).

3. Discussion

In this exploratory study, we attempted to understand the potential multidimensional nature of a simple self-report measure of intrasexual competition (Buunk & Fisher, 2009) relying on multinational data to provide new details about intrasexual competition along with sex

differences, age effects, and life history correlates. The factor analyses revealed three potential emotional systems. First, intrasexual jealousy may be related to guarding what one has earned to maintain one's attained status. Second, intrasexual envy may be related to admiring what others have attained. And third, intrasexual competitiveness may motivate people to be better than others. These three "emotional" systems may be part of the underlying architecture of various intrasexual phenomena like gossip (Reynolds, 2021).

Assuming we can trust this factor solution, our subsequent nomological network tests may be informative about the nature of each. First, in terms of sex differences, our contention that such effects may have been obscured in the past given that sex differences depended on the kind of intrasexual competition examined. Women were more intrasexually envious whereas men were more intrasexually competitive. Women may be more envious because the kinds of things women compete over—mate value markers—are relatively fixed like physical appearance or because they have traditionally had less access to resources than men. In contrast, men—like nonhuman primate males (Puts, 2010)—may be more competitive with other men because attaining power/status has greater fitness consequences than in women. Albeit tentative, these sex differences were contingent upon how WEIRD

Table 3
Correlations between three emotions of intrasexual competition with age, life history strategy, and the Dark Triad traits.

	Envy				Jealousy				Competitiveness			
	Overall	Men	Women	<i>z</i>	Overall	Men	Women	<i>z</i>	Overall	Men	Women	<i>z</i>
Age	-0.16**	-0.09**	-0.20**	3.31**	0.06**	0.10**	0.03	2.07*	-0.08**	-0.09**	-0.11**	0.59
Parenting effort	-0.09**	-0.09**	-0.11**	0.59	-0.15**	-0.16**	-0.14**	0.30	-0.06**	<0.01	-0.08**	2.34*
Mating effort	0.23**	0.28**	0.25**	0.95	0.17**	0.19**	0.16**	0.91	0.31**	0.28**	0.29**	-0.32
Machiavellianism	0.36**	0.35**	0.39**	-1.36	0.23**	0.24**	0.23**	0.31	0.40**	0.38**	0.39**	-0.35
Psychopathy	0.18**	0.22**	0.20**	0.62	0.23**	0.25**	0.22**	0.93	0.25**	0.18**	0.26**	-2.47**
Narcissism	0.42**	0.40**	0.45**	-1.79*	0.22**	0.17**	0.24**	-2.15*	0.57**	0.55**	0.57**	-0.86

Note. *z* is Fisher's *z* (<http://quantpsy.org/corrttest/corrttest.htm>) to compare independent correlations.

* *p* < .05.

** *p* < .01.

the country sampled was, suggesting that sex differences were more pronounced in WEIRD nations, with a sex difference emerging for jealousy as well. While we have no data to understand these tentative effects, it may be that the wealth or individualism of the “West” increases competitiveness because there is “more to fight for”.

Last, we tested the nomological network surrounding each factor. Younger people (who may lack resources) reported more intrasexual envy and competitiveness (especially women), but older people (more likely to have resources) were more intrasexually jealous (especially men). As people age and, therefore, acquire more resources and security, they may shift their intrasexual emotions from covetous to protective. Alternatively, those with a faster approach to life were generally more intrasexually competitive.

Despite the strengths in this project, it was (1) based on college-student data at imbalanced rates across countries, (2) brief scales for a limited range of traits, and (3) our study was exploratory in nature. Despite these issues, we feel our results present a clear picture that intrasexual competition comes down to jealousy, envy, and competitiveness. This solution reveals new and reasonable relationships with sex, age, and life history strategies.

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CRediT authorship contribution statement

PKJ guided analyses, assisted in data collection, and wrote the paper. SKS was responsible for the analyses and wrote parts of the Method and

Results. The remaining authors—in alphabetical order—collected data, translated scales as needed, and reviewed the manuscript.

Data availability

An OSF site has been created and is linked within the manuscript.

References

- Albert, G., Richardson, G. B., Arnocky, S., Bird, B., Fisher, M., Hlay, J. K., McHale, T. S., & Hodges-Simeon, C. (2022). A psychometric evaluation of the Intrasexual Competition Scale. *Archives of Sexual Behavior*, *51*, 2741–2758.
- Brislin, R. W. (1970). Back-translation for cross-cultural research. *Journal of Cross-Cultural Psychology*, *1*, 185–216.
- Buunk, A. P. (2022). Cultural dimensions associated with intrasexual competitiveness. *Evolutionary Behavioral Sciences*, *16*, 181–186.
- Buunk, A. P., & Fisher, M. L. (2009). Individual differences in intrasexual competition. *Journal of Evolutionary Psychology*, *7*, 37–48.
- Jolliffe, I. T., & Morgan, B. J. (1992). Principal component analysis and exploratory factor analysis. *Statistical Methods in Medical Research*, *1*, 69–95.
- Jonason, P. K., & Luoto, S. (2021). The dark side of the rainbow: Homosexuals and bisexuals have higher Dark Triad traits than heterosexuals. *Personality and Individual Differences*, *181*, 111040.
- Jonason, P. K., & Webster, G. D. (2010). The dirty dozen: A concise measure of the dark triad. *Psychological Assessment*, *22*, 420–432.
- Kruger, D. J. (2017). Brief self-report scales assessing life history dimensions of mating and parenting effort. *Evolutionary Psychology*, *15*, 1–10.
- Puts, D. A. (2010). Beauty and the beast: Mechanisms of sexual selection in humans. *Evolution and Human Behavior*, *31*, 157–175.
- Reynolds, T. A. (2021). Our grandmothers' legacy: Challenges faced by female ancestors leave traces in modern women's same-sex relationships. *Archives of Sexual Behavior*, *51*, 3225–3256.
- Rogoza, R., Żemojtel-Piotrowska, M., Jonason, P. K., et al. (2021). Structure of Dark Triad Dirty Dozen across eight world regions. *Assessment*, *28*, 1125–1135.
- Semenyna, S. W., Vasey, P. L., & Honey, P. L. (2019). Replicating the relationships between Dark Triad traits and female mate-competition tactics in undergraduate women. *Personality and Individual Differences*, *147*, 73–78.